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Index

STRESS MANAGEMENT AMONG EMPLOYEES: WITH REFERENCE TO CHIT FUND FINANCE COMPANIES

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Stress has risen to become a major source of concern in today's society since it has been shown to negatively impact employee health and productivity. Sickness, turnover, and absenteeism caused by work-related stress cost organizations billions of dollars every year. In order to increase employee participation and productivity, it is vital for any firm to understand the factors that contribute to stress among its employees, as well as how they manage it. In this research study, the participants were asked to identify the factors that cause stress in their workplaces, as well as the methods they use to manage their stress. In this study, a descriptive research design was employed. It was decided to use the questionnaire method for gathering primary data. The Convenience Sampling Technique was utilized in the study, and a total of 120 participants were included. This study used different tools to analyze the data, including the percentage analysis, Chi-Square test, and ANOVAs, as well as Factor Analysis (see below). The most significant finding is that employees must place a high value on time management skills in order to finish their work within the time constraints.

Keywords: Stress, Coping Strategies,Employee Health,Performance

IMPLEMENTATION AND ANALYZING SEVERAL FEATURE DETECTION & EXTRACTION TECHNIQUES WITH DIFFERENT SIMILARITY MEASURES ON WANG IMAGES USING BAG OF FEATURES

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Images have become most vital source of communication. While conveying information all mediums diverged to multimedia images as it is easy to visualize and entertaining also, especially in the social media world it becomes the need of hour. Therefore it becomes essential to sharpen the digital image processing tools and techniques. One of most frequent operations that perform on ever increasing bulky social multimedia databases is Image Retrieval and classification. Image retrieval is to fetch the most relevant images and its research has gone through various ups and down in the past and now immerged as one of the most prominent field in computer vision and image processing. The foundation of Content Based Image Retrieval (CBIR) relies on the content also known as Features filtration. Therefore, CBIR aim is to select and extract right features and use them for effective retrieval scheme. Bag of features (BOF) is such an automatic feature detection and extraction technique that is addressed in this paper. The images are subjected to a feature detection strategy followed by extraction of strongest features in mass and quantized and a codebook is generated in form of visual words histograms that is thus responsible for retrieval of most similar images to the desired query image. This paper discusses various BOF creations and implementation techniques using different feature detection and extraction methods like SURF, FAST, BRISK, MSER, ORB for local and global features. MATLAB 2021a is used for BOF implementation. For comparison and analysis FAST feature extraction & detection method results are presented. Along with this, the result of features with different similarity measures is also compared. The dataset used for this is 1000 natural images WANG data with ten different categories of jpeg images. The results are quite promising as compared to different algorithms.

Keywords: BOVW, SURF, MSER, FAST, SVM, Similarity Measures.

ONLINE SHOPPING BEHAVIOUR OF FEMALES- A REVIEW OF LITERATURE

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Online shopping is an under researched area when it comes to females. Although plenty of literature points that consumers have adopted online shopping as a part of their shopping activity but not many studies explored the online buying behaviour of females in particular as females are known to be associated with shopping and their love for shopping is a known notion. This impelled the author to review existing literature and different researchers' views are collated and presented. The objective of this paper is to extract major aspects and factors of online buying behaviour of females by conducting a literature review. Trust in online shopping websites, absence of social contact or social affiliation, perceived risks associated are major factors hindering women to buy online. Whereas, online offers and discounts, convenience are major factors driving them to buy online. According to the present literature, females majorly indulge in buying low cost products online and mostly purchase products like apparels and accessories, health and beauty products, household products, baby care items and toys. This research has also discussed scope for further research in this area.

Keywords: Online shopping, Perceived risk, Online shopping behaviour of females, E-commerce

COMPARATIVE ANALYSIS OF MARKETING MIX STRATEGIES OF INDIAN MULTINATIONALS IN FMCG BUSINESS WITH SPECIAL REFERENCE TO DABUR INDIA LTD. AND PATANJALI AYURVEDA LTD.

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India is one of the fastest growing economies at present. There are a number of industries serving here which plays a vital role to develop our economy in proper manner. The FMCG sector is the Fourth largest sector in India which is expected to grow at a CAGR of 14.9% to reach US$ 220 billion by 2025, from US$ 110 billion in 2020. Indian fast moving consumer goods industry has emerged as one of the most dynamic and fast-paced industries due to increasing demand of novel and standardised products. This thing gave a chance to entry of global retail businesses with the intention of covering more market share by moving their businesses from globalization to glocalization means think global act local. Also the allowance of 100% in Single brand and 51% in multi brand FDI has given a remarkable pace to the development of such sector. In this series Indian companies are not very far away. Some of them have established their businesses world-wide far ago and some of them are doing currently by using wonderful strategic and marketing mix strategies. Even during Covid-19 pandemic and complete lockdown situation FMCG sector's growth witnessed a reflection of positivity recorded in the overall macroeconomic scenario amid opening of the economy and easing of lockdown restrictions. Dabur India limited and Patanjali Ayurveda limited are two well-known Indian multinationals, doing their business worldwide. The current paper examines the marketing mix strategies adopted by selected companies and their impact on the sales and overall profitability of companies. For this purpose various articles and reports have been accessed and two welldesigned questionnaires were prepared to collect the primary data from the consumers and Retailers/wholesalers/Distributors for a better understanding of their view point about strategies adopted by selected companies. Their responses were further put under certain statistical tools like Rank correlation, Frequency Distribution, Calculation of Means, Graphical Presentation and Multiple Linear Regression etc.

Keywords: Glocalization, Economy, FMCG, Consumer, Marketing-Mix and Growth.

A STUDY ON THE IMPORTANCE OF TELEVISION ON OVER THE COUNTER DRUGS ADVERTISEMENT

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In today's time television has become a major part of people's life. It is a great fact that various media are spreading awareness in the society. In today's era television advertisements play a major role in human behavior to buy ideas and thoughts? Advertisement is shown on television, it has the power to transmit visual and audio communication simultaneously, thereby influencing its audience. Television makes advertising an important way to make people aware of any product. Current research has been conducted on the study of television commercials in OTC drug purchase practices. For this purpose, a questionnaire has been prepared by me. Consumer responses to questionnaires are followed in tables that include a correlation matrix using percentage analysis, a flexible test. From the results of the study we found that adults strongly believe that OTC drug television commercials have a significant and significant impact on their purchasing behavior. The final findings, limitations, conclusions and specific recommendations are documented in this paper.

Keywords: Data analysis, Television Advertisement, OTC drug, Visual.

INFLUENCE OF SUSTAINABLE MARKETING ON CONSUMER BEHAVIOR : A REALISTIC STUDY ON INDIA

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Sustainable marketing is an important issue today due to need for conservation of the environment for subsequent generations, as well as for the needs of the aid and the integration of the Community. Researchers are always interested in the net asset of the mark and consumer behaviour. This study tries to analyse the impact of sustainable marketing on consumer behaviour by measuring customer perceptions related to green products. The study also tries to identify factors that influence the customers' purchase decisions related to green products. The study includes the result of a consumer product and sustainable marketing survey using a questionnaire devised by the author based on several types of research carried out in the field. This study claims that even if there is much scope in the Indian market for environmentally responsible products to be utilised more within consumer groups with pro-environmental preferences, green product marketing communication does not reveal enough for consumers. The study urges the greater use of marketing and brands to promote and sell environmentally favourable products and function effectively.

Keywords: Consumer behavior, Sustainable marketing, Green products

SUGAR ANALYSIS IN DIFFERENT PARTS OF CHIRONJI PLANT AND IN VITRO STRATEGY FOR SEED GERMINATION

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Buchanania lanzan Spreng. (Chironji) is an important non-woody deciduous tree of family Anacardiaceae. Due to highly nutritious value of its kernel and medicinal properties of different parts, the tree serves as an important source of economy of tribal communities thriving in Indian forests. The seeds are the major source of regeneration in B. lanzan but the key problem is the low germination frequency due to the presence of hard seed coat and fungal contamination during germination. Mass collection from natural habitat and destructive harvesting techniques urge the need for alternative seed germination strategies for quality planting material. To counterfeit this problem, in the present investigation, Total soluble sugars (TSS) were estimated from different parts of B. lanzan seedling viz. cotyledons, stem, leaf, root and dried kernel. The results revealed the presence of maximum soluble sugar in root part followed by cotyledons while minimum sugar concentration was found to be present in dried kernels. Besides, in vitro seed germination strategy was adopted for ex-situ conservation of this economically important tree species taking into account that higher concentration of sugars in root and cotyledonary parts reduces germination rate owing to fungal attack, possibly.

Keywords: Buchanania, Fungus, Germination, In vitro, Kernel

PROCESS INTENSIFIED REACTORS

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This review paper demonstrates the current state of idea to replace the conventional reactors in the field of unit operations. The studies spotted some of the unique reactors such as Spinning Disc Reactor, Oscillatory Baffled Reactor, Field Enhanced Reactor and Membrane Reactor. Oscillatory Baffled Reactor identified as a replacement for the plug flow reactor for continuous long reactions, as mixing occurs irrespective of flow rate. Spinning Disc Reactors is used for the manufacture of particle via precipitation polymerization reaction, hydrodynamic behavior of the liquid flow film and residence time distributions. Membrane reactors possesses the ability to replace conventional energy intensive technique by reducing equipment size / productivity ratio, energy consumption, waste production reduction and improve the performance of the reactors. Field Enhanced Reactors mainly deals with the principle and working of different types of reactors such as Sono-chemical reactors, Microwave Enhanced Reactors, Plasma Reactors and Induction Heated Reactors and how advantageous is Field Enhanced Reactors than that of conventional reactors. This paper highlights each reactors working, principle, features, pros and cons as well as corresponding process intensification and future aspects.

Keywords: Process Intensification, Spinning Disc Reactor, Oscillatory Baffled Reactor, Field Enhanced Reactor,Membrane Reactor

IN VITRO BANANA BUNCHY TOP VIRUS TRANSMISSION IN BANANA SHOOT CULTURES

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Banana bunchy-top virus (BBTV), the most destructive etiological agent limiting banana cultivation areas worldwide is naturally transmitted by an aphid vector Pentalonia nigronervosa. In order to investigate the virus's potential for artificial transmission, in vitro mechanical sap transmission experimental trials were conducted for BBTV transmission into healthy Musa acuminata cultures. The infectivity efficacy of inoculum prepared in phosphate buffer (with or without ascorbic acid/sodium sulphite as additive). The mechanically inoculated infected regenerants showed symptoms such as stunted growth and reduced leaf size. Furthermore, BBTV infection was detected using PCR-based virus-indexing detection methods to test mechanical sap transmission (MST), which confirmed the induction of viral infection. The current research on successful MST has demonstrated the potential transfer of virion particles, and the infectivity rate that increased with increasing time duration. Hence, the current study develops a novel, efficient in vitro MST protocol for infecting Musa cultures with BBTV-infected samples, which will be useful in disease modelling studies.

Keywords: Banana, BBTV, PCR, Virus indexing, Virus inoculums

IN-SILICO SCREENING OF SOME INDIGENOUS MEDICINAL PLANTS OF CHHATTISGARH FOR THEIR PHARMACOLOGICAL POTENTIAL.

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The application of bioinformatics in the field of pharmaceutical research has constantly increased. The pharmacy industry is now employing in silico based virtual screening and network analysis of medicinal plants to elucidate their pharmacological properties and discover novel biologically active compounds from medicinal plants. Bioinformatics tools can assess the molecular properties and the cellular interaction between active compounds and targeted cells. Bioinformatic tools have proved to be the most effective method for finding the efficacy of novel bioactive agents and are also cost-effective. The present study focused on the druggability prediction, pharmacophore searching, and target annotation of some indigenous medicinal plants of Chhattisgarh State.

Keywords: In silico, Virtual screening, Network analysis, Drug ability prediction, Target annotation, Indigenous medicinal plants, Chhattisgarh

ISOLATION OF SOME FUNGI FROM THE PADDY FIELDS OF BIRKONA VILLAGE OF BILASPUR (CHHATTISGARH)

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Soil is inhabited by a number of micro-organisms that mainly include bacteria and fungi. A number of biogeochemical processes are performed by such microorganisms in soil. All these result into decomposition of organic residues as a consequence of which many inorganic minerals and organic substances are freed in the soil matrix. Among such microbes, Fungi occupy an important position not only for their role in decomposition process rather than many other functions like symbiotic association with plant roots, Protection of plants from pathogen, increased absorption capacity of plants, secretion of some bioactive compounds like plant hormones etc. are also performed by many soil fungi. Present piece of work has been started as a part of doctoral research work. During the investigation, soil samples were collected from paddy fields of Birkona village. These were carried to laboratory. Soil suspension was prepared by dissolving 25 grams of soil in 100ml of pre sterilized tap water. The filtered suspension was diluted three times by using sterilized normal saline. 0.1ml of 3rd dilution was plated on petriplates poured with PDA. Plates were incubated at 30°C for 72-96 hours. After 96 hours of growth, a number of fungal colonies appeared on plates. On the basis of colony colour, morphology and structure of their asexual reproductive parts specially conidia and conidiophores, the fungi were identified as Aspergillus niger, A. fumigates, A. flavus, A. nidulans, A. terreus, Penicillium chrysogenum, P. frequentans, P.granulatum and Mucor sps.The above finding constitute preliminary part of our proposed research work. Isolation of fungi from other crop fields, their detailed identification and biochemical characterization are still in progress.

Keywords: Soil fungi, Decomposition, Incubation

FUNCTIONAL ASSOCIATION OF MELATONIN RECEPTOR (MT1, MT2) AND CIRCADIAN CLOCK (BMAL1, PER1, CRY1) WITH POLYCYSTIC OVARIAN SYNDROME LINKED PROTEIN: A IN SILICO STUDY

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Proteins and their functional interactions form the backbone of the cellular machinery. The identification and characterization of protein-protein interactions in several organisms is important to understand their physiology and to demonstrate their effectiveness. In this study we aimed to illustrate the interaction of PCOS associated proteins (LH, FSH and androgen receptor) with clock genes (PER1, CRY1and BMAL1) and melatonin receptor (MT1, MT2) to know the protein-protein enrichment value. The objective is to determine the role of clock genes in female reproductive cycle and therapeutic potential of melatonin receptor in PCOS pathogenesis. Our study highlights the advantages and importance of applying bioinformatics tools to merge in silico tactics without experimental in vitro findings for rapid advancement of our knowledge about protein-protein interactions. STRING database is used to construct network between proteins. This tool requires proteins sequence as FASTA format which is the database of NCBI and protein BLAST. Based on network analysis, the average local clustering coefficient is 0.674. The clock proteins (PER1, CRY1 and BMAL1) show strong interaction with each other whereas its functional association with melatonin receptor is indirect and connected via CRY1 proteins. The interaction between clock protein and PCOS associated proteins is weak as androgen receptor is the connecting link between them. Our findings also indicate that bioinformatics tools such as the STRING protein network database can help to predict potential interactions between proteins and thus serve as a guide for future steps in our exploration of the Human proteomics. The result shows the co-expression and co-occurrence of proteins by giving average local clustering coefficient value. The interpretation suggests the functional association between proteins and this will be useful for better understanding of protein- protein interaction.

Keywords: Melatonin receptor, Clock gene, PCOS, STRING

ADVANCES IN BIOTECHNOLOGY OF PHYLLANTHUS EMBLICA L. (GAERTN.): A SUPERFOOD FRUIT BEARING TREE WITH POTENTIAL ETHNOMEDICINAL VALUES

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Phyllanthus emblica L. (Gaertn.), commonly known as 'Amla' or 'Aonla' or 'Indian gooseberry', belonging to the family Phyllanthaceae (formerly Euphorbiaceae) is a popular fruit bearing tree having potential ethnomedicinal values. The utility of entire plant parts i.e., leaf, flower, fruit and seed are mentioned in Ayurvedic and Unani medicinal formulations to cure a number of ailments, including common cold and fever, as antipyretic, anti-inflammatory, diuretic, liver-tonic, peptic ulcer, and digestive problems etc. Fruit contains a significant amount of Vitamin C, alkaloids, Amino acids, carbohydrate, flavonoids, organic acids, tannin (Emblicanin-A, Emblicanin-B and Gallic acid), polyphenol, etc. However, due to the presence of high moisture content, low pH, sugar and high vitamin C contents, the fruits become very much susceptible to a number of fungal pathogens mostly by Phoma exigna, Ravenelia emblicae, Aspergillus niger, Penicillium funiculosum etc. leading qualitative and quantitative loss on agricultural commodities. So, conservation of this valuable medicinal plant is an urgent task. Recently, several attempts has been made to propagate the plant agro-biotechnologically viz. genetic engineering, molecular markers and tissue culture. The article aims to review fungal diversity on its fruits, strategy for protection of fruits from fungal infection, recent biotechnological advancement in plant propagations etc. The summarized information might be helpful for future researchers who are interested in developing yet to possible biotechnological applications to conserve this valuable medicinal plant.

Keywords: Phyllanthus emblica L. (Gaertn.), Ethnomedicine, Fungal infection, Biotechnology, Plant propagation, Conservation.

RAINBOW CONNECTED AND STRONGLY RAINBOW CONNECTED NUMBERS OF THE INVERSE GRAPHS

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The Rainbow connected number and strongly rainbow connected numbers are the two significant parameters in the study of the graph theory. The Aim of this paper is to find the rainbow connected number and strongly rainbow connected numbers of the inverse graphs corresponding to the modular groups under different operations are evaluated and discussed their properties under different scenarios. The Objective of this Study is to apply these concepts and results in Networks and Coding. The Scope of our Research is in Communication Networks and Coding Theory. Studying the algebraic structures of groups based on graphs with Number Theory properties has created the interests of many researchers in recent Research areas for a few decades. Recently, graphs associated with groups has become more interesting and active area of Research. This work incline more light on the algebraic structures of groups via graphs and explore for more researches in this approach. Many of the properties of graph and group theories are analogous for more than a century. Many investigations and surprising results from group theory to Graph Theory have been proved easily via Number Theory properties. [8]. This creates the motivation for this Research. Let GS ( ) be a nontrivial connected Inverse graph on which is defined a coloring C : E(GS (Zn)) → {1, 2, · · · , k}, k ∈ N of the edges of GS (Zn), where adjacent edges may be colored the same. A path in GS ( ) is called a rainbow path if no two edges of it are colored the same. GS ( ) is rainbow connected if GS ( ) contains a rainbow u − v path for every two vertices u and v in it. If for every pair u, v of distinct vertices GS ( ) contains a rainbow u – v geodesic then GS ( ) is strongly rainbow-connected [3]. It was investigated that the Inverse graph GS ( ) corresponding to the cyclic group (Zn, +) is Rainbow connected and hence is Strongly Rainbow connected such that (GS ( )) = (GS ( )) = 2. Also found that for (GS (Zn),×), the inverse graph $\forall n$ (n is prime)then rc(GS (Zn),×) = 2 = src(GS (Zn),×) The main conclusion of the Study is to investigate the minimum number of colors to be used in the Rainbow connected paths of the Inverse Graph by employing the techniques and concepts of Number Theory

Keywords: Cyclic group, Geodesic, Inverse graph, Rainbow connected number, Self-invertible elements, Strongly rainbow connected number and Tree.

ISOLATION OF FUNGAL STRAIN (ASPERGILLUS SPS.) HAVING HIGHER EFFICACY OF PHOSPHATE SOLUBILIZATION FROM PADDY CROP FIELD OF KOTA (DISTRICT-BILASPUR) OF CHHATTISGARH.

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Fungi are ubiquitous group of microbes as they are found everywhere in our environment. They are not static, so they play a dynamic role in soil chemistry. Fungal flora are important component of biodiversity and essential for the survival of the other organism on earth as they are decomposers of organic residue present in soil. Fungi are fundamental for soil eco-system functioning specially in agricultural soil as they play important role in many essential processes such as organic matter decomposition and elemental release by mineralization. This paper illustrates to isolate, screen, identify and catalogue the agriculturally useful germplasm of Fungi from paddy field of the area (near Kota dam) of Bilaspur district (Chhattisgarh).As far as the relative distribution of fungal species is concerned Aspergillus sps. were found to have highest value of density in terms of their colony forming unit.

Keywords: Fungi, Prevalence, Colony Forming Unit

DESIGN OF VIBRATION BASED PIEZOELECTRIC ENERGY HARVESTING SYSTEM FOR BATTERY APPLICATION.

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The goal of this paper is to focus on piezoelectric energy harvesting, electronic equipment has been integrated into human beings as a part of their body. Some electronic equipment is connected by wires, while some are self-powered by batteries. Today the ultra-low-power smart electronic gadgets and smart wireless sensor devices need an unlimited battery for enhancing the performance. In a remote area such as forests and hilly areas, conventional charging methods of batteries by wire is not possible. Supplying power through wires is difficult. To overcome this, a sustainable solution is energy harvesting. The renewable sources for energy harvesting are light, heat, wind, tidal and with this vibration also plays a great role in harvesting systems. Researchers have more interest in harvesting energy through mechanical vibration due to its sufficient availability. This paper is about piezoelectric crystals and their role in energy harvesting, simulation software used, energy harvesting circuits and battery application.

Keywords: Energy scavenging, Piezoelectric materials, Simulation circuit, Scavenging circuit

PARTIAL CHARACTERIZATION 0F UNKNOWN PROTEIN OF TEREDINIBACTOR TURNAREAE

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Bioinformatics provides important tool to identify the function of unknown proteins. in this study we have chosen a hypothetical protein WP_019605431 1.1 from Teredinibactor Turnareae without any known function And protein family classification. A blast P search against the non redundant database returns showed Many homolog of WP_019605431 1.1. The query sequence showed similarity with adenylate guanylate cyclist protein of many organism which suggest that the protein might be of adenylate cyclase protein. for further confirmation Inter Pro scan was done to analyse the domains of the query sequence and it was found that the protein is of adenylate cyclase family. with the help of mega5 The evolutionary relation among proteins of adenylate cyclase family was established. Further the prediction of structure of the query sequence was done by using prosite.

Keywords: Teredinibactor Turnareae, Adenylate cyclase, Partial characterization

PHYTOCHEMICAL INVESTIGATION OF MORINGA OLEIFERA

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 "Moringa Oleifera" is a fast-growing drought resistant tree belonging to Moringaceae family native to tropical and subtropical region of South Asia. Its common name includes moringa, drumstick tree, ben oil tree. Phytochemical investigation shows that its leaves used as a traditional herbal medicine. Mature seed yield 38-40% edible oil and it is also used as a traditional medicine.

Keywords: Moringa Oleifera, Moringaceae, Edible oil

INFESTATION BEHAVIOR OF TERMITES ON TERMINALIA ARJUNA AND THEIR MANAGEMENT IN THE FIELD

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The termites (Isoptera), commonly called as White-Ants, are most destructive polyphagous pest in agriculture, forest and urban ecosystem. They feed on living & dead plants, decomposing, humus and organic materials in the soil. Termites construct galleries on roots, trunk, and stem of the living plants with a sheet of mud and gnaw away the bark and wood underneath their galleries. By these activities, trees become weak and seriously affect their vigor. A similar effect is also being noticed on host plants of the tasar silkworm, Antheraea mylitta D. (Lepidoptera: Saturniidae) and reduce their survivability in systematic plantations in the tropical India. The present study was intended for quantification of infestation level by the termites on Terminalia arjuna W. & A. in Bilaspur and Kota regions of Chhattisgarh and their management by insecticides. Study revealed that the termite mounds were distributed randomly in both the fields. On an average of 4.50 % and 6.76 % of plants were infested with termites at Kota and Bilaspur, respectively. Observations indicated that the termite infestation was substantially high at the base of the plants compare to middle and top of the plants. Plant mortality due to termite attack was also high on young plants compare to matured plants. Significantly less number of plants were found infested by the termite within 6.0 m periphery from the termite mound comparing to outside of the periphery. Further, the termites found feeding on an average of 616.06 cm2 area in mature plants with an average daily feeding area of 1.43 cm2. The depth of infestation was 2.5 cm in mature plants. Among the insecticides, tested against the termites, chlorpyrifos 20 % EC (2 ml/l) and imidacloprid 17.8 % SL (0.6 ml/l) were found most effective in avoiding infestation on stems.

Keywords: Antheraea mylitta, Polyphagous pest, Terminalia arjuna, Termite and Insecticides

AN REVIEW: THERMOLUMINESCENCE RADIATION DOSIMETRIC PROPERTIES OF RARE EARTH ACTIVATED SULFATE BASED PHOSPHORS

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Thermo luminescence dosimeters have great importance in present scenario. Today's world is full of radiation. It may be harmful as well as beneficial for human beings and vegetation, and it is decided by dose of radiation which we absorb. Thermo luminescence dosimeter is used to measure the absorbed radiation. Thermo luminescence dosimetric properties are studied under the glow-curve, fading, reusability, dose rate effect, dose response, crystal structure, crystalline size, thermal stability etc. Various TLD materials have been widely explored such as sulfides, sulfates, titanates, phosphates, aluminates with rare-earth activation. Sulfate based TLD materials are highly sensitive than others. It has many properties such as good resistance to environmental condition; low fading and a linear response over a wide range of doses of radiation. The search for new TL materials should aim for simplicity of glow curve, high range of TL response linearity and very low fading. Furthermore, the TL mechanism is also very important and must be considered before developing new efficient materials for different applications. In this article we focus on review of recent advancement in rare earth activated sulfate based TLD materials

Keywords: Thermo luminescence Dosimeter, TL mechanism, TL response glow curve, Fading

POTENTIAL OF CARBON SEQUESTRATION OF PROTECTED FOREST AREA AND PLANTATION SITE OF BILASPUR FOREST DIVISION

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Forest Ecosystem is the largest terrestrial carbon sink on the earth so its management should be cost effective strategy for mitigating the GHG. Annually sequestration estimated 2.4Gt of carbon from the atmosphere. Natural forest stores more carbon than plantation forest, because of complex structure and accumulation of carbon belowground and in the forest floor. But the loss of natural forest continues relentlessly so we need reforestation and plantation to achieve the goal of GHG mitigation. The policy makers in plantation management techniques weigh optimization of timber harvest vs. carbon sequestration. In our present study we selected a nearby protected forest area and calculated the carbon sequestrated in this forest by dimensional measurement (DBH, Height etc.) of the tree with using algometric equations. In the same manner Koni plantation carbon sequestration potential has been done. The result showed that the protected forest area has sequestrated significantly higher than the Koni plantation

Keywords: GHG, DBH, Sequestration, Plantation

FALLACIES IN MEASUREMENT OF PHYSICAL QUANTITIES

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We always measure a physical quantity by comparing it with its standard value and use it with unit. But in some physical quantities, which we call dimensionless, we do not follow it. Dimensionless quantities are said to have only numerical values with no units and with no dimensions (i.e. M 0 L 0 T 0). "Plane angle" and "solid angle" are exceptions in this case because we have named their SI units as "radian" and "steradian" respectively. But yet there dimensions are written as M 0 L 0 T 0. When we say that some material has relative density X it means its density is X times of density of water. Similarly when we say that a rod has length of X meter it means its length is X times of standard meter. It is very strange that in measurement of both physical quantities we compare with their standard value but in one we use units while in others we do not. In this paper we are trying to point out that there is no such thing as dimensionless quantities and some fundamental improvements are needed.

Keywords: Dimensionless, Physical quantities, Relative densities

SOME FIXED POINT RESULTS FOR CONTRACTION MAPPINGS IN A FUZZY B-METRIC SPACES

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In this paper we indroduce the concept of contraction mapping in a "fuzzy b-Metric spaces.and obtain fixed point results for contraction mapping in a fuzzy b- Metric spaces. Our obtained results generalize and extended the existing ones in fuzzy metric spaces and fuzzy b-Metric spaces.

Keywords: Fixed point, Contraction Mapping,Fuzzy b-Metric spaces

PROSPECTING FUNGAL BIODIVERSITY ON DECAYING LOGS AND STUMPS OF ACHANAKMAR REGION OF BILASPUR DISTRICT

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In India, forests are largely managed and it was estimated that the volume of dead wood is reduced tremendously as compared to natural forests. Such a reduction in available habitats has a negative effect on the diversity of species depending on dead wood. It has been suggested that the presence of large dead logs and the continuous supply of new dead wood is important to protect fungal biodiversity in managed forests. Achanakmar area is a tiger reserve area of Chhattisgarh, where there is a variety of fungus especially on the logs and stumps of tree where there is a rich biodiversity of macro and micro fungi. All factors influencing the distribution of fungus should be analyzed through the survey level. A survey was prepared by dividing the entire Achanakmar forest into sub-divisions from which various sources including wood and stumps were collected. The isolates have been analyzed morphologically and biochemically for their identification for further studies.

Keywords: Biodiversity,Habitat, Stumps, Micro fungi, Achanakmar region.

SUPPORT VECTOR MACHINE USING RBF, POLYNOMIAL, LINEAR AND SIGMOID AS KERNEL TO DETECT DIABETES CASES AND TO MAKE A COMPARATIVE ANALYSIS OF THE MODELS

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Abstract: This paper is a continuation of the work done by the author in the field of Artificial Intelligence in the past. In this paper we can see a brief idea about Diabetes. The types of diabetes. The remedies that can be taken for diabetes. The paper majorly focuses on the implementation done in python for finding out whether a person is suffering from diabetes or not. We got satisfactory results. The paper speaks of the tools and the packages available to make a detection of Diabetes. In the results we are available with the parameters of Precision, Recall and F1 score. We made a comparative analysis of the four types of kernels i.e. rbf, linear, polynomial and sigmoid.

Keywords: Diabetes, SVM, rbf, polynomial, linear, sigmoid

SYNTHESIS AND CHARACTERIZATION OF PHOSPHATE BASED NANOMATERIALS: A REVIEW

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Phosphorus plays an important role in energy metabolism, acid-base balance, and genetic substances transfer. As the nanotechnology advances, lots of phosphorus-based materials have been developed, which can be widely used in the different fields of science and technology such as in biomedicals drug nanocarriers, tumor theranostics, biosensors, and bone formation. The size and structure of phosphorus-based nanomaterials provides unique physicochemical, optical, and biological properties, and greatly increasing the variety of nanomedicine. This review summarizes recent progress of phosphorus-based nanomaterials and discusses their synthesis methods, various properties, and corresponding biomedical applications.

Keywords: Nanomaterials, Physicochemical properties, Biomedical applications, Biosensors

KNOWLEDGE ATTITUDE OF TRADITIONAL MEDICINE AMONG THE RURAL COMMUNITIES OF BILASPUR DISTRICT (C.G.) INDIA

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Herbs are still an important part of traditional healing systems. Drugs of herbal origin are being used for many degenerative diseases. Herbal preparations are natural, intrinsically harmless and produce desired pharmacological effects. There are many tribal communities live in Chhattisgarh state having great deal of knowledge about the utility of the uses of medicinal plants. The Literature reveals that about 6,000 Traditional Healers are still practicing the knowledge of herbal medicines in the state. They adopt traditional diagnostic methods and prescribe drugs in treatment of internal as well as external common as well as complicated diseases. This paper reports about the use of Fifty Two plant species for the treatment of various ailments by the rural people of Bilaspur District. The study emphasizes the need for ethno-medicinal exploration in order to revive the traditional knowledge for the healthcare systems. Present investigation revealed that the villagers, tribal's are also used traditionally these plant species against various diseases, Dysentry, Conjutivities, Cuts, Cancer, Chikcken-Pox, Contraceptive, Dental Problem, Dog- bite ,Swelling, and other diseases. Generally barks, roots, leaves, seeds and some time whole plants are used for the treatment of diseases.

Keywords: Traditional Knowledge,Ethnomedicine,Chhattisgarh

EFFECTS OF NON STEROIDAL DRUGS

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Potential adverse effects and drug interactions of non-steroidal anti-inflammatory drugs (NSAIDs) are of community interest now, which are among the most widely prescribed medicines, globally. They have a variety of clinical applications due to their anti-inflammatory, analgesic, antipyretic, or antithrombotic effect, but these drugs are not entirely innocuous, since they could increase the risk of gastrointestinal and cardiovascular complications.

Keywords: Non-Steroidal Drugs,Medication,Immunology

THE LINK OF THYROID DYSFUNCTION & CKD (CHRONIC KIDNEY DISEASE)

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Patients with chronic kidney disease (CKD) display a variety of endocrine disturbances. The kidneys play an important role in the metabolism, degradation and excretion of several hormones including that of thyroid gland. So impairment in the kidney function may lead to disturbed thyroid physiology. These findings include dry skin, sallow complexion, low temperature, cold intolerance, decreased basal metabolic rate, lethargy, fatigue, edema and hypo-reflexia. Hypothyroidism has been associated with increased serum creatinine and decreased glomerular filtration rate. The reverse effects have been reported in thyrotoxicosis.

Keywords: Chronic Renal Disease, Creatinine, Hyperthyroidism , hypothyroidism.

THROMBOCYTOPENIA-RESULT OF MEGALOLASTIC ANEMIA

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Pregnancy induces a number of physiologic changes that affect the hematologic indices, either directly or indirectly. Recognizing and treating hematologic disorders that occur during pregnancy is difficult owing to the paucity of evidence available to guide consultants. Anemia secondary to iron deficiency is the most frequent hematologic complication and is easily treated with oral iron formulations. Thrombocytopenia is also a common reason for consulting the hematologist and distinguishing gestational thrombocytopenia from immune thrombocytopenia , preeclampsia, thrombotic thrombocytopenic purpura is essential since the treatment differs widely. Occasionally the management of mother and infant involves the expeditious recognition of neonatal auto-immune thrombocytopenia ,a condition that is responsible for severe life-threatening bleeding of the newborn. Additionally, inherited and acquired bleeding disorders affect pregnant women disproportionately and often require careful monitoring of coagulation parameters in order to prevent bleeding in the puerperium. Thus any type of Anaemia, during pregnancy is still largely responsible for mortality during pregnancy and the diagnosis, treatment options and guidelines for prevention of it during pregnancy is utmost requirement. Most, but not all, megaloblastic anemia is produced by "ineffective erythropoiesis" in the bone marrow due to either folic acid or vitamin B12 deficiency. In folic acid deficiency the cause is inadequate dietary intake, whereas vitamin B12 deficiency is almost always conditioned by some specific type of malabsorption. Anemia with oval macrocytes, few reticulocytes, moderate leukopenia, and thrombocytopenia is typical of both. Aplastic anemia, refractory anemias with cellular marrow, preleukemia, aleukemia, and erythroleukemia may have somewhat similar blood findings but are usually recognizable from bone marrow biopsy. Decreased levels of folate or vitamin B12 are the most reliable criteria of megaloblastic anemia. With these available in advance, therapy with the appropriate vitamin can be begun at once. If serum levels are unavailable or available only in retrospect, initial treatment, especially of severe anemia, should be with both vitamins.

Keywords: Megaloblastic anaemia, Deficiency, Erythropoiesis

BSE STOCK INDEX RANKING USING COMBINED COMPROMISE SOLUTION (COCOSO) METHOD

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Criterion of stock index are conflicting in nature i.e. change in value of one criteria can affect the value of other criteria. Due to that selection of best stock index(SI) for the investment is difficult task. This research is used the application of Combined Compromise Solution (CoCoSo) method for ranking of stock index(SI). Raking of the stock index(SI) is done in the stocks of Bombay Stock Exchange (BSE). We have taken six stock indices for the experimental work with criterion High, Low, Open, P/E ratio, P/E ratio and dividend. At the end BSE SENSEX is identified as the best stock index(SI) with 1st rank.

Keywords: Combined Compromise Solution (CoCoSo). Bombay Stock Exchange (BSE), Stock index (SI).

GENDER EQUALITY, ALIENATION AND NATIONAL STRATEGY ON ARTIFICIAL INTELLIGENCE IN INDIA.

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Tasks which earlier believed to accomplish only by human intelligence involved decision, data management, complex calculation and pattern recognition are now capable to perform by Artificial intelligence (AI) or AI-enabled technologies and AI-led robotics with more accuracy, efficiency and time-saving at cheaper cost. Thus, concerning the recent development in AI or AI-enabled technologies, it has an impact on jobs in three ways including alienating workers; complementing the workers in performing their job tasks, and generating new kinds of jobs for advancing the AI/AI-enabled technologies. In addition to this, it is imperative to analyse the significant impact of these AI/AI-enabled technologies on gender equality, particularly in the marginalised group such as women to see how it affects their daily lives socially, politically and economically. Furthermore, it is also necessary to inquire about how women are alienated more as compared to men due to the activity of modern-day intelligence-based work automated increasingly by AI. It is required to investigate the different cultural and economic values assigned to promoting technical education among women in India. Thus, it raised the question about the sustainability of women in the working environment that demands new age technological skills. In India, The Ministry of Electronics and Information Technology constituted four committees intending to promote AI and develop National Policy Framework for AI. However, there is no national policy on AI released by the Indian government to date. Concerning the key challenges and issues about the development and deployment of AI in India, NITI Ayog announced the National Strategy on AI in February 2018.

Keywords: Artificial Intelligence, Value Change, Gender Equality, Alienation

SEASONAL VARIATIONS IN DIFFERENT PHYSICOCHEMICAL CHARACTERISTICS IN SHIVNATH RIVER AT MADKU DWEEP DISTRICT MUNGELI (C.G.)

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H2O is one of the most important natural resources in earth. The objective of present research paper to provide Information on the Physico-Chemical behaviour of Shivnath River at MadkuDweep dist. Mungeli (C.G.). During study seasonal variations of water sample directly Influence the abiotic and biotic factors of such particular area. Under study the Physico-chemical parameter are pH, Temperature , Conductivity, TDS, Turbidity , Chloride , Iron, Silica, BOD, COD, DO, Total hardness, Calcium hardness, Magnesium hardness, Alkalinity, Total Alkalinity.

Keywords: Water sample physico-chemical analysis, pH Ttemperature, TDS, turbidity, BOD, COD, DO, Conductivity, Mg, Ca, Ir, Chloride, Alkalinity, Total Alkalinity (water quality), Shivnath river.

CUSTOMER-ORIENTED STRATEGIC SELECTION OF BUSINESS MODELS FOR IOT ECOSYSTEMS

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Digitization requires companies to be far more customer-oriented than in the past. At the same time, especially products and services related to the Internet of Things (IoT) are usually operated and marketed via platforms and ecosystems. All of this requires new, strategically coordinated business models. On the basis of an empirical study, we show which business models are acceptable from a customer perspective and offer managers the opportunity to put these findings into practice. The increasing importance of platforms and ecosystems with the associated opportunities and risks are forcing companies to rethink and innovate their business models. In order to master the challenges of the digital economy, companies must find suitable strategies to take their own interests and those of their customers into account without jeopardizing the company's potential for added value or the trust of customers. Under the premise that taking customer needs and preferences into account in the company's business model selection can be a sustainably successful corporate strategy, this article offers practical advice that can be particularly valuable for small and medium-sized companies.

Keywords: Digitization, IoT, Business models, Digital economy, Corporate Strategy

INVOLVEMENT OF MANY PARTICIPANTS IN THE SOFTWARE-SUPPORTED IDEA GENERATION PROCESS

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This article presents the development and evaluation of an idea generation process that can be scaled across a large number of participants. The aim of this study is to efficiently involve a large number of people in this process. The central problem with increasing the number of participants is that large groups of people cannot easily be included in a conventional idea generation process because they cannot participate efficiently. It is investigated how ideas can be digitally collected, categorized, prioritized and presented at the same time and in the same spatial location. For this purpose, a process based on the 1-2-4-All method and a software solution with the concept of the Evolution method were designed, prototyped and evaluated.

Keywords: Software, Software Support, Idea generation, Process, Implementation

ARTIFICIAL INTELLIGENCE FOR IMAGE EVALUATION AND DIAGNOSIS

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Radiology is characterized by constant change and is defined by technological progress. Artificial intelligence (AI) will change all aspects of practical work in paediatric and adolescent radiology in the future. Image acquisition, diagnosis recognition and segmentation as well as the recognition of tissue properties and their combination with big data will be the main areas of application in radiology. Higher effectiveness, acceleration of examinations and findings as well as cost savings are expectations associated with the use of AI. Improved patient management, easier work for medical-technical radiology assistants and children and adolescent radiologists as well as faster examination and diagnosis times mark the milestones of AI development in radiology. From appointment communication and device control to therapy recommendation and monitoring, everyday life is changed by elements of AI. Paediatric and adolescent radiologists must therefore be fundamentally informed about AI and work together with data scientists in the establishment and application of AI elements.

Keywords: Machine learning, Computer assisted diagnosis, Convolutional neural network, Big data paediatric radiology.

A JENSEN-SHANNON FUZZY DIVERGENCE INFORMATION MEASURE AND ITS APPLICATION IN PATTERN RECOGNITION

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The require of appropriate divergence measures emerge as they play a vital part in segregation of two likelihood disseminations. The display communication is committed to the presentation of one such divergence measure utilizing Jensen inequality and Shannon entropy and its approval. Too, a new dissimilarity measure based on the proposed divergence measure is presented. Other than building up approval, a few of its major properties are moreover presented. Advance, a new multiple attribute decision making method based on proposed dissimilarity measure is presented and is altogether clarified with the assistance of an outlined case. The paper is summed up with an application of the proposed dissimilarity measure in pattern recognition.

Keywords: Divergence measure, Multiple attribute decision making, Pattern recognition

A FRAMEWORK FOR THE THYROID DISEASE PREDICTION USING MACHINE LEARNING ALGORITHMS

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Thyroid disease is one altogether the foremost common human diseases within the globe and affects somebody's health very badly. Thyroid disease is a disease in which the body does not secrete or supply the required amount of hormones. Our thyroid gland produces hormone, which regulates many functions in your body, including how briskly you burn calories and your heart rate. In thyroid disease, hormones are made in excessive or insufficient amounts. Depending on how high your hormone levels are, you may feel uncomfortable or tired, or else you will twist or gain weight. Women are more likely than men to develop thyroid disease, especially after pregnancy and after menstruation. In this paper classify healthy people and people with thyroid disease, machine learning is reliable and efficient. In the proposed study, we developed a machine-learning-based system for thyroid disease prediction using the thyroid disease datasets We have easily identified and classified people with thyroid disease out of healthy people using three popular machine learning algorithms, for this we have taken help of feature selection method, evaluation metrics like classification accuracy. This research work has demonstrated a disease prediction system developed using machine learning algorithms based such as Decision Tree Classifier, Logistic Regression Classifier and Naïve Bayes.

Keywords: Prediction, Logistic Regression, Accuracy, Thyroid, Hybrid.

A COMPARATIVE EVALUATION FOR CLASSIFICATION OF INDIAN AIRLINES CUSTOMER SATISFACTION TWEETS BETWEEN WEKA AND RAPID MINER

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In the current era, social networking and micro blogging sites have grown in popularity as a means of communicating users' personal feelings, facility feedback, and social liking. In the aviation sector, where a company's performance is determined by the opinions of different customers. In this paper we have been used five different airline companies data set from different social media websites by webharvy tool and the experiment has been performed in Rapid Miner tool to find accuracy of sentiments polarity using different machine learning techniques and also compare the each best performing technique with our previous experiment best results which has been done in Weka tool. In our study we have focused on the best airline service provider which have been provided all facilities to the customers in all aspects so that provider and all another providers also improve their facilities according to the sentiments or tweets for future.

Keywords: Decision Tree, Rapid Miner, Opinion Mining, Airline Service Providers.

A FRAMEWORK FOR ANALYZING POLARITY OF SOCIAL MEDIA HINDI SENTANCE CLASSIFICATION USING NLP

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In the past, due to the elaboration amount of Hindi content on the social media; there are more requirements for displaying sentiment thought Analysis for the Hindi language platform of Hindi social media. The Sentence analysis (SA) is a Work in which the orientation of an opinion is found in one's opinion Information is related to as a comment of any persons. It is concerned with analyzing classified and the writer from a piece of information in social media (i.e. Twitter).The analysis involves capturing user behavior, likes and negative. Positive and natural Hindi Text to person. Most functions of the SA system are to identify the thought being expressed on a unit sentence and then classify it into a positive, negative and natural sentences using existing software technique. In a Social media (Twitter) review proposed system for sentiment analysis Uses Hindi Senti Word Net (HSWN) to find the overall sense associated with the Hindi sentence Polarity of words. The review is derived from HSWN and then the final total polarity is calculated. The sum to Negative words, positive words and Natural words Synset is the substitution algorithm used to find the classify of sentences that do not have polarity associated with it in Natural language processing (NLP).

Keywords: NLP, Hindi Senti Word Net (HSWN), Web Social Media (WSM), Senti Word Net (SWN), Synset, Sentiment Analysis (SA), Polarity

ENHANCEMENT ON K-NEAREST NEIGHBOR ALGORITHM USING METAHEURISTIC OPTIMIZATION

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The k-nearest neighbor (KNN) algorithm is vulnerable to noise, which is rooted in the dataset and has negative effects on its accuracy. Hence, various researchers employ variable minimization techniques before predicting the KNN in the quest so as to improve its predictive capability. The genetic algorithm (GA) is the most widely used metaheuristics for such purpose; however, the GA suffers a problem that its mating scheme is bounded on its crossover operator. Thus, the use of the novel inversed bi-segmented average crossover (IBAX) is observed. In the present work, the crossover improved genetic algorithm (CIGAL) is instrumental in the enhancement of KNN's prediction accuracy. The use of the unmodified genetic algorithm has removed 13 variables, while the CIGAL then further removes 20 variables from the 30 total variables in the faculty evaluation dataset. Consequently, the integration of the CIGAL to the KNN (CIGAL-KNN) prediction model improves the KNN prediction accuracy to 95.53%. In contrast to the model of having the unmodified genetic algorithm (GA-KNN), the use of the lone KNN algorithm and the prediction accuracy is only at 89.94% and 87.15%, respectively. To validate the accuracy of the models, the use of the 10-folds cross-validation technique reveals 93.13%, 89.27%, and 87.77% prediction accuracy of the CIGAL-KNN, GA-KNN, and KNN prediction models, respectively. As the result, the CIGAL carried out an optimized GA performance and increased the accuracy of the KNN algorithm as a prediction model.

Keywords: CIGAL-KNN, GA-KNN, IBAX operator, KNN algorithm, Prediction models.

A HYBRID LEAST SIGNIFICANT BIT IMAGE STEGANOGRAPHY USING VIGENERE CIPHER AND HUFFMAN CODING TECHNIQUES

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This paper improves information security on the basis of the traditional LSB steganography by the integration of cryptography and data compression techniques. The proposed method improves the security of information hiding by introducing multiple layers of security processes such as encryption and decryption, compression, and data embedding technique, respectively. This paper employed the Vigenere cipher for the encryption and decryption of the secret file where the generated ciphertext is compressed using the Huffman coding algorithm. The proposed method is tested on three image couriers embedded with 16kB, 32kB, and 48kB secret messages. The empirical results show that the proposed methodology is more competent compared to the traditional LSB image steganography alone with respect to imperceptibility by Peak Signal to Noise Ratio (PSNR), Structural Similarity Index (SSIM), stego image file size, and Mean Square Error (MSE) metrics.

Keywords: Cryptography, Huffman coding algorithm, Least significant bit algorithm, Vigenere cipher, Steganography

USING ARIMA MODEL FOR INDEX CRIME FORECASTING IN DAVAO CITY, PHILIPPINES

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In this study, crime analysis through data mining methods is implemented to identify crime patterns and support decision making process in crime prevention. A total of 48 monthly index crime observations from 2017 to 2020 were collected from the Davao City Regional Police Office crime database. The dataset was used to generate an ARIMA timeseries model to forecast commission of index crimes in the year 2021. The ARIMA (0,1,0) (2,1,0) was selected as the model using a python script. Simulation results reveal a decreasing trend over the year. Further, volume spikes are anticipated in the months of March, July, and October; while dips are expected in the months of April and September. These findings may be used by the Davao City Regional Police Office in their resource allocations and assessment of their operations.

Keywords: Data mining, ARIMA model, Crime analysis, Forecasting, Timeseries.

APPLICATION OF FUZZY ANALYTICAL HIERARCHY PROCESS TECHNIQUE FOR RANKING ACTIVITIES IN SCHOOLS IN VIEW OF COVID 19 RISK

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The widespread of novel coronavirus (COVID-19) has proven to be a tough challenge for the school authorities to restore teaching and learning activities and follow the guidelines and regulations, issued by World Health Organization (WHO) and local government authorities. It is not possible to run all the activities as usual by maintaining social distance. Although the vaccination process is in full pace to cover more and more people, still there is no guarantee that after vaccination there will be no danger of COVID-19. As this virus is mutating frequently and new variants are surfacing, societies and institutions must be prepared to face and adapt to new situations. After the second wave of this virus, and speedy vaccination, countries are lifting lockdown and gradually switching to the new normal life. There is substantial evidence demonstrating school closure is a higher risk to children than COVID-19. The prolonged closure of schools is a social crisis. Most of the schools are closed since 2020 and now they are planning to reopen. There is a need for a decision support system that can be used to take proper measures like closing certain activities or pushing some activities to online mode in view of the severity of infection. In this paper, considering the opinions of stakeholders, school activity domains are identified and categorized based on the virus threat. To deal with the complexity and vagueness of the opinions fuzzy analytic hierarchy process (FAHP) is applied to rank these activities according to their risk of infection level. It may provide a framework for the administration of schools to take appropriate decisions for full or partial closure of specific activities. For the illustration, an empirical case study has been conducted in Indian Schools of Oman.

Keywords: Covid-19, Fuzzy Analytical Hierarchy Process, MCDM, Ranking

DESIGNING AN ADVANCED VERSION OF EVM WITH VVPAT

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The Indian Election Commission employed EVMs (Electronic Voting Machines) in conjunction with VVPATs (Voter-verified paper audit trails) on a trial basis in the 2014 general elections. Since 2019, every assembly and general election in India has used this technique, according to the Supreme Court of India's directions. It is an M3 version of EVM with VVPAT capabilities instead of the earlier M1 and M2 versions. It has built-in hardware and software that prevents tampering by allowing just a specific control unit to work with a specific voting unit. An EVM consists of two components: the control unit and the balloting unit. One of the voting booth officers operates the control unit, while the voter operates the balloting unit privately. The officer confirms the voter's identity before electronically activating the ballot unit to receive a new vote. When a voter casts a ballot, the balloting unit shows it, records it in memory, and sends it to the printing unit. The voter inserts the print copy of the ballot into the ballot box, which can be used for cross-verification in the event of a disagreement. The polling booth officer issues a "close" instruction from the control unit, which registers the vote and relocks the device to prevent duplicate votes. When the next voter with a fresh voter ID arrives before the polling booth officer, the process is repeated. This approach lacks a safeguard against impersonation or proxy voting, which undermines voters' trust in democracy. As a result, there is a need to create a system that detects bogus voters and prevents them from voting. The proposed system is equipped with a device and software to incorporate the features to read and match identification numbers and biometric measures of the voter with that of in the database of the system in order to identify fake voters. This system is useful in increasing voters' confidence in democracy in democratic countries as many more popular countries are moving towards a democratic system.

Keywords: EVM, VVPAT, Election

ROOT WORDS STEAMING IN INDIAN LANGUAGES

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Root word steaming is an activity of Natural Language Processing. In this paper we describe our works towards the development of Root words Steaming for Indian Languages a special reference to Assamese language. The main purpose of this study is to remove both suffix and prefix and find the root word so that the system can understand the word and can read smoothly.In compared to English language, steaming of root word in Assamese Language which have different format of suffixes and prefixes are little bit difficult to execute. The proposed architecture of our Assamese language comprises a database and a graphical user interface (GUI). Stem (root) is the part of the word to which we add inflectional (changing/deriving) affixes such as (jon,or,bur). For example, the words Manuhjon, Manuhor, Manuhbur all can be rooted to the word Manuh. The main role of stemming is to minimize storage requirement and maximize the efficiency of Information Retrieval Model. Stemming is the main part of Text Normalization,and it gives meaning word after retrieval. Several stemming algorithms exists with different techniques and this research paper describes the rule-based stemmer for the Assamese language with the system architecture. In our proposed system, the stemmer will look up at the Assamese dictionary to check word for both suffix and prefix. If suffix is not present, go for prefix, after that must apply pruns and found the root word.

Keywords: Root word, Steaming, Natural Language Processing.

DEVELOPMENT OF DEPRESSION IDENTIFICATION DECISION SUPPORT SYSTEM (DIDSS) USING MACHINE LEARNING APPROACH

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Depression is a mental disorder which typically includes recurrent sadness and loss of interest in the enjoyment of the positive aspects of life, and in severe cases fatigue, causing inability to perform daily activities, leading to a progressive loss of quality of life. Wearable sensors measuring different parts of people's activity are a common technology nowadays. In research, data collected using these devices also draws attention. Nevertheless, datasets containing sensor data in the field of medicine are rare. Often, data is non-public and only results are published. This makes it hard for other researchers to reproduce and compare results or even collaborate. In this paper we present a unique dataset containing sensor data collected from patients suffering from depression. The dataset contains motor activity recordings of 23 unipolar and bipolar depressed patients and 32 healthy controls. In this work a methodology was proposed to detect depressive subjects from control subjects based in the data of their motor activity, recorded by a wearable device, obtained from the "Depresjon" database. From the motor activity signals, the extraction of statistical features was carried out to subsequently feed a Xgboost classifier. Results show a Accuracy value of 99.48% and Sensitivity value 99.88% in Interval on 1 hours Data. Based on these results, it is concluded that the motor activity allows distinguishing between the two classes, providing a preliminary and automated tool to specialists for the diagnosis of depression.

Keywords: Depression, Machine Learning, Feature Extraction, Feature Selection

HYBRID CONVOLUTIONAL NEURAL NETWORK AND ENSEMBLE BOOSTING CLASSIFIER TECHNIQUES FOR HANDWRITTEN DIGIT RECOGNITION

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In the field of pattern recognition, there are various types of patterns to recognition like images, videos, audios, handwritten digits, handwritten characters etc. In this research paper, we have concentrated in the field of handwritten digit classification and recognition using modern's techniques. Here we have proposed the hybrid techniques which is the combination of deep learning and ensemble techniques, where deep learning Convolutional neural network model used for feature extraction and ensemble classifier used to classification and recognition. We have used gradient boosting techniques for classification like: AdaBoosting classifier (ABC), XGBOOST classifier (XGB) and Light-GBM (LGBM) boosting classifiers with standard and tuned parameters values. For handwritten digit data, we have used two famous dataset known as MNIST and EMNIST which is collection of 70000 and 2,40,000 sample respectively for 0–9 handwritten digits. All three proposed model CNN-ABC , CNN-XGB , CNN-LGBM have been implemented in both dataset and achieved highest recognition accuracy which is more than 99%. The accuracy achieved by the proposed model is higher than other previous works.

Keywords: CNN, AdaBoosting, XGBOOST classifier, Light GBM classifier

IN DEPTH ANALYSIS OF CANCER MICROARRAY GENE EXPRESSION PROFILE

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Cancer is one in all the dreadful diseases, which causes a substantial death rate in humans. Cancer is featured by associate irregular, unmanageable growth which will demolish and attack neighbouring healthy body tissues or somewhere else in the body. Microarray based mostly gene expression identification has been emerged as an economical technique for cancer classification, as well as for identification, prognosis, and treatment functions. In recent years, Deoxyribonucleic Acid microarray technique has gained a lot of attraction in both scientific and in industrial fields. It showed great importance in deciding the informative genes that can cause the cancer. This led to enhancements in early cancer diagnosis and in giving effective chemotherapy treatment. Studying cancer microarray gene expression data could be a difficult task because microarray is high dimensional-low sample dataset with loads of noisy or irrelevant genes and missing data. In this paper, we have a tendency to conduct a comprehensive study that focuses on exploring the main objectives and approaches that are applied using cancer microarray gene expression profile. We proceed by creating a classification for all approaches, and then conclude by investigating the foremost economical approaches that may be employed in this field.

Keywords: Cancer classification, Clustering approaches, Gene expression, Gene selection, Microarray

SOCIAL MEDIA BIG DATA SENTIMENT ANALYSIS OF SOME TWEETS

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The main purpose of this white paper is review of social media big data for e-commerce products. It also provides beneficial results to online shopping customers, We also provide product quality and helpful decision support. With business ideas according to customer requirements buy the product. This includes features and words of opinion such as- Uppercase words, Repeating letter sequences, Pictograms, Slang Words, Exclamation words, Reinforcements, Modifiers, Conjunctions Words that can be used in tweets, negative words, etc. Existing The work considered only two or three features Sentiment analysis with Machine learning technology (MLT), Natural language processing (NLP). In this proposed job a well-known classification model for machine learning- Multinomial Naive Bayes, Support Vector Machine, Decision Tree classifiers and Random forest classifiers Emotion classification. Emotion classification is used as follows Decision support system for customers and customers shop.

Keywords: Big Data, Social Media, NLP

DIAGNOSIS OF CARDIAC DISEASE USING MACHINE LEARNING CLASSIFICATION ALGORITHM

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An early detection and prevention of Cardiac disease can save many lives. Nowadays, Machine learning is being used to process huge, multi-dimensional dataset and disease related variables in a dynamic environment with accurate predication. It is being used as a popular tool for disease diagnosis. In this research work, we compared outcome of various classification algorithms including SVM (Support Vector Machine), Naïve Bayes classifier and Decision Tree to classify data related to cardiac disease obtained from Kaggle heart disease databases from UCI repository site. Results were analyzed in terms of error measures like accuracy, precision and F1 Score. After applying Feature Selection Technique, eight attributes were selected and it was found that Decision Tree gave better accuracy and precision then SVM and NB.

Keywords: Cardiac Disease,Machine Learning, Support Vector Machine(SVM), Naïve Bayes(NB), Decision Tree(DT)

PROTECTING INTERNET OF THINGS DEVICES USING AUTOMATED SECURITY MODEL

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Internet of Things consists over millions of digital gadgets, public, services and their materials things that has the potential for establishing connections, exchanging and associating data or information, processing materials environment controlling as well as monitoring it, the information or data that is created by the artistic object this data analysis and collection. Because of the high risk of damage that might be paid by administrative sector, people distrust, people and their property and this may also lead issues to the national concerns, the privacy and security of IoT sector for enterprises, general public, government, ICT companies and private media. At the time of series of IoT supply proactive believe safety, privacy and security should be displayed by the all the important stakeholders for the economies and societies to understand the optimistic interest of the IoT. We present an ideal Model definition as well as a Model for analyzing and modelling the safety of IoT. Using it inside the IoT System, with the assistance of the framework, one has the power to search the scenario of possible attack, with the aid of well-defined security metrics to understand the IoT safety and to analyze the efficacy of the various ways of protection.

Keywords: Internet of Things, Sensors, GPS, GSM, Google map, Security, Authentication

PREDICTION OF FOREX DATA USING HYBRIDIZATION OF GENETIC ALGORITHM WITH ANN AND DEEP LEARNING

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This paper proposes a novel ensemble methodology comprising an Artificial Neural Network, a deep learning architecture called Long Short Term Memory (LSTM) with hybridization of Genetic algorithm to forecast Foreign exchange data. Two novel models GA-ANN and GA-LSTM have been developed to forecast next day FX data. In this research work INR/USD FX data has been used for prediction. These two models has been compared Two Error measures Mean Absolute Percentage Error (MAPE) and Mean Square Error (MSE) are used to check the accuracy of model and reveals that hybrid techniques GA-ANN and GA-LSTM is performing better than model with individual technique .

Keywords: Artificial Neural Network, Long Short Term Memory, Deep learning

FACE MASK DETECTION USING MACHINE LEARNING METHODS

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From the past few years COVID 19 has impacted many lives globally. Loss of lives, economic uncertainty in markets, losing livelihoods, post Covid consequences have impacted thousands of people differently. Though a number of vaccines have been developed, the time for which the antibodies will be active inside an individual body may vary and is still undergoing research. Also, newer variant of concern have been detected and its impact is not much clear to be neglected .In order to avoid the risk of rapid spread of the pandemic and bearing the consequences of it again Covid appropriate behavior is still a necessity. Since it's a respiratory virus covering the mouth and nasal area as Covid hygiene has always been a major concern. Machine learning deals with programming the machines to simulate thinking like humans. Over Past years its use is rapidly increasing in image identification and classification areas such as face detection. This paper presents few attempts made to detect face mask using machine learning methods which can help promoting Covid Hygiene and thus will help preventing the Covid 19 spread.

Keywords: Machine Learning, COVID 19, Artificial Intelligence, Deep transfer learning

A PROPOSED MODEL FOR AUTOMATIC FEATURE EXTRACTION AND CLASSIFICATION OF BREAST CANCER IMAGES

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Breast cancer is the most common type of malignant tumour in women, and its early detection is crucial for effective treatment. The analysis of the biopsy images is still crucial for deciding whether patients have cancer or not. But the segmentation of these images is complex due to associated unstructured patterns and different levels of colour intensities. This research presents an automatic machine learning-based model for image pixel classification. Pre-processing steps have also been employed to improve the effectiveness of the classification. The features were also extracted and submitted to the different classifiers. By comparing the processed image with the ground truth image, we can conclude that the proposed model is effective and reliable enough for pixel-wise classification of sample images. The Decision tree has provided the best training accuracy as 100% and test accuracy as 94% .

Keywords: Breast Cancer, Machine Learning, Classification,Feature extraction,Image analysis

INTERNET OF THINGS SECURITY ASPECTS: ANALYSING INFORMATION TRAFFIC IN IOS APPLICATIONS

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In recent years, a great technological advance has been observed and Internet service is not the exception. This has allowed connecting increased devices, thus arising the Internet of Things (IoT). In this way, the number of connected devices has reached around of 20 billion, and it is expected to reach 70 billion by 2021. This has generated major challenges for supporting information security and privacy, because most IoT devices focus on connectivity and are including default settings where security is severely affected. This paper presents the results of the traffic analysis performed on various iOS apps, with the goal to inform how easy can be to capture traffic, even though using https protocol, and to show that there are still many applications that transmit information without encryption.

Keywords: Internet of Things, Security,Apple Watch, Traffic Analysis.

SELECTION OF BEST CRITERIA FOR ONLINE EXAM USING VIKOR METHOD

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The growing covid-19 pandemic has compelled educational institutions to reconsider in-person learning and shift their focus to online learning. Many 'traditional' educational institutions still use pen-and-paper exams as their normal and preferred mode of communication. However, given current global conditions, they have been obliged to consider online assessments as a viable option. Students and professors across India are protesting the plan to hold exams in person and are seeking an online test instead. For this reason, giving an online exam is a highly difficult work for educational institutions, and picking criteria is critical for educational personnel. Using the VIKOR approach of the MCDM technique, we attempt to solve this difficult task. This strategy aids you in determining the most appropriate criteria for using the online exam.

Keywords: MCDM, VIKOR, CRITERIA FOR ONLINE EXAM

CLASSIFICATION OF CORONARY ARTERY DISEASEUSING FATURE OPTIMIZATION AS ANT COLONYOPTIMIZATION

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Coronary Artery Disease (CAD) is the most common form of heart disease and has become the primary reason for death. A correct and on-time diagnosis of CAD is very important. Diagnosis of CAD being a strenuous activity, scientists have planned different intelligent diagnostic frameworks for improved CAD diagnosis. Still, low CAD classification accuracy is an issue in these frameworks. We applied one Meta-heuristic (MH) methods such as Ant Colony Optimization (ACO) with objective function is popular vote based ensemble method. The ACO-Ensemble is used for feature reduction and useful for identifying the most high risk parameter for CAD. The classification process the popular deep neural network (DNN) learning is proposed. The model is trained and tested over two CAD data of 302 patients with 56 and 59 attributes. Our model generates alert for patient at risk and can also be tested to identification risk on any new patient.

Keywords: Ant Colony Optimization (ACO), Coronary Artery Disease (CAD),Classification, Deep Neural Network (DNN)

BIG TRAJECTORY DATA: A SURVEY OF EXISTING TRAJECTORY SEGMENTATION METHODOLOGIES

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With the rapid growth of wireless communications and positioning technologies, trajectory data have become increasingly popular, posing great challenges to the researchers of data mining and machine learning community. Trajectory mining is a research field which aims to provide fundamental insights into decision-making tasks related to moving objects. One of the fundamental pre-processing steps for trajectory mining is its segmentation, where a raw trajectory is divided into several meaningful consecutive sub-sequences. Trajectory segmentation plays a major role in analysis of big trajectory data. In this paper we provide the survey of existing methodologies for trajectory segmentation.

Keywords: Trajectory Segmentation, trajectory Pattern Mining, Big Data, Trajectory Clustering

A SURVEY OF CLASSIFICATION OF AUTISTIC SPECTRUM DISORDER AND FEATURE SELECTION TECHNIQUE

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ASD is a type of Neuro-developmental disability disorder that cannot be cured but may be ameliorated by early detection with the help of data mining. In this paper, I reviewed feature selection technique (FST) data mining method. The FST key goals of improving classification efficiency and reducing feature counts. I also reviewed the different classification methods on Autistic Spectrum Disorder (ASD) dataset. The reviewed paper results demonstrate that in all cases in the ASD dataset, the proposed classifiers with selected characteristics are effectively and accurately implemented. In the future, other data mining and deep learning algorithms can also be used to improve the results.

Keyword: Autistic Spectrum Disorder (ASD), Classification, Feature Selection Technique (FST), Machine Learning (ML)

RANKING FOR SOFTWARE'S BY ONLINE EXAM: USING MCDM METHOD

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COVID-19 has wrought devastation over the world, and education, like any other essential industry, has been heavily damaged. Students, schools, colleges, and universities have all suffered significant consequences. With Covid-19 wreaking havoc on exam schedules, online exams are gradually becoming more common. Online education and assessments have now become the standard. That is why online exam patterns are trusted by teachers, parents, and students. When taking an online exam, there are a lot of software options available on the internet, but it's difficult to choose the ideal one. The MCDM approach helps in the search for and ranking of software.

Keyword: MCDM, AHP method, Online exam software

TRACKING OF CRIMINAL LOCATION BY USING CALL DATA RECORD

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(CDR) Call Detail Records are the detailed record of all the calls that pass through a telephone exchange. This CDR is maintained by telephone exchange that contains the time of the call, duration of the call, source and destination number, type of the call, etc,thus Call data records- play an important part while dealing with critical criminal cases. Real-time streaming data processing is becoming a new trend in Call Detail Record processing. It helps to analyze Call Detail records in real-time and helps in finding the real time location of any criminal and also behaviour of their network in real-time. But these Call Detail Records has a huge volume, variety of data, and different data rate, while current telecom systems are designed without considering these issues in mind. Call Detail Records can be seen as the largest source, and hence, it is applicable to use them (for storage, processing, and analysis). There are considerable research efforts to address the Call Detail Records analysis challenges face in the telecom industry.This paper presents the use of excel in Call Detail Records analysis by using Call Detail Record of any criminal case which has been registered in the year 2014 & solved in the year 2018. In this paper,I am processing Call details records and tracing their locations manually.

Keywords: CDR, Crime, FIR, Crime investigation, Call data record

INTRUSIONS IN NETWORK SECURITY- ISSUES, CHALLENGES, AND SOLUTION IN REFERENCE OF CICIDS2017 DATASET

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With the recent increase in computer network assaults, information or network security has become a vital concern for any business looking to secure data and information from various sorts of hostile activities or invasions. Intrusion Detection Systems (IDS) are becoming one of the most important study areas in network security. It is the procedure for identifying various security breaches in a computer network. Intrusion detection systems (IDSs) are monitoring devices that protect computer networks from hostile activities. An Intrusion detection system based on ensemble approaches to detect real-time attacks concerning CICIDS2017 Dataset is provided in this paper. The decision tree approaches are used in ensemble techniques. On the CICIDS Dataset, the ensemble approaches Bagging and Boosting are explored using the WEKA machine learning tool. The CICIDS dataset having around 2830740 instances, consists of 80 attributes and various real-time attack files. These attacks are falls under seven different categories of attack scenario including Web attacks, Brute-force, Botnet, Heartbleed, DoS, DDoS, and infiltration. The performance of the proposed system is assessed using parameters including accuracy, TP Rate, FP Rate, Precision, Recall, F-Measure, and time. The proposed system has been shown to have high accuracy and low false-positive rates in all types of attacks. Accuracy of detecting DDoS attack with respective classifier is J48- 99.97 %, RepoTree- 99.96%, Bagging- 99.96%, Boosting- 99.99%. Accuracy of detecting Web attack with respective classifier is J48- 99.76 %, RepoTree- 99.73%, Bagging- 99.77%, Boosting- 99.74%. Accuracy of detecting Botnet attack with respective classifier is J48- 99.98 %, RepoTree- 99.97%, Bagging- 99.98%, Boosting- 99.99%. Accuracy of detecting infiltration attack with respective classifier is J48- 99.98 %, RepoTree- 99.98%, Bagging- 99.98%, Boosting- 99.99%. Empirical results demonstrate that decision tree approaches using ensemble approaches improve the performance of designing a network intrusion detection system that is both efficient and effective.

3D PRINTING USING CONTINUOUS CARBON FIBER

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3D printing can be done by designing a 3D structure, slicing the structure using slicing software, and then printing it. The material used for 3D printing can be strayed for printing in two ways are Continuous and Chopped. The continuous straying process ides better stiffness and helps in the even distribution of load while the Chopped straying can lead to a cavity or overlaying of material resulting in the printing of deformed structures. Carbon fibers provide strength and lightness to the structure. Though being expensive and requiring initial expenses, the physical properties provided by carbon fiber are worth it. Continuous carbon fiber has its limitation as it is reactively new method, more research and development will help in reducing the initial expediture.

Keywords: 3D Printing, Continuous Carbon Fiber, Mechanical Properties

PERVASIVE COMPUTING: CONFRONTATION WITH EMBEDDED LIFESTYLE

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Since last few years embedded technology has changed our environment drastically, which made our life smarter and improved our experiences in manifold. Our intention to write this paper is to simplify some aspect of the Pervasive Computing approach, explore its usability now a days and challenges that may occur during its implementation. In coming era hand handled or embedded device will be available everywhere and will perform computation for us using wireless environment which help to improve quality of lifestyle. Varity of embedded objects allows interaction of human to machine and machine to machine which brings revolution in everyday appliances uses. Invisible (hidden) resources can play a major role in computation of abstract data and provide us useful functions or information without human interaction. Internally all models of pervasive computing represent a vision of tiny, low cost, vigorous networked computing devices, distributed throughout the day-to-day life and finally collect the sensory data commonplace at the end, to produce some valuable information.

Keywords: Ubiquitous computing, Hardware and Software, Usability, Challenges

INVESTIGATION AND COMPARISON ON EXISTING IOT BASED FRAMEWORKS FOR SMART CITIES: SPECIAL REFERENCE FOR CHHATTISGARH

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Urbanization leads to use new methodologies and technologies to adopt for sustainable growth of life standard of peoples. This emerges the concept of Iot based framework for smart cities. Iot provides a modular and scalable framework to the services needed to a smart city . It not only efficiently handles and manages the services but also provides a scope for future advancement in the digital and technological opportunities. So, there is a need of IoT based Framework for Raipur, Bilaspur ,Durg , Bhilai , Ambikapur which are in future enhanced as smart cities as the requirements and life style of the peoples of these cities are changing daily.Investigating the current existing IoT based frameworks which are used in Smart Cities.Comparing the services provided to the citizens with all existing IoT based frameworks for Smart Cities .Investigating Cognitive IoT framework in prospect to Chhattisgarh .

Keywords: Urbanization, Investigating, Comparing, Smart Cities, Frameworks, Sustainable, Cognitive.

THE EFFECT OF CONSUMER PERCEPTION OF PROMOTION AND SOCIAL INFLUENCE ON CONSUMER BEHAVIOUR

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As our promotion technology has become more and more advanced, many of which improving the idea of promotion. In order to stimulate consumer behaviour it is important to evalaute what kind of promotion is effective to affect target market's behaviour. The purpose of this study is evaluate on how digital promotion activities and social influence affecting people's behaviour. This study used a non-probability sampling technique by using snowball sampling method. A number of 300 consumers were participated in this study. Data was collected by using a structured interview method assisted with questionnaire. The research questionnaire was distributed online using a google form. The data analysis technique used in this research is descriptive statistical analysis and inferential statistical analysis. The processing of the data obtained in this study is path analysis by utilizing the Smart PLS 3 application. The results show that the most important aspect of promotion strategies in which implemented by marketers should improve public opinion regarding the product. It is shown that social influence had a significant role to affect one's purchasing behavior.

Keywords: Promotion, Digital Promotion, Social Influence, Social Effect, Consumer Behaviour

OPTIMIZING LECTURER PERFORMANCE TO BUILD CONTINUOUS ADVANTAGE IN TODAY'S DOUBLE DISRUPTION ERA

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We face double disruption known as industrial revolution 4.0 and the COVID-19 pandemic, which affects the whole world. In order to remain competitive, universities are required to create a significant improvement. One of the determinants of continuous advantage to universities is the lecturer. In order to successfully educate the next generation that is even more prominent than today, the role of lecturers is essential. This research is at evaluation factors that may affect lecturer performance to fulfill their task known as "Tridharma". As many as 360 lecturers were taken to this study. We employ stratified sampling based on many lecturers in State Universities within Northern Sumatra. The data were analyzed using SEM-PLS through SmartPLS. Our study indicated that job satisfaction significantly affects lecturer performance. It is essential to remain satisfied with the job given. Emotional intelligence and the ability to collaborate are also proven as significant variables toward job satisfaction. Therefore, lecturers' satisfaction is required to optimize the lecturer's performance in the dual disruption era. This study also empirically showed that job satisfaction has a role as a mediation variable that can optimize the performance of lecturers to achieve sustainable competitiveness

Keywords: Adaptation competency, Collaboration Competency, Emotional Intelligence, Job Satisfaction, Online Teaching Competency, Tridharma Performance

QUANTUM SOFTWARE SECURITY

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Software security is the main goal in the era of artificial Intelligence (AI). The security methods are large in numbers of crypto algorithm used in software security. The research study has focussed on the security of software and the characterization of the quantum computer and its principal. In recent times majority of software developers uses different cryptography (cryptography is science or art to design protocol to protect data) algorithms for security. For the enhancement of software security, the researchers upgraded the algorithm in terms of memory. Large number of security algorithm are likely to be collapse when the large quantum computer is developed. Since cryptographic algorithm, can be solved by the quantum computers, the present cryptosystem would be rendered obsolete. Hence, it is imperative to focus more on intensive research in the context of the present quantum security. The main challenges in quantum era would be cryptography methods that fulfil the demands of security usability and flexibility without sacrificing the users' confidence. This research study focussed on working of Grover's Algorithm and how it can improve the security feature of software. For software and web application, distinguished that security factors are influenced in quantum computing era, software security will be examined in quantum computing.

Keywords: Software Security, Quantum Computing, Grover's Algorithm, Cryptography, Qubit, Quantum Security

IMPLEMENTATION OF A NOVEL ARTIFICIAL INTELLIGENCE COGNITIVE MECHANISM FOR 'SOCIAL HUMANOIDS'

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Human-robot interactions require many functional capabilities from a robot that have to be reflected in architectural components in the robotic control architecture. For this, various mechanisms for producing social behaviours, goal-oriented cognition, and robust intelligence are required. In the last two decades, many research works have been initiated to conceive an architecture that can cater to human-robot interactions. A major and most recent contribution in this direction is the Distributed Infrastructure with Remote Agent Control (DIRAC) architecture leading to more natural interactions with humans, while also extending the overall capability of the integrated system. There is a high potential in extending the same DIRAC architecture to design humanoids. The pace at which soft robotics is accelerating points out that a breed of humanoids called social humanoids is not far away. So, there is a need to conceive a novel architectural framework for humanoid-Sapien interaction which would lay the platform on which soft robotics thrives. This research paper endeavors to design this artificial cognitive mechanism for social humanoid interactions.

Keywords: Social Humanoids; Human Robot Interaction (HRI); Semantics; Ontology; Artificial Intelligence

CASE STUDY ON TOOLS AND TECHNIQUES FOR ANALYSIS OF HUGE DATA SET IN DISTRIBUTED ENVIRONMENT

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The age of internet and web world is a part of our routine life in almost all task humans perform today whether it's a personal one, professional one or related to any business, every field is connected to it. Because of these heavy uses of internet web world and digital technology also known as distributed environment large volume of data is generated by each and every organization and not just organization it is also applicable for the individual on who uses these technologies. This huge data set needs a big storage capacity to manage and access these huge data set also known as big data. To turn these huge data set or big data into useful information there is need to analysis of this big data and to perform analysis of huge data set lot of effort is taken at every level of data for accurate prediction and decision no lag Progression. To analysis of huge data set of distributed environments there are lot of tools and techniques are available and they all are putative rich and capable but also has some drawbacks and disadvantages, here in this paper a case study on these tools and techniques has been presented in which their advantages, disadvantages, features and draw belies are also defined, the aim of this paper is to find out the best tool and technique and their performance.

Keywords: Internet Web Technology, Decision Making, Prediction, Distributed Environment, Big Data.

DESIGNING: FAST IMAGE SECURITY TECHNIQUES FOR IOT APPLICATIONS USING GP-RSA

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Uses of IOT based imaging applications have exponentially increased due to availability of low cost cameras. Thus security is major concern for imaging uses. It is observed that efficiency of security methods degrades under the presence of noise. Thus in this paper it is proposed to design the fast and efficient image encryption algorithm for uses in IOT applications. Paper is focused to design real time efficient and robustness RSA encryption algorithm using Gaussian pyramid (GP) approach. Paper contributed in two pass. Firstly brief survey is presented for image encryption methods. Then in letter pass GP-RSA based fast and efficient Gaussian pyramid based encryption algorithm is designed. Proposed method performs better under noisy environment. Results are implemented and performance is compared on the basis of the visual artifacts and entropy analysis. Since, it was observed that performance of encryption method suffers under the noise attacks. Thus result of proposed fast and efficient encryption is presented for different set of the input images with feature variations. The performance is also evaluated under different noise variances. The proposed method increases the elapsed time significantly.

Keywords: Image encryption, Internet of Things, Cryptography, Security, Secure Force (SF), RSA, Histogram,.

A CASE STUDY OF: THE LARGE AREA WSN PERFORMANCE FOR PEGAISS BASED ROUTING

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There are certain applications required to access the wide area sensor networks. The performance of the chain based routing protocols have to evaluated under such scenarios. Thus, this paper initially presented the survey of the chain based PEGASIS routing protocols considering the dynamic sync locations. Additional survey is given for the large area networks. Then, in the second pass of the paper a case study evaluation of large area and small area WSN networks is presented for the fixed sink at center location. During the experiment numbers of nodes are kept constant and network area is changed. The performance is evaluated based on the operating live nodes and the energy consumption required per transmission or round.

Key Words: WSN, Dynamic Sink, PEGASIS, Large Area Networks, Energy Consumption.

A MODIFIED POLYBIUS CIPHER AS ENHANCED CYRPTOGRAPHIC CYPHER FOR CYBER SECURITY PROTECTION

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For all industries, cybersecurity is regarded as one of the major areas of concern that needs to be addressed. Data and information in all forms should be safeguarded to avoid leakage of information, data theft, and robbery through intruders and hackers. This paper proposes a modification on the traditional 5x5 Polybius square in cryptography, through dynamically generated matrices. The modification is done through shifting cell elements for every encrypted character using a secret key and its ASCII decimal code equivalents. The results of the study revealed that the modified Polybius cipher offers a more secure plaintext-ciphertext conversion and is difficult to break, as evident in the frequency analysis. In the proposed method, each element produced in the digraphs exhibits a wider range of possible values. However, with the increase of process in the encryption and decryption, the modified Polybius cipher obtained a longer execution time of 0.0031ms, being identified as its tradeoff. The unmodified Polybius cipher, however, obtained an execution time of 0.0005ms. Future researchers may address the execution time tradeoff of the modified Polybius cipher.

Keywords: Cryptography, ciphers, ciphertext, modified Polybius cipher, plaintext.

WATER QUALITY MONITORING WITH ARDUINO BASED SENSORS

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Water is the most important element for the existence of human life. Its wide variety of uses means that it is always in a state of constant demand. Water is supplied mainly from large water bodies, districts and rivers and seas. Such as to ensure that it is suitable for human consumption. Monitoring its quality a good practice of current water quality monitoring is often done in conventional laboratories. So it takes time and money too much and there is a risk of inaccuracies. Therefore the aim of this paper is to investigate the feasibility of implementing an Arduino based sensor system to monitor water quality. An extraordinary prototype consisting of a WiFi based microcontroller and a couple of sensors attached somewhere was attached to test the water to see if the water for daily use is potable or not which we have tested several times. It was found that the system works robustly but it is dependent on human assistance and is prone to data inaccuracy. However the system provides a solid foundation for various future expansion works in the same range to upgrade the system to be Internet of Things (IOT) compatible.

Abstract: arduino UNO board; Level sensor; DH11 temperature sensor; turbidity sensor; solids sensor (conductivity sensor)

AUGUMENT OF POWER QUALITY IN AN OUTLYING POWER SYSTEM THROUGH SERIES COMPENSATION

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A traditional method to achieve improved power quality (PQ) is to use passive filters connected at the sensitive load terminals. However, this practice has some shortcomings: the effectiveness of the scheme could deteriorate as the source impedance or load condition changes; it can lead to resonance between the filter and the source impedance. In this paper the use of series compensators (SC) in improving voltage quality of isolated power systems is considered. The roles of the compensators are to mitigate the effects of momentary voltage sags/swells and to control the level of harmonic distortions in the networks. SC injects harmonic currents of the same magnitude but of opposite polarity to cancel the harmonics present there. A control strategy for the SC is developed to regulate power flow. This is achieved through phase adjustment of load terminal voltage. It leads to an increase in the ride through capability of loads to the voltage sags/swells. The isolated power systems are often considered weak in that they possess relatively lower shortcircuit ratio, in comparison to a grid. Network voltage control becomes a challenging task as a result. The power quality problem is compounded with the drive-converter load. The sensitive loads would be connected in parallel with the nonlinear drive. Often such sensitive loads also contain input rectifiers that are capacitive in nature. The total capacity of the sensitive loads could be much smaller than that of the main drives; the distorted supply voltage is harmful to the sensitive loads. Excessive voltage distortions could cause the sensitive loads to malfunction. The loads are also sensitive to short-duration disturbances, in the form of voltage sags or swells. Validity of the proposed technique is illustrated through simulation. Simulation has confirmed the effectiveness of the proposed method, as it is applied on the SC to achieve improved quality of supply in the power system.

Keywords: Power Quality (PQ), PI Controller, harmonics, Series Compensator(SC), Voltage Source Inverter (VSI)

STUDY OF VARIATION OF COSMIC RAY INTENSITY WITH VARIOUS SOLAR AND GEOMAGNETIC PARAMETERS DURING SC 19 TO SC 24.

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Entire world is facing with very serious global climatic and tremendous (rapid) environmental changes problem in the last three Century. Matter and energy both are the main constituents of the supergiant Universe .Our planetary system is controlled by super energetic Sun and by whole Galactic world .Tremendous amount of energy in the various forms is releasing from galaxies, including Sun, powers our Earth in very fascinating way . Most abundant highly energetic and penetrating cosmic radiation, which is perhaps assuming to be responsible for life on Earth by various researchers; how these cosmic radiations play a major role in climatic changes in our solar system including environment of our Earth. Sunspot formation, Solar flux emissions , Solar radio bursts (Solar flares) ,Coronal mass ejections ,Solar wind plasma emissions and Solar proton ejections etc. are most important phenomena occur in the Sun. The mean time-lag observed between cosmic ray intensity and solar activity parameters is estimated to be about 0 to 4 month for Oulu , Moscow & Rome NM stations during 1954 to 2021. The average time-lag observed between CRI and Solar Flux 2800 MHz is found to be 0 to 15 month for SC 19 to SC 24. It is found that the most of these solar activity parameters are highly negatively or anti-correlated (~ -0.8832 to -0.9667) with cosmic ray intensity for all these stations. SSN Total (SIDC-SILSO) shows high negative correlation with CRI count rates for Oulu and Moscow Cosmic ray neutron monitor stations .Moderate correlation observed for Rome CRI counts with SSN Total. C(t)) ≈ -0.807 for both Oulu and Moscow and C(t)) ≈ -0.433 for Rome NM stations count rates with SSN. Solar activity parameter such as Sunspot number (SSN) Total (SIDC-SILSO) correlates with various solar indices i.e., Grouped Solar Flare, Solar Flare Index, Coronal Index, Solar Flux 10.7cm and Solar Flux 2800MHz. All these Solar parameters GSF, SFI, CI, SF 10.7cm and SF 2800 MHz shows high (strong) positive correlation with SSN Total (SIDC -SILSO). C(t) ≈ 0.843 for SSN-GSF, C(t) ≈ 0.818 for SSN-SFI ,C(t) ≈ 0.913 for SSN-CI, C(t) ≈ 0.981 for SSN -SF 10.7cm and C(t) ≈ 0.983 for SSN-Solar Flux 2800 MHz for SC19 to SC 24, high positive correlation found during the whole period of investigation April 1954 to December 2020. SSN shows moderate correlation with Geomagnetic parameters i.e., with AA [C(t) ≈ 0.362], with Ap [C(t) ≈ 0.433], with Kp [C(t) ≈ 0.412], with Cp [C(t) ≈ 0.412] and with C9 [C(t) ≈ 0.414] . Solar Flux 2800MHz shows strong negative correlation with Cosmic ray counts, for Oulu C(t)) ≈ -0.814, for Moscow C(t)) ≈ -0.814 and moderate correlation coefficient C(t)) ≈ -0.428 for Rome NM stations during April 1954 to April 2018 (SC 19 to SC 24).

EVALUATION OF POOLING SAMPLES FOR DETECTING SARS-COV-2 IN MASS SCREENING OF COVID-19

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Accurate diagnosis for the detection of SARS-COV-2 in population and social isolation of COVID-19 infected individuals are the necessities to break viral transmission. Though molecular diagnostic methods like quantitative reverse transcriptase PCR (qRT-PCR) is considered as the gold standard for COVID-19 diagnostics, it's implementation in resource-constrained settings could be challenging to achieve the increasing demand of COVID-19 testing. Current approach focused on a pooled sample testing strategy and its evaluation in the screening of SARS-COV-2 clinical samples during disease outbreak in Bilaspur region in a state of Chhattisgarh to estimate whether the cost of the test and the time required to accomplish the process could be reduced without disturbing its diagnostic characteristics and thus lead to effective epidemiological strategy. To determine the optimum pool size, nasopharyngeal and oropharyngeal samples were collected from Bilaspur region and were analyzed by implementing 5-sample pool and 3-sample pool simulation. We examined the diagnostic performance of qRT-PCR on pooled samples and compared them with tests which use a single sample in a blinded manner. It was observed that pooling reduced the cost of testing and the turn-around time of testing when compared with individual samples. Three pool sample simulation resulted in more précised and accurate diagnostic outcomes as compared with 5 pool samples. False negative results were observed in a few 5 pooled samples which further found positive upon retesting it in a single sample. It was observed that very minimal single positive samples with Ct values near to 35-37 were likely to be missed in pooled sample analysis. Overall, we can conclude that pooled sample qRT-PCR analysis should be considered an effective screening tool for COVID-19 when mass sampling is needed to be tested.

Keywords: COVID-19; Pooling; qRT-PCR; SARS-CoV-2.

RESEARCH STUDY OF CUSTOMER PAYMENT MODE AND ITS SAFE TRANSECTION SECURITY SYSTEM

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Financial organizations try to cut costs of favoritism by dealing directly with customers and Share information with Internet users and encourage customers to pay online. One of the core difficulties faced by organizations in dealing with Internet users and making online payments Are concerned and reluctant to send sensitive information over the Internet. Are actually customers Fears that hackers and internet interlopers will get their bargains through transactions India has been using electronic payment system for many years. However, the retail sector Cash transactions still predominate, and payments though cards have not yet picked up. Credit and debit cards Cashless are one of the most secure and convenient models of payment in the retail market, while trying to find Due to poor usage of payment cards, this article studies the costs involved in holding India

Keywords: credit cards, electronic payment, debit card, convenient, electronic gadget.

ON RICCI PSEUDO-SYMMETRIC MIXED GENERALISED QUASI-EINSTEIN NEARLY KAEHLER MANIFOLDS

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In this paper, we have studied new curvature properties of projective curvature tensor in nearly Kaehler manifold. The present paper deals the study of a projective ricci psedo-symmetric mixed generalised quasi-Einstein nearly Kaehler manifolds also found some properties in the manifold.

Keywords: Einstein manifold, quasi-Einstein manifold, mixed generalised quasi-Einstein manifold, generalised quasi-Einstein manifold, projective curvature tensor.

STATISTICAL ANALYSIS FOR PHARMACEUTICAL RESEARCH

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Statistical methods are used to summarize the research data using statistical interpretation to make more understandable results. Variables play an important role to determine the accuracy of hypotheses of research.

Keywords: Statistics, Variable, Hypotheses.

THE INTERVAL VALUED FUZZY GRAPH ASSOCIATED WITH THE GRAPHICAL STRUCTURE OF THE CYCLIC GROUP

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In this paper, we have constructed the interval - valued fuzzy graph (IVFG) corresponding to crisp graph based on the inverse of the elements of the Cyclic group and analyze various properties. The edges of the IVFG corresponding to the crisp graph can be determined if the Inverse of the element in a group is identified. We proved few theorems and some results, which are carrying over to construct IVFG.

Keywords: Crisp Graphs, Interval valued fuzzy graphs, Cyclic Groups

EXISTENCE OF COMMON FIXED POINTS UNDER WEAK COMMUTATIVITY CONTINUOUS SELF-MAPPINGS IN COMPLETE MENGER SPACES

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Abstract: The purpose of this paper is to establish necessary and sufficient conditions for existence of a common fixed point of three maps f,g and h in a complete Menger space under a general contractive condition. Our main result is generalization of the result of Ismat Beg and Mujahid Abbas [7].

Keywords : Menger space, Compatible map, Compatible mapping of type(A), weakly compatible map.

DECEPTIVE ADVERTISEMENT AND ITS IMPINGEMENT ON CHILDREN

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The International Organisation for Standardisation has highlighted the need to regulate advertising targeted at children though such regulation is lagging behind (ISO 2019). Research on advertising to children has focused on a variety of topics including persuasive tactics utilized by advertisers targeting children, impingement of celebrities on children's buying behaviour and attitudes of parents toward regulating advertising targeted at children and views on stricter policy decisions by the government. The current study extends the literature and fills in the research gap by studying the influence of advertising on children, especially where celebrities endorse brands for children, and assessing the impingement of contemporary media advertisements as perceived by parents and parent attitudes on need for stronger regulatory framework.

Key Words: Unethical, Deceptive, celebrity, endorser credibility, regulatory framework

AUTOMATIC ANSWER CHECKER

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We have seen that a various of understudied petition for a range of assesments, which might begovermental, non-coercive, or perhaps serious. Ambitious tests usually have a purpose or multiple choice questions (mcqs). Automatic detection of direct or indirect answers may be a requirement that's considered today. This paper focuses on the event of a good algorithm which will automatically evaluate students' responses and supply scores supported good AI technology as scores given to humans. Here the concept of automatic text similarity is employed to develop an application that may check the answers to questions given automatically and determine the appropriateness of the answers.. An automated answer checker utility that exams and marks written answers much like a man or ladies. This software program application is built to check subjective solutions in an online exam and allocate marks to the consumer after verifying the answer. The device requires you to keep the precise solution for the system. This facility is furnished to the admin. The admin might also moreover insert questions and respective subjective solutions within the machine. those answers are saved as notepad documents. whilst someone takes the take a look at he is supplied with questions and area to kind his answers. as soon because the consumer enters his/her solutions the machine then compares this solution to particular answer written in database and allocates marks therefore

Keywords: E-appraisa, Accessible by computer topic Feedback Tester , preprogrammed subject matter comparibility, grammar,illustrative.

SPATIAL DOMAIN IMAGE ENHANCEMENT OF CHEST X-RAY IMAGES OF COVID-19

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Image enhancement is a technique that is commonly used in the field of image processing to improve image quality without modifying the content. COVID-19, a virus that affects the lungs of humans, has spread rapidly over the world this year. The use of X-ray imaging of human lungs to detect COVID-19-affected people is being studied. As a result, the pre-processing stage, which incorporates image enhancement, comes first before the detecting process. In the present paper, various spatial domain methods of image enhancement are presented and compared for their performance analysis on chest X-ray images of covid-19 affected patients.

Keywords: Contrast limited adaptive histogram equalizer, Contrast-stretching transformations, Histogram equalization, Linear transformation, Logarithmic transformation, MSE, Power Law transformation, PSNR.

FUZZY BASED ENERGY AWARE CLUSTER HEAD SELECTION IN WSN

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Energy is one of the challenging tasks in the wireless sensor network (WSN) paradigm. Clustering is one of the techniques to enhance the network lifetime. Cluster head selection is one of the important research issues. Though WSN is divided into different clusters for efficient data gathering in the context of energy dissipation, it improves energy efficiency with its cluster head (CH) selection mechanism. It organizes a network into a connected hierarchy and balances the load of the network. In a cluster-based WSN, each sensor node communicates the information to the cluster head. The cluster head is responsible for aggregating the gathered data and routing it to the sink of the deployed network. In this research, a fuzzy based CH selection algorithm (FBCS) is introduced, which takes into account the residual energy, distance from the sink, node-to-node distance, and degree of nodes as inputs to the Fuzzy Inference System. An eligibility index is computed for each node for the selection of a CH role. The experiment results show that the proposed model gives commendable results compared to existing approaches like LEACH, FEBCS and BCSA.

Keywords: Fuzzy logic. Cluster Head, WSN, Node degree

SATELLITE-BASED ESTIMATION OF HARMFUL EMISSIONS IN DENSLY POPULATED SOUTH ASIAN COUNTRIES USING DENSE DEEP NEURAL NETWORKS

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Improving acquiescence with ecological regulations is dangerous for generating clean environment areas and healthy populaces. In South Asia, there are various small scale and large scale industries is a major source of pollution but it is majorly subjugated by small-scale industries, there are various unceremonious creators who are difficult to monitor and regulate is a common encounter in low-income settings. This paper focuses how we can generate a low-cost and an easy approach for locating industries in high-resolution satellite imagery from South Asian countries. Various imprecisions and possible favoritism with regard to local protocols in the government data. Here the method creates a relation between machine learning and various Earth surveillance which can be jointly used to better comprehend and extent inferences of regulatory acquiescence in informal industries. We blend the rising literature that uses satellite images to understand these consequences, with a focus on various types of approaches that will be used to combine imaginings with machine learning. To focus on actual problems where there is shortage of various ground data on key human-related outcomes and the growing abundance and tenacity of satellite imagery. After this we will conduct analysis topical machine learning approaches to model-building in the background of uncommon and noisy training data, showing the importance of how this noise often leads to incorrect calculation of models. The paper focuses on Deep Learning tactic for spatially and temporally unceasing pollution plotting which depends on various collection of satellite recoveries. The back studies mainly relied on AOD, meteorological and land-use data which were is used to predict the ground level Pm and also depict the various creation/expansion and for diverse emission sources by mainly relying on satellite-retrieved data. Moreover, the existing application targets to quantify and apprehension of spatio-temporal patterns and long-term tendencies in PM10 and PM2.5 absorptions and their epidemiological impacts

Keywords:satellite images, machine learning, deep learning.

MULTI CRITERIA DECISION MAKINGTOOLS AND TECHNIQUE FOR THE SELECTION OF PLANT LAYOUT: A REVIEW

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The aim of this paper is to provide a survey related to different Multi Criteria Decision Making (MCDM) tool and techniques to pick the most suitable plant layout design. MCDM methods are particularly suitable to deal with complex situations and conflicting goals. To satisfied the conflicting goals MCDM used the criteria weight design by the expert. The review serves as a guide to those interested in how to evaluate and select the most appropriate layout which can handle an expanded range of manufacturing companies.

Keywords: Multi-Criteria Decision Making (MCDM), Plant Layout design selection, Criteria

CASE STUDY ON ONLINE FRAUD DETECTION USING MACHINE LEARNING

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Fraud means the representation of false information which is not true. In this world right now, there are many types of frauds are going on and we have to work on the detecting machine or algorithms so that we can find out the fraud this all process is about fraud detection. Machine Learning consists of many algorithms that can be used in fraud detection such as Random Forest, Local Outlier Fraction, Isolation Forest, Naïve Bayes, K-nearest Neighbor, Hidden Markov Model, Neural Networks, etc. that can be used in fraud detection. In this paper we have done comparative study of Random Forest algorithm and Local Outlier Factor. AI can help battle and defeat application fraud by recognizing illegal action from the get-go all the while. Algorithms can search for associations between applications for credit cards and loan applications, as well as monitor recently opened records to stop monetary harm before it happens.

MULTI-FACTOR AUTHENTICATION FOR HEALTHCARE CLOUD USING ROLE BASED ACCESS CONTROL

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Cloud technology is major technical development in information technology also unavoidable factor today. Industries are still upgrading their standards on demand and on requirement of customers in an effective way. The consumers always looking for security and cost-effective model. Among the types of cloud, the public cloud is the cost-effective model which helps lot the startup companies. Still the companies looking for securing the volumes of data. There are various mechanisms are there to protect the data, here we propose the security mechanism for health application over multi-factor authentication. There are numerous cloud security issues, of which this paper addresses the problem of security in cloud storage. An application programming interface is used it will be act as the validator in the cloud storage it be controlled by active directory (AD). We designed a multi-factor authentication method to validate the user and their role through the active directory. Hence, we proposed a strength access control mechanism implemented using Role based Access control Model.

Keywords: Cloud technology, Security, Healthcare, Access Control, RBAC.

ANTIOXIDANT PROPERTIES OFBAUHINIA PURPUREA L.

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Leguminosae, also known as legume, pulses, pea and bean family, is considered as a large economically important family due to its proteinaceous value. Although nitrogen is the most abundant gas in the atmosphere, it is not directly taken by ordinary plants and animal. But root nodules of legumes have symbiotic bacteria which are capable of converting atmospheric nitrogen into assimiable form by breaking their triazide bond, which is later converted into amino acids and proteins. Biological Nitrogen fixation is a very important characteristic feature of this family due to this forming the building block for protein. About 83 plant species of this family are growing luxuriantly in Durg district of Chhattisgarh (India). Thus a wise farmer repeats growing plants of this family in their field for biological nitrogen fixation. Primary and secondary metabolites are components of members of legume family due to inter-conversion of various metabolites through metabolic activities within the plant. Hence besides carbohydrates, proteins, fats and primary metabolites, they also consist of secondary metabolites like phenols, alkaloids, flavonoids, terpenes, terpenoids, glycosides, tannins, saponins, steroids etc. Antioxidants are compounds that inhibit oxidation, a chemical reaction that can produce free radicals and chain reactions, that may damage cells of organisms. The consumption of these plant products may protect organisms, directly or indirectly, from oxidative stress. Thus the present topic has been taken into consideration to find antioxidant properties of *Bauhinia purpureaL.* with the help of DPPH(1, 1-Diphenyl-2 -picrylhydrazyl) scavenging activity.

Keywords: Antioxidants, Secondary metabolite, Medicine, Bauhinia, Leguminosae, Durg

1. INTRODUCTION

Chhattisgarh is present in the heart of India and has a rich cultural heritage and numerous ethno-botanical medicinal plants. *Bauhinia purpurea*,locally known as "Sonpatti", is linked to the legend of Lord Rama (a deity in Hinduism) and istraditionally gifted to senior members of the family as a sign of love and Victory of Lord Rama over Ravana.The leguminosae family has many useful plants, ornamental plants, vegetables, crops, and is also important for its medicinal properties in local and tribal communities(Sutjaritjai et al.,2019, Kumar et al.,2021). *Bauhinia purpurea L.* is a flowering plant species belonging to the family of leguminosae. Their different parts have been used in medicine for treatment of pain, fever, stomach pain, diarrhea, etc. (Annegowda et al.,2011). Due to the Phenol content, it has excellent antioxidant property. Antioxidant compounds have the ability to slow the process of oxidation by terminating the oxidation chain reactions (Kushwaha and Narayan,2018). Oxidation means transfer of electrons of a molecule to an oxidizing agent. Oxidation reaction is caused due to free radicals that start chain reactions immediately which result in damage to the living cells (Shrivastava et al.,2014). Antioxidants such as thiol or ascorbic acid (vit.C) may act to inhibit this chain reaction to balance oxidative stress in plants and animals. Vitamin A, C, & E are only dietary oxidants. Although certain level of antioxidants vitamins in the diet is required for good health, there is still considerable debate on whether antioxidants rich food has anti microbial or anti-disease activity (Maret et al.,2011).

2. LITERATURE REVIEW

Shajiselvin C.D. & Kottai Muthu A. et al. (2010), in-vitro evaluation of various extract of whole plants of *Bauhinia Purpurea L.* Annegowda H.V. et al. (2011), they work on HPTLC determination of antioxidant and anti-bacterial activity of *Bauhinia purpura* L. Murgan M. & Mohan V. R. (2011), evaluation of phytochemical analysis & antibacterial activity of extract of leaf & stem barks of *Bauhinia purpurea L..* Marimuthu K. (2014), estimate the antioxidant potential of *B. purpurea L.* and confirm its diversified therapeutic applications. Marimuthu K. & Dhanalakshmi R. (2014), study on phytochemicals in leaf and flower extract of *Bauhinia purpurea L.,* etc.

3. EXPERIENTIAL WORK

Durg district fall between $21.1623°$ N latitude and $81.4279°$ E longitude. The district covers an area of 2,238 km².

Longitude 81° 10' 24.74" to
81° 36' 22.31" E

Latitude 20° 54' 40.95" to
21° 32' 57.10"N.

Total Area=2238.36 Sq. km.
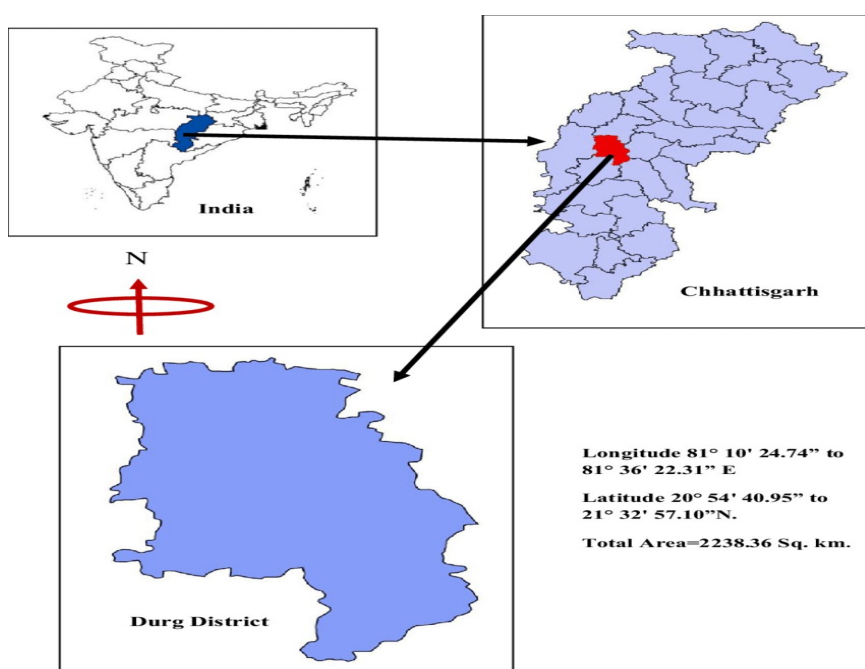
3.1 Extraction:

The leaves of *Bauhinia purpurea* L. were collected from Durg district of Chhattisgarh. The leaves were initially separated from the main plant body and washed with distilled water and dried in shade paper towels in laboratory and then precisely homogenized into fine particles and extraction was performed.

Figure 1: *Bauhinia purpurea L.*

Preparation of extract:

We have studied and analyzed the impact of different types of solvents viz. water, methanol, ethanol, and chloroform for the purpose of antioxidant extraction. The present work has been carried in aqueous and methanol extract.

Aqueous extraction

20 gm of leaves shade dried powder was weighed and soaked separately in 50ml cold water in a conical flask with rubber cork stopper and leave it for 24 hrs uninterrupted condition and then separate the filtered in sterile conical flask by using sterile filter paper (Whatman No: 1). The extract was got with the help of muslin cloth and was subjected to centrifugation at 5000X rpm for 5 minutes and the supernatant was obtained and stored at 4°C for further use.

Methanol extraction

20 gm of each leaf shade dried powder was weight and was placed in 100ml of organic solvent (methanol) in a conical flask and then kept in a rotary shaker at 190-220 rpm for 24 hrs after 24 hrs it was filtered with the help of muslin cloth and centrifuged at 5000X rpm for 15 minutes. The supernatant was collected and the solvent was evaporated to make the final volume of one-fourth of the original volume, giving a concentration of 40 µg/0.1ml stored at 40°C in air tight bottles for further studies .

3.2 Determination of primary and secondary metabolites

The primary and secondary metabolite content of aqueous and methanol extract was analyzed.

Test of carbohydrate: Fehling's test, Benidict's test, Molisch's test, Iodine test were done.

Test of protein: Biuret's test, Million's test, Ninhydrin test were done.

Test of lipid: Emulsion test was done.

Test of phenol: Folil-ciocalteau test and ellagic acid test were done.

Test of alkaloids: Mayer's test, and Hager's test were done.

Test of glycosides: Liebermann's test, Salkowaski's test, Keller-Killiani test, Borntrager;s test were done.

Test of terpenoids & terpene: Test for terepene and terpenoids were done.

Test of tannins: Ferric chloride solution test for Tannins was done.

Test of saponin: Froth test, and Foam test were done.

Test of flavonoids: Lead acetate test and Shinoda test were done.

Test of steroids: Sulfuric acid test, naphthol-sulfuric acid test, Liebermann's test, and Mandelin's test were done.

Determination of antioxidant activities:

Aqueous and methanol extract has been adopted for testing of antioxidant activities and we have performed 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging assay.

Assay of free radical scavenging activity by DPPH method:

The antioxidant activities were determined using DPPH, (Sigma-Aldrich, Germany, M.W.394.32M) as a free radical. 1µg/ml solution of plant extract in methanol was prepared & 6×10^{-5}mol/L DPPH was prepared in methanol. 0.1 ml of plant sample extracts was added to 3.9 ml of DPPH solution. Then the decrease in absorbance at 517nm was recorded at 1 min interval up to 15 minute or until the reaction is reached a level. Firstly, absorption of blank sample containing the same amount of methanol and DPPH solution was prepared and measured as a control. Ascorbic acid (Merck; M.W.176.13) was used as a standard. The experiment was carried out in triplate. Then the free radical scavenging activity was calculated by the following formula:

Percentage (%) DPPH radical scavenging activity =

[(Absorbance of control -Absorbance of test Sample)] / (Absorbance of control) × 100

Assay of reducing power

The reductive potential of the extract was evaluated by the method of (Oyaizu., 1986).1 ml of extract (100, 200 and 300 µg/ml) mixed in distilled water and add 2.5 ml of 0.2 M phosphate buffer (pH 6.6) and 2.5 ml of 1% potassium ferricyanide [K3Fe(CN)6]. Similar concentrations of standard routine were used as standard. The mixture was incubated at 50°C for 15-20 minutes. Then, the reaction was terminated by adding 2.5 ml of 10% trichloroacetic acid. The upper layer of solution (2.5 ml) was mixed with the distilled water (2.5 ml) and 0.5 ml of 0.1% FeCl3 was added. As above without adding any extract blank reagent is prepared. Then the absorbance was measured in a spectrophotometer against a blank sample at 700 nm. The result was shows that increased absorbance of the reaction mixture indicated greater reducing power (Chopra, et al., 2002).

4. RESULT AND DISCUSSION

In plants, alkaloids and phenolic compounds constitute the main class of natural antioxidants present in plants. The use of plant extract and phytochemicals with antioxidant activity can be shows most significant effect on treatment on many diseases. The phytochemical screening of aqueous and methanol extract of *Bauhinia purpurea* showed the positive result in primary and secondary metabolite test of protein, carbohydrate, lipid, phenols, alkaloids, glycosides, flavonoids, terpene & terpenoids, steroids, tannins and saponins etc. DPPH is a radical that has been used widely to evaluate the antioxidant activity of various natural products. Antioxidants have been the most effective way to eliminate adverse effects caused by free radicals in plants but an antioxidants can scavenge them. The experiment of DPPH shows the decreasing of absorbance is due to the presence of antioxidants. The purple colour was turns to yellow due to decrease of absorbance. It was reported by (Yadav et al., 2011) that DPPH absorbance is reduced by antioxidant compound or free radicals spices to become stable diagnostic molecules resulting colour change from purple to yellow that can indicates that hydrogen denoting ability of extract sample *Bauhinia purpurea.*

Table 1: Results of Preliminary phytochemical screening of the leaf extract (Aqueous/Methanol) of *Bauhinia purpurea*				
Plant part	**NAME OF TEST**		**Results**	
			Aqueous	**Methanol**
*Bauhinia purpurea L. (*Leaves)	Primary Metabolites	Carbohydrates	+ve	+ve
		Proteins	+ve	+ve
		Fixed oils & fatty acids	-ve	+ve
	Secondary Metabolites	Phenols	+ve	+ve
		Flavonoids	+ve	+ve
		Alkaloids	+ve	+ve
		Steroids	-ve	+ve
		Terpene & Terpenoids	+ve , +ve	+ve , +ve
		Tannins	-ve	+ve
		Saponins	+ve	+ve
		Glycosides	+ve	+ve

Table 2: Results of DPPH ASSAY		
Sl. No.	μg/ml	OD(scavenging activity %)
1	0	0
2	1	0.99
3	10	0.86
4	20	0.77
5	30	0.62
6	40	0.53
7	50	0.50
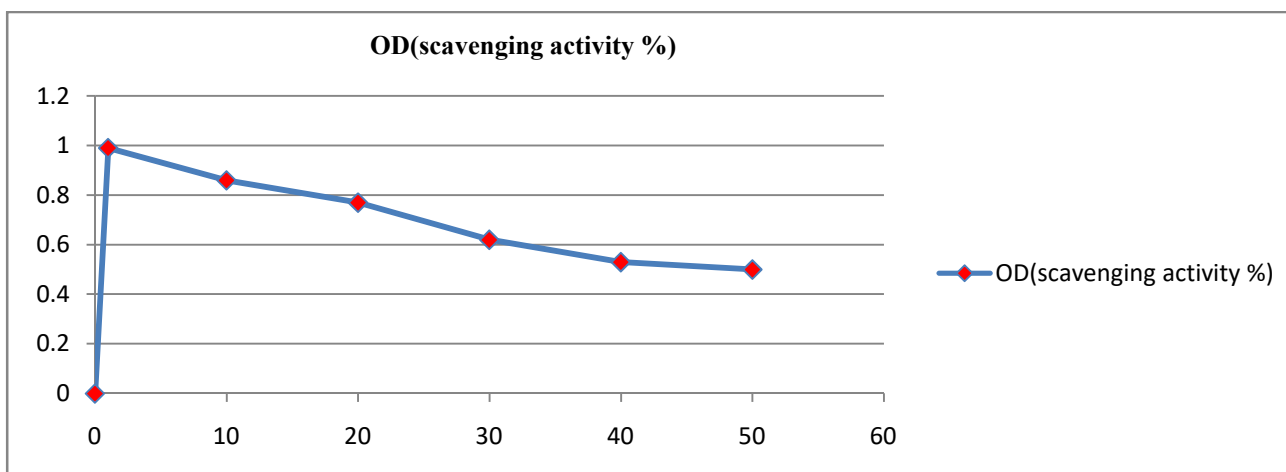
Figure 2: OD (Scavenging activity %)

Table 3: Scavenging activity % Ascorbic acid and Leaves of *Bauhinia purpurea*			
Sl. No.	μg/ml	Ascorbic acid (Scavenging activity %)	Bauhinia purpurea(scavenging activity %)
1	0	0	0
2	1	22.26±2.33	17.50±1.76
3	10	29.51±3.80	25.26±1.33
4	20	36.98±1.26	31.04±2.98
5	30	40.63±2.15	36.80±1.05
6	40	44.98±3.68	41.75±1.48
7	50	56.26±1.75	49.33±2.69

Scavenging activity of Ascorbic acid and Bauhinia Purpurea
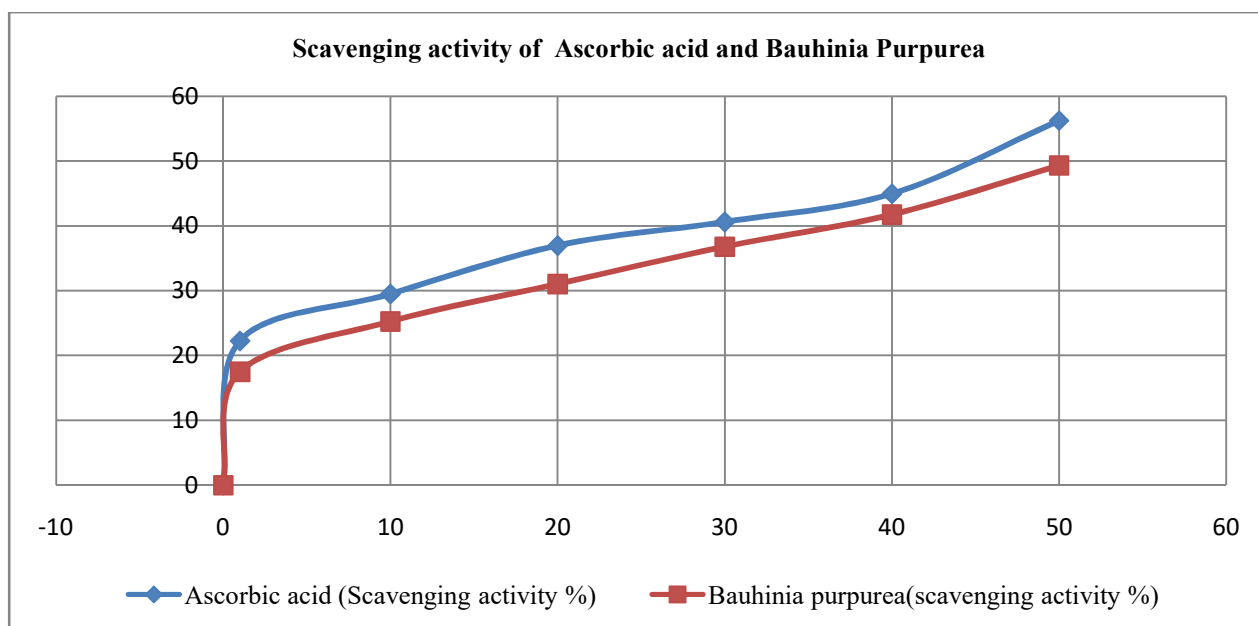
Figure 3: Scavenging activity of Ascorbic acid and Bauhinia Purpurea

5. CONCLUSION :

The present study analyzed that the presence of secondary metabolites in *Bauhinia purpurea.* Due to presence of phenolic secondary metabolites *Bauhinia* shows antioxidants activity. This antioxidant properties increases their medicinal value that's why mostly people of tribal and local inhabitants used in medicine as well as leafy vegetable in their diet. Knowledge about the metabolic content like phenol, alkaloids etc. and antioxidant properties of *Bauhinia purpurea* leaf assist in the efforts to achieve commercial utilization of plant as a new source of antioxidants. That's why this study will be relevant for the pharmaceutical, medical and biochemical science. Being a photosynthetic organ although leaves shows presence of primary and secondary metabolites with antioxidant properties but due to translocation of this important macromolecules where they are being stored is to be work further. So, the further study will be carried out on whole parts of *Bauhinia pupurea L.*

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ASTUDYOFNOVEL CORONAVIRUS(COVID-19) DIAGNOSIS SYSTEM FROM CT & X-RAY IMAGE BASED ON DEEPLEARNINGTECHNIQUES

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Novel corona virus (COVID-19) has raised a calamitous situation all over the world and has become one of the most acute and severe ailments. The infection rate of COVID-19 is rapidly rising every day. Deep learning techniques are powerful tool for the diagnosis of COVID-19. This paper aims to overview the recently developed systems based on deep learning techniques using different medical imaging system like Computer Tomography (CT) and X-ray. This review discusses the systems developed for COVID-19 diagnosis based deep learning techniques and highlights the various performance measures developed by researchers.I also conclude the challenges associated with the use of deep learning methods for COVID-19 detection. The aim of this paper is to facilitate experts to understanding the deeplearning techniques that are used in this regard and how they can be potentially furtherutilized to combat the outbreak of COVID-19.

Keywords: Coronavirus,COVID-19,Deeplearning,Deeptransferlearning,Diagnosis,X-ray,Computer tomography.

1. INTRODUCTION

Novel corona virus(COVID-19),resulting from a severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has become a pandemic worldwide in recent times (Wu, et al., 2020 & Cucinotta, et al., 2020). The number of infected cases as well as the death rate is increasing rapidly. As of the writing of this manuscript, it is reported that more than 253929777 people have been infected with COVID-19, the death cases are around 5114383 and the number of recovered patients is around 229615540 globally (Worldometers, 2021). The universal transmission of COVID-19 has put a large portion of the world's population into quarantine and ravaged numerous industrial sectors which in turn caused a worldwide financialcrisis.

The most typical signs of the novel coronavirus include fever,dry cough,myalgia,dyspnea,and headache (Huang, et al., 2020 & Vetter, et al., 2020)but in some scenarios, no symptoms are visible(asymptomatic) that make the disease an even bigger threat to public health. The reverse transcript polymerase chain reaction (RT-PCR) is considered as the gold standard for COVID- 19 diagnosis (Ai, et al., 2019) .

Specifically, for COVID-19 diagnosis, different imaging modalities like CT and X-ray are considered among the mosteffective techniques (Kanne, 2020, Rubin, et al., 2020 & Dong, et al., 2021).These traditional medical imaging modalities play a vital role in the control of the pandemic.

Artificial Intelligence (AI), an evolving software technology in the area of medical image analysis has also directly helped combating the novel coronavirus (Shi, et al., 2021 , McCall, et al., 2020 & Vaishya, et al., 2020) by efficiently providing high quality diagnosis results anddramatically reducing or eliminating manpower.Veryrecently,deep learning and machine learning, two major areas of AI have become very popular in medical applications. Deep learning based support systems are developed for COVID-19 diagnosis using both CT and X-ray samples (Mei, et al., 2020 , Wynants, et al., 2020, Wynants, et al., 2020 & Huang, et al., 2020). Machine learning (Albahri, et al., 2020 & Muhammad, et al., 2020) and data science (Latif, et al., 2020) are also thediverse areas that are actively used for corona diagnosis, prognosis, prediction, and outbreak forecasting. Computer vision (Ulhaq, et al., 2020)has also contributed for the reduction of the severity of this pandemic. Moreover, Internet of things (IoT) (Singh, et al., 2020 & Swayamsiddha, et al., 2020)big data (Shah, et al., 2020 & Haleem, et al., 2020) and smart phone technology (Iyengar, et al., 2020 & Banskota, et al., 2020)are extensively utilized to enable innovative solutions to fight against the spread ofCOVID-19.

The main aim of the paper is to review there cent developments of deep learning based COVID-19 diagnosis systems based upon data collected from medical imaging samples. I review the most vital schemes developed for the diagnosis of COVID-19 highlighting some aspects such as the data used for experiments, the data splitting technique, the proposed architecture for detection,and the evaluation metrics.

Deep learning techniques are able to explain complex problems by learning from simple depictions. Deeplearning methods are widely use dinmedical system such as biomedicine **(Wainberg, et al., 2018)** smart healthcare **(Esteva, et al., 2019)** , drug discovery **(Chen, et al., 2018)**, medical image analysis **(Shen, et al., 2017)**etc.

More recently, it is extensively used in the diagnosis of COVID-19 in patients.Ingeneral, deep learning based systems are comprised of several steps such as data collection,data preparation,feature extraction and classification, and performance evaluation. The general structure of a COVID-19 diagnosis system based on deep learning isillustrated in Figure1. At the data collection stage,the patients from the hospital environment are considered as a participant. The data may have different forms but for COVID-19 diagnosis, imaging techniques like CT and X-ray samples are taken.
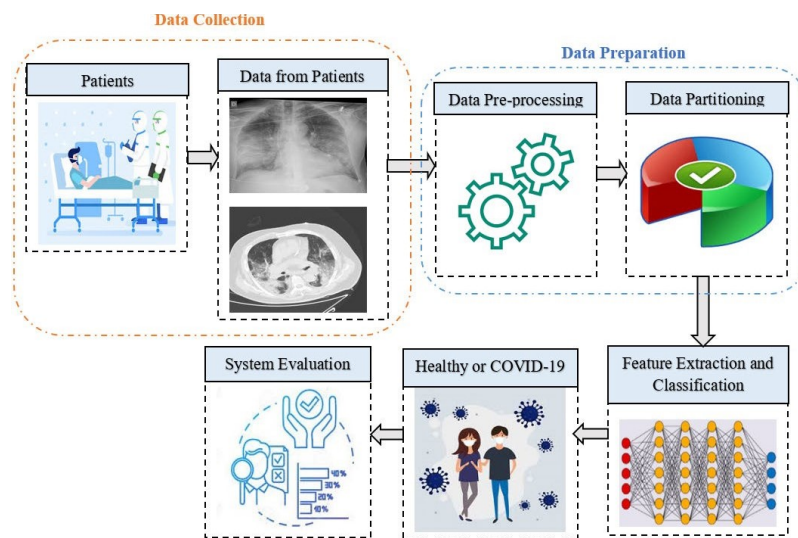
FIGURE 1.A general structure of deep learning based COVID-19 diagnosis system.

2.   DIAGNOSIS USING COMPUTER TOMOGRAPHY (CT) IMAGES

Wu et al. (2020) introduced a deep learning multi-viewfusion concept system which is a variant of CNN called ResNet50 for screening of coronavirus. The dataset is collected total of 495 images from two hospitals in China into account for the experiment in which 368 are associated with confirmed COVID-19 cases, and 127 are of other pneumonia. The dataset isdividedintoaproportionof80% fortraining,10% for testing,and10%forvalidation. In the test case, the developed system obtained accuracyof76%,sensitivityof81.1%,specificityof 61.5%, and Area under Curve (AUC) of 81.9%.

Lietal. (2020) demonstrated a deep learning technique ResNet50 which is a variant of CNN.The dataset consists of 4536 chest CT samples, including 1296 samples for COVID-19, 1735 for community acquired pneumonia (CAP), and 1325 for non-pneumonia. The dataset is divided into a proportion of 90% for training and 10% for testing. The experimental result showed that the system obtained sensitivity of 90%, specificity of 96%, and AUC of 96% for COVID-19cases.

Yousefzadehetal. (2020) introduced deep learning techniques DenseNet, ResNet,Xception,andEfficientNetB0 which is a variant of CNN. TheDatasetcontained 2124 CT slices in overall where 1418 images are of non-COVID-19, and 706 slices are of COVID-19 infected cases. The dataset divided into a proportion of 80% for training and 20% validation.Theproposedsystem foundaccuracyof96.4%,sensitivity of 92.4%,specificity of 98.3%, F1-score of 95.3%, and AUC of 98.9% from the experiment.

Jinetal. (2020) developed ResNet152 which is a variant of CNN.The dataset is collected from three renowned Chinese hospitals and two publicly available databases. A total number of 1881 cases are considered where 496 cases are for COVID-19 infected patients, and 1385 are negative cases. The dataset is split randomly for experiments. The system achieved an accuracy of 94.98%, sensitivity of 94.06%, specificity of 95.47%, precision of 91.53%, F1-score of 92.78, and AUC of97.91% from theexperiment.

Xu et al. (2020) developed a system called Resnet18 for classifying healthy individuals from COVID-19 pneumonia andInfluenza-AviralpneumoniautilizingCNNvariants. Thedatais collected from three different hospitals in China. This study considers 618 CT images in which 219 images are obtained frompatientsinfectedwithCOVID-19,224fromInfluenza-A viral pneumonia, and 175 from normal individuals. To train the model, a total of 85.4% (528) images are used, and the remaining samples are used to test the developed model. The framework achieved 86.7% accuracy, 81.5% sensitivity, 80.8% precision, and 81.1% F1-score from the experiment.

Jin et al. (2020) introduced a medical system for COVID-19 screening using deep learning techniques. Their system used various pre-trained models of CNN like DPN- 92, Inception-v3, ResNet-50, and Attention ResNet-50 with 3D U-Net. The dataset is retrieved from different five hospitals in China. In this system, a total of 139 samples are used where 850 sample from COVID-19, and 541 samples from other cases which are considered as negative. The total data is randomly split into training and testing sets for performance evaluation. The system obtained sensitivity, specificity, and AUC of 97.4%, 92.2%, and 99.1% respectively using 3D Unet ResNet-50which isconsideredasthebestmodel.

Javaherietal.(2020) developed a deep learning approach called CovidCTNet for detecting coronavirus infection via CT images. The system used BCDU-Net architecture which is developed based on U-Net. The scheme distinguished COVID-19 from CAP as well as other lung disorders. The system used 89,145 CT images in total where 32,230 CT slices are confirmed with COVID-19, 25,699 CT slices are confirmed with CAP, and 31,216 CT slices

90% is used for training and 10% is utilized for testing. The experimental results obtained accuracy, sensitivity, specificity, AUC of 91.66%, 87.5%, 94%, and 95%respectively.

Ardakani et al. (2020)*proposed* a system for the detection of COVID-19 using ten variants of CNN techniques in CT images.TheusedpopularvariantsfordiagnosisareAlexNet, VGG-16, VGG-19, SqueezeNet, GoogleNet,MobileNet-V2, ResNet-18, ResNet-50, ResNet-101, and Xception. In the proposed system, a total of 1020 CT samples are considered fromthecasesofCOVID-19andnon-COVID-19.Thedataset issplitintotrainingandvalidationsetinaproportionof80% and 20% respectively. Among the 10 networks, ResNet- 101 and Xception performed comparatively better than the others. The ResNet-101 model obtained accuracy of 99.51%, sensitivity of 100%, AUC of 99.4%, and specificity of 99.02%. Inanothernetwork,Xceptionfoundtheaccuracy,sensitivity, AUC, and specificity of 99.02%, 98.04%, 87.3%, and 100% respectively.

Chen et al. (2020)introduced a deep learning based scheme in which a powerful pre-trained model named UNet was applied to high-resolution CT images for COVID-19 detection. Initially, UNetextracted valid regions in CT images. In this study, 46,096 images are collected from a hospital including 51 COVID-19 infected patients and 55 infected with other diseases. Among the dataset, 35,355 images are selected while eliminating low images using filtering and partitioned into training and testing set respectively. The sensitivity of 94.34%, specificity of 99.16%, accuracy of 98.85%, precision of 88.37%, and negative predictive value (NPV) of 99.61% are achieved.

Cifci(2020)presentedaschemefortheearlydiagnosis of coronavirus using various pre trained models with deep transfer learning. The pre-trained models are AlexNet and Inception-V4 which are popular for medical image analysis. The study is carried out through CT images. To develop the system, 5800 CT images are retrieved from a public repository. As a training step, 4640 (80%) CT samples are used, while 1160 (20%) samples are used for testing. AlexNet performed comparatively better than Inception-V4whichisfoundthroughexperimentalresults.AlexNetgot anoverallaccuracyof94.74%withsensitivity,andspecificity of 87.37%, and 87.45%respectively.

TABLE 1 : Summary of deep learning based COVID-19 diagnosis in CT images

Authors	Data Source	Number of images	Number of classes	Partitioning	Techniques	Performances (%)
Wu et al. (2020)	Two hospitals (China Medical University, Beijing Youan Hospital)	495 (Covid -19 = 368, other pneumonia=1 27)	2 (Covid-19, other pneumonia)	Training = 80%, Testing = 10%, Validation = 10%	ResNet50	Accuracy = 76, Sensitivity = 81.1, Specificity = 61.5, AUC = 81.9
Li et al. (2020)	Multiple Hospital	4536 (Covid-19 = 1296, CAP = 1735, non-pneumonia=1 325)	3 (Covid-19, CAP, non-pneumonia)	Training = 90%, Testing = 10%,	ResNet50	Accuracy = 90, Specificity = 96, AUC = 96
Yous efzadeh et al. (2020)	Real-time data from hospital environment	2124 (Covid-19 = 706, non-Covid 19=1418)	2 (Covid-19, non-Covid-19)	Training = 80%, Testing = 20%,	DenseNet, ResNet, Xception, EfficientNetB 0	Accuracy = 94.4, Sensitivity = 92.4, Specificity = 98.3, FI-Score = 95.3, AUC = 81.9,

						Kappa=91.7
Jin et al. (2020)	Three different hospitals (Wuhan Union Hospital, Western Campus of Wuhan Union Hospital, Jianghan Mobile Cabin Hospital)	1881 (Covid-19 positive = 496, Covid 19 negative =1385)	2 (Covid-19 positive, Covid-19 negative)	Random partition	ResNet152	Accuracy = 94.98, Sensitivity = 94.06, Specificity = 95.47, Precision=91.53 FI-Score = 92.78, AUC = 97.91, NPV=96.86, Youden Index= 89.53
Xu et al. (2020)	Zhejiang University, Hospital of Wenzhou, Hospital of Wenling	618 (Covid-19 = 219, Influenza-A-viral-pneumonia = 224, irrelevant to infection = 175)	3 (Covid-19, Influenza-A-viral-pneumonia, irrelevant to infection)	Training + Validation = 85.4%, Testing = 14.6%	ResNet18	Accuracy = 86.7, Sensitivity = 81.5, Precision=80.8, FI-Score = 81.1
Jin et al. (2020)	Five different hospital of China	1391 (Covid-19 positive = 850, Covid 19 negative =541)	2 (Covid-19 positive, Covid-19 negative)	Random partition	DPN-92, Inception-v3, ResNet-50, Attention ResNet-50 with 3D U-Net++	Sensitivity = 97.04, Specificity = 92.2, AUC = 99.1,
Javaheri et al. (2020)	Five medical center In Iran	89,145 (COVID-19 = 32,230, CAP = 25,699 other Diseases = 31,216)	3 (COVID-19 CAP, other diseases)	Training = 90% Validation = 10%	BCDU-Net (U-Net)	Accuracy = 91.66, Sensitivity = 87.5, Specificity = 94, AUC = 95
Ardakani et al. (2020)	Real-time data from hospital environment	1020 (Covid-19 = 510, non-Covid 19=510)	2 (Covid-19, non-Covid-19)	Training = 80%, Testing = 20%,	AlexNet, VGG-16, VGG-19, SqueezeNet, GoogleNet, MobileNet-V2, ResNet-18, ResNet-101, Xeeption	Accuracy = 99.51, Sensitivity = 100, Specificity = 99.02, Precision = 99.27, AUC = 99.4, NPV=100
Chen et al. (2020)	Renmin Hospital of Wuhan university	35355	2 (Covid-19, other diseases)	Random partition	UNet	Accuracy = 98.85, Sensitivity = 94.34, Specificity = 99.16, Precision = 88.37, AUC = 99.4, NPV= 99.61
Cifci	Different	5800	2	Training	AlexNet,	Accuracy =

(2020)	website's data from Kaggle		(Covid-19, other pneumonia)	= 80%, Testing = 20%,	Inception-V4	94.74, Sensitivity = 87.37, Specificity = 87.45

3. DIAGNOSIS USING X-RAYIMAGES

Apostolopoulos et al. (2020) developed a system for the automatic diagnosis of COVID-19 cases utilizing the concept of transfer learning with five variants of CNNs.The pre-trained models which are used in the system are VGG19, MobileNetv2, Inception, Xception, and Inception- ResNet-v2. The system considered 1427 images including 224forCOVID-19,700 for common pneumonia, and 504 for healthy cases in the first scenario. In the second scenario, 224COVID-19 images,714bacterial and viralpneumonia images, and 504 healthy individual images are considered. The dataset was divided using the 10-fold cross-validation method. The highest accuracy of 96.78%, sensitivity of 98.66%,and specificity of 96.46% are obtained for the second data set using MobileNetv2.

Loeyetal.(2020) introducedanovelsystemforthediagnosis of coronavirus using Generative Adversarial Network (GAN) and pre-trained models of CNN with deep transfer learning. The pre-trained models which are used in the proposed system are Alexnet, Googlenet, and Resnet18. As the number of X-ray images for COVID-19 is small, GAN is used to generate more   samples   for   accurate   detection   of   this virus.Atotalnumberof307imagesareconsideredincluding four classes like COVID-19, normal, pneumonia_bac, and pneumonia_vir. The system experimented on three different scenarios of the   dataset   depending   on   the   consideration   of classlevel.Consideringfourclasses,Googlenetobtained the highest accuracy of 80.6%. Alexnet and Googlenet achieved accuracy of 85.2% and 100% respectively.

Horry et al. (2020) described a COVID-19 detection system used four popular pre-trained models like VGG, Inception, Xception, and Resnet with transfer learning. The used dataset consisted of 100 COVID-19 cases,100 pneumonia,and 200 healthy cases for experiments. In this system, the data is partition for training and testing in a ratio of 80. The experimental findings reveal that the system obtained precision, sensitivity, and F1-score of 83%, 80%, and 80% respectively using VGG19 which is measured as the highest performance in the study considering three class data.

Ozcan (2020) proposed a deep learning scheme with a combination of the grid search strategy and three pre-trained models of CNN(GoogleNet,ResNet18,andResNet50).The system used three public datasets where the images are of 242 bacteria cases, 131 COVID-19 cases, 200 normalcases,and148viralcases.Allthedataarepartitioned into training, testing, and validation set in a proportion of 50:30:20. The ResNet50 with grid search performed better and obtained accuracy of 97.69%, sensitivity of 97.26%, specificity of 97.90%, precision of 95.95%, and F1-score of96.60%.

Sethyet al.(2020) introducedasystemforthediagnosis of COVID-19 cases using pre-trained models of CNN and Support Vector Machine (SVM). The algorithm used eleven CNNpre-trained models for automatic extraction of features, and SVM for classification. In this system, two separate datasetswereusedwherethefirstdatasetincluded25positive COVID-19 and 25 negative X-ray images of COVID-19. A total of 133 images containing Middle East

Respiratory Syndrome (MERS), SARS, and Acute Respiratory Distress Syndrome (ARDS) are used as positive samples and 133 normal X-ray images as negative samples in thesecond dataset. From the experimental results, it is found that Resnet50 with SVM obtained accuracy, False Positive Rate (FPR),Matthews Correlation Coefficient(MCC) ,and Kappa of 95.38%, 95.52%, 91.41%, and 90.76% respectivelywhich the best is in the developed system for the first scenario of the dataset.

Minaee et al. (2020) proposed a framework named Deep-COVID using the concept of deep transfer learning for COVID-19 prediction in X-ray images. Four popular pre-trained models like ResNet18, ResNet50, SqueezeNet, and DenseNet-121wereconsideredinthisstudyforCOVID-19 diagnosis. In total, 5071 images are collected from different open access resources. Among them, 2000 images with 31COVID-19caseswereusedfortraining,and 3000 images with40COVID-19 in fected cases were used fort estingin the experiments.The resulting dataset was named COVID-Xray.The best performance obtained by the system is sensitivity of 100%, and specificity of 95.6% usingSqueezeNet.

Punn et al. (2020)developed an automated COVID-19 diagnosis system using several pre-trained models like ResNet, Inception-v3, Inception ResNet-v2, DenseNet169, and NASNetLarge with a small number of X-ray images. The system used random oversampling and a weighted class loss function for fine tuningknownastransferlearning.Inthissystem,atotal of 1076 chest X-ray images are considered for experiments. The dataset is partitioned into 80%, 10%, and 10% ratios for training, testing, and validation set respectively. From the experimental results, it was shown that NASNetLarge performed comparatively better and achieved accuracy, precision, sensitivity, AUC, specificity, and F1-score of 98%, 88%, 91%, 99%, 98%, and 89% respectively.

Narin et al. (2020) introduced a method for automatically classifying COVID-19 infected patients from X-ray images using the variants of CNN. The pre-trained models used are ResNet50, InceptionV3, and Inception-ResNetV2 which obtainedhigherpredictiveaccuracyonasubsetX-raydataset. Thesystemusedatotalof100X-rayimageswhere50images were from COVID-19 patients while the remaining 50 from healthy individuals. The 5-fold cross-validation was used to partitionthedatasetfortheexperiment.Thesystemachieved an accuracy of 98%, 97%, and 87% from ResNet50, InceptionV3, and Inception-ResNetV2 respectively in test cases. Intermsofotherevaluationmetrics,thebestperformancewas obtained using RecNet50 with a recall of 96%, specificityof 100%, precision of 100%, and F1-score of98%.

Bukharia et al. (2020) presented a COVID-19 diagnosis system using a variant of CNN named Resnet50. The system considered 278 X-ray images of three classes where89 samples of COVID-19 infected, 93 samples of healthy participants, and 96 samples of pneumonia patients. The collected dataset was split into two sets like training and testing in a proportion of 80% (223 images), and 20% (55 images). The diagnosis process obtained accuracy, precision, recall, and F1-score of 98.18 %, 98.14%, 98.24%, and 98.19 % respectively from the experiment.

Abbas et al. (2020) categorized COVID-19 infectedpatients, from healthy individuals using Decompose, Transfer, and Compose (DeTraC) deep ResNet18. The proposed DeTraC can fix any anomalies in the image dataset through the use of a class decompos it ion method to investigate classboundaries. In this system, a total of 196 images were utilized where   80

samples of normal patients, 105 samples of COVID-19, and 11 samples of SARS. The system generated 1764 samples from given samples using decomposition. The dataset was split into two groups, 70% for system training and 30% for evaluation. The proposed system

achieved accuracy of 95.12%, sensitivity of 97.91%, specificity of 91.87%,and precision of 93.36% using DeTraC-ResNet18framework.

TABLE 2: Summary of deep learning based COVID-19 diagnosis in X-ray images.

Authors	Data Source	Number of images	Number of classes	Partitioning	Techniques	Performances (%)
Apostolopoulos et al. (2020)	Covid-19 X-ray image database (Cohen et al., 2020), Kaggle dataset (2020), Kermany et al. (2018)	1442 (Covod-19 = 224, pneumonia = 714, normal = 504)	3(Covid-19, pneumonia, normal)	10-fold cross-validation	VGG19, MobileNetv2, Inception, Xception, Inception-ResNetv2	Accuracy = 96.78, Sensitivity = 98.66, Specificity = 96.46
Loey et al. (2020)	Covid-19 X-ray image database (Cohen et al., 2020), Kermany et al. (2018), Dataset (2020)	307 (Covod-19 = 69, normal = 79, pneumonia_bac = 79, pneumonia_vir = 79)	4(Covod-19, normal, pneumonia_bac, pneumonia_vir)	Training = 80%, Testing = 10%, Validation = 10%	GAN, AlexNet, Googlenet, Resnet18	Accuracy = 100, Sensitivity = 100, Precision = 100, F1-Score = 100
Horry et al. (2020)	Covid-19 X-ray image database (Cohen et al., 2020),, NIH Chest X-Ray (2020)	400 (Covod-19 = 100, pneumonia = 100, normal = 200)	3(Covid-19, pneumonia, normal)	Training = 80%, Testing = 20%	VGG16, VGG19, ResNet50, InceptionV3, Xception	Sensitivity = 80, Precision = 83, F1-Score = 80
Ozean (2020)	Covid-19 X-ray image database (Cohen et al., 2020), Kaggle chest x-ray repository (2020)	721 (Covod-19 = 131, bacteria = 242, normal = 200, virus = 148)	4(Covod-19, normal, bacteria, virus)	Training = 50%, Testing = 30%, Validation = 20%	GoogleNet, ResNet18, ResNet50	Accuracy = 97.69, Sensitivity = 97.26, Specificity=97.90 Precision = 95.95, F1-Score = 96.60
Sethy and Behra (2020)	Covid-19 X-ray image database (Cohen et al., 2020), NIH Chest X-Ray (2020), Kaggle chest x-ray repository (2020)	316	2(Covid 19 +, Covid-19 -)	Training = 60%, Testing = 20%, Validation = 20%	AlexNet, VGG16, VGG19, GoogleNet, ResNet18, ResNet50, ResNet101, InceptionV3, InceptionResNetV2, DesneNet201, XceptionNet, SVM	Accuracy = 95.38, Sensitivity = 97.47, Specificity=93.47 Precision = 95.95, F1-Score = 95.52, MCC=91.41, FPR=91.41, Kappa=90.76
Minaee et al. (2020)	Covid-19 X-ray image database (Cohen et al., 2020), ChexPert (Irvin	5071 (Covid -19 = 71, non-Covid = 5000	2(Covid 19, non-Covid-19)	Training = 40%, Testing = 60%	ResNet18, ResNet50, SqueezeNet, DesneNet121	Sensitivity = 100, Specificity=95.6 AUC = 99.6

	et al., 2019)					
Punn and agarwal (2020)	Covid-19 X-ray image database (Cohen et al., 2020), RSNA Pneumonia detection Challenge dataset (Radiological Society of North America , 2020)	1076 (Covod-19 = 108, pneumonia = 515, normal = 453)	3(Covod-19 , pneumonia , normal)	Training = 80%, Testing = 10%, Validation = 10%	ResNet, Inception-v3, Inception, ResNet-v2, DesneNet169, NASNet	Accuracy = 98, Sensitivity = 91, Specificity=91, Precision = 98, F1-Score = 89, AUC = 99
Narin et al. (2020)	Covid-19 X-ray image database (Cohen et al., 2020), Kaggle chest x-ray repository (2020)	100 (Covod-19 = 50, normal = 50)	2(Covod-19 , normal)	5-fold cross-validation	ResNet50, Inception-v3, Inception ResNet-v2	Accuracy = 98, Sensitivity = 96, Specificity=100, Precision = 100, F1-Score = 98, AUC = 100
Bukharia et al. (2020)	Covid-19 X-ray image database (Cohen et al., 2020), NIH Chest X-Ray (2020)	278 (Covod-19 = 89, pneumonia = 96, normal = 93)	3(Covod-19 , pneumonia , normal)	Training = 80%, Testing = 20%	ResNet50	Accuracy = 98.18, Sensitivity = 98.24, Precision = 98.14, F1-Score = 98.19
Abbas et al. (2020)	Covid-19 X-ray image database (Cohen et al., 2020), Japanese Society of Radiological Technology (JSRT) (Candemir et al., 2014 & Jaeger et al., 2014)	196 (Covod-19 = 105, SARS = 11, normal = 80)	3(Covod-19 , SARS , normal)	Training = 70%, Testing = 30%	DeTraC - ResNet18	Accuracy = 95.12, Sensitivity = 97.91, Specificity=91.87, Precision = 93.36

4. CHALLENGES

There are many unique challenges for applying deep learning techniques and algorithms for the detection of novel coronavirus (COVID-19). Although deep learning based COVID-19 detection from chest CT and X-ray images show promising results.

While deep learning techniques are highly automatable,it needs a large set of data to develop a robust system for diagnosis purposes. The lack of standard data for COVID-19 is a major challenge for diagnoses. On the other hand, the available imaging data for COVID-19 patients are incomplete, noisy, ambiguous, and inaccuratelylabeledincertaincases.Totrainadeeplearning architecture with such massive and diverse data sets is very complex and a variety of problems must be resolved (e.g., data

redundancy, missing values). Almost all the reviewedsystemsuseddifferentdatasetsfortheexperiment. The developed systems collected data from internet sources, prepared it their way, and finally evaluated their systems using evaluation metrics. For this reason, it is quite difficult to conclude definitively which system yields the best result for COVID-19detection.

Data shortage is a huge issue for deep learning based COVID-19 detection systems. Due to the relative newness of the COVID-19 pandemic, clinical data is still very rare and strongly regulated. Thus datasets related to these are also very few. The datasets also contain a limited numberof COVID-19 cases (a couple of hundred samples in general).

A small sized dataset results in a low approximation in the trainingphaseandleadstoanoptimisticaswellashighvariance estimation of the performance of deep learning based COVID-19 diagnosis systems in the testing phase. Alimited numberofdatacausesunderfitoroverfitproblemdepending on the nature of deep learning architecture that degrades the performance of the developed systems. Class imbalance is another big issue for deep learning based COVID- 19 diagnosis systems. Data related to COVID-19 exist far less than other common lung diseases in chest X-ray and CT images.

Theimbalance in data very often raises bias during the training phase of deep learning techniques. With the fewer number of positive samples, it has become increasingly difficult to balance out thetargetsample.Whilebothoftheproblemsarefoundinthe developed systems, the small sized dataset problem is more severe than class imbalanceproblem.

While accuracy is a viable metric to determine the performance of deep learning models, it cannot be used as thesolemetric.OthermetricssuchasF1-score,sensitivity, specificity, ROC, AUC, confidence interval, etc. should also be used alongside the accuracy metric to determine the performance of deep learning models. The lack of confidence interval in particular is an issue for deep learning based COVID-19 diagnosis systems. Deep learning architecture providestheoutputaspredictionconfidencewhereastheoutput indicator of a particular neuron is considered as a single probability.ForCOVID-19diagnosis,thelackofconfidence interval across a predicted value is usually notdesirable.

5. LIMITATIONS OF THESTUDY

The goal of this paper is to review and present some well known deep learning based COVID-19 diagnosis systems based on CT and X-ray images. I observed some limitation as follows:

1. Only the COVID-19 diagnosis systems based on deep learning techniques are described, yet there are no specific descriptions of background knowledge on deep learning techniques highlighting mathematical representations. This work assumes a certain level of domain specific knowledge.
2. Some specific aspects of the reviewed neural networks such as the number of layers, layer specification, learning rate, number of epochs, batch size, dropout layer, optimizer, and loss function, especially for custom architectures are not mentioned here, and instead the reader is invited to consult related references.
3. This review discusses COVID-19 diagnosis from a computer vision perspective; this article does not provide any qualitative results of diagnosis in CT or X-ray images.
4. Most of the reviewed systems present accuracy greater than 90%approximately for both CT and X-rays having a small or large number of data, but reliability of the reviewed systems in real-world is not properly assessed.
5. This work does not provide computer code or implemented examples that simulate

some of the most significant results in reviewed COVID-19 diagnosissystems.

6. CONCLUSION

The infection rate of COVID-19 is rapidly rising every day. Deep learning techniques are powerful tool for the diagnosis of COVID-19. The review describes the systems which are developed based on pre-trained model with deep transfer learning architectureforCOVID-19diagnosis andoutlines the recently developed systembased on deep learning techniques using different medical imaging system like Computer Tomography (CT) and X-ray as well as allthe sources of used datasets which can be easily understood and accessed by the research community. The major challenge of the COVID-19 diagnosis systems based on deep learning is the lack of gold standards. It is not really implied in the present study that the role of physicians or clinicians in clinical diagnosis can be replaced by deep learning techniques. In the near future, it is hoped that deep learning experts cooperate pro-actively with radiologists and medical expertstoprovideappropriatesupportsystemsforidentifying COVID-19 infections in the early stages of the disease.

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A STUDY ON EFFECTS OF OCCUPATIONAL STATUS OF WOMEN FOOD BUYING AND COOKING BEHAVIOUR WITH SPECIAL REFERENCE TO BILASPUR

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Food and grocery is the second-largest segment of the retail industry and the potential for new entrants in this segment is enormous, particularly in the urban markets where the lifestyle is undergoing tremendous changes. Growing at the rate of 30%, the Indian food retail is going to be the major driving force for the retail industry.Thefood industry is on a roller coaster ride as Indians continue to have a feast. Fuelled by– large disposable incomes and less availability of time the food sector is witnessing a remarkable change in consumption pattern. Being the largest producer in fruits, milk, cashewnuts, coconuts and tea,and these condlargest producer of wheat,vegetables,sugarand fish, and the third largest producer of tobacco and rice, now it's time to provide better infrastructure and facilities for the food processing industries to serve good quality and safest processed food. This industry is on a growing stage and understanding the market as well as customers demand is very important for amarketer in this field.The proposed study on the consumer attitude of working women towards food buying and cooking behavior will surely provide many valuable insights for both the existing players and new entrantsand also those firms which are planning to make its foot step in the field.

Keywords: Buying Behavior, Demand, Occupational Status, Retail Industry, Working Women.

1. INTRODUCTION

For today's business change is the only constant. Firms need to always keep in track with the changing business scenario. Firms which do not change their marketing activities and adjust themselves to the market trends will go out of business in no time. Hence the marketing function of a business organization plays a pivotal role in ensuring the success of the firm. In a business organization, marketing department generates the revenues, essential for the survival and growth of the firm. The real challenge to marketers lies in generating those revenues profitably, by satisfying customers in a socially responsible manner. The post liberalization phase in India has gone through plenty of changes in the marketplace. This transition phase has not only spotted the massive inflow of brands coming from various countries all around the globe but also has observed the changing consumers and evolving trends in consumer behavior. Thus, the transition phase has created the concept of "Holistic Marketing" in the contemporary times. Quality advancements, media revolution, technological advancements service culture, and healthy competition among firms to satisfy the consumers have educated the customers like never. Food is something that people consume daily. With more disposable income in their pockets, people are more interested in

new products and their propensity to try and taste different things increases. Brands for Food and beverages grow due to the regular nature of their use and consumption. Undoubtedly food accounts for the largest share of consumer spending. The percentage of income spent in the households will drive a change in the food market. This change happening in the eating pattern of households is nothing short of a revolution. The time- starved working Indian consumer who is in no mood to spend an hour in the kitchen preparing food, is adopting a new eating habit to suit her lifestyle. She is stocking up on packaged and Ready-To-Eat / Cook products that not only serve the purpose of a tasty meal but also save the time. Thus, taste and convenience become major requirements. This is the result of the busier lifestyle of the modern consumer with both partners working and lesser time available for shopping as well as preparing food at home. With time at a premium and Indians getting busier, the demand is more for "ONTHE-GO" products. By the next decade Indian consumers will be demanding convenience, not just of products but of availability too. The change in the family structure – disintegration of joint family and emergence of nuclear units, rise in single person household, migration of educated persons to cities, engagement of more women to their career goals, etc has increased the spread of more On-The-Go products.

TABLE 1: SHARE OF FOOD IN TOTAL CONSUMER EXPENDITURE		
Year	Rural	Urban
1987-88	64.0	56.4
1993-94	63.2	24.7
1999-00	59.4	48
2004-05	55.0	42.5
2009-2010	53.6	40.7

Source: 66th round survey by *National Sample Survey Organization (NSSO)*

2. REVIEW OF LITERATURE

- According to Madhukar Sab Navis, Ogilvy and Mather, the average age of the India in 2020 will be 29, while the average age in both China and the US will be 37 and in Europe 45. The modern consumer will be a "Spoilt for Choice" one, exposed to plenty of brands and options. They would tend to be more consumptive borrowing from future income for purchasing luxuries.
- According to a report published by market research firm RNCOS in April 2010, titled "Indian Food and drinks Market: Emerging opportunities" the Indian food and beverage market is expanding rapidly and is projected to grow at a compound annual growth rate (CAGR) of about 7.5% during 2009-2013 and would touch US$ 330 Billion by 2013.
- The study "Flavours of Incredible India-Opportunities in the Food Industry" carried on by FICCI –Ernst &Young notes that the Indian Food industry is a significant part of the Indian Economy with food constituting about 30% of the consumer wallet.
- **Martinez (1998)** contends food is much the same as living things which includes changes and modernization through industrialization and urbanization to majorly affect food **(Cwiertka, 2000).** Agreeing to **Gillette (1997)** some social movements are happening in the arrangement and utilization of food and this to a great extent connected with modernization. Indeed, even the creation, preparing, dissemination of

food was broadly formed by modernization (**Sobal et al., 1998 and Sobal, 1999). Jussaume (2001)** placed that the modernization of food making, circulation just as utilization is supported by business and strategy creators.

- **Kaufman-Scarborough and Lindquist (2003)** set that at the point when an individual encounter significant level of time lack, they are probably going to have certain methods of contemplating and utilizing of time that may fortify their experience of time lack, which may sway on thoughts regarding what establishes their comfort food and preparing and this convenient implies numerous things to numerous individuals.

3. NEED FOR THE STUDY

Food and grocery is the second-largest segment of the retail industry and the potential for new entrants in this segment is enormous, particularly in the urban markets where the lifestyle is undergoing tremendous changes. Growing at the rate of 30%, the Indian food retail is going to be the major driving force for the retail industry. The food industry is on a roller coaster ride as Indians continue to have a feast. Fuelled by– large disposable incomes and less availability of time – the food sector is witnessing a remarkable change in consumption pattern.

Being the largest producer in fruits, milk, cashew nuts , coconuts and tea, and the second largest producer of wheat, vegetables, sugar and fish, and the third largest producer of tobacco and rice, now it's time to provide better infrastructure and facilities for the food processing industries to serve good quality and safest processed food. This industry is on a growing stage and understanding the market as well as customers" demand is very important for a marketer in this field.

The proposed study on the consumer attitude of working women towards food buying and cooking behavior will surely provide many valuable insights for both the existing players and new entrants and also those firms which are planning to make its foot step in the field.

Thus, the study is very much relevant in the current scenario when the Food Industry is poised for a diverse take off.

4. OBJECTIVES OF THE STUDY

- To understand the effects of occupational status on women food buying and cookingbehavior.

- To study the Impact of working schedule on cookingbehaviors.

- To identify the Preferences of working women on buying pattern on regard tofood.

5. EXPERIMENTAL WORK

a) Sampling and Instrument

A descriptive research design was used with self-reported and self-administered questionnaire. The sample population was among the full-time working women in the IT sector, age between 25 to 50 years old, had servant and at least having one or more child living in the household. However, owing to the large numbers of working women who reside in Bilaspur city chosen as target population.

b) Data analysis

TABLE 2: AGE OF THE RESPONDENT			
Sl. No.	Particulars	No. of respondents	Percentage
1	15-19	6	5.4%
2	20-29	92	82.9%
3	30-39	7	6.3%
4	40 and above	6	5.4%
	Total	111	100%

The table reveals that 82.9% belongs to the age group between 20 – 29 . Other age groups are of very smaller percentage. This is not surprising as the jobs mostly offered in Cochin are IT based and that often demands youngsters.

TABLE 3: WHICH BEST DESCRIBES YOUR LEVEL OF EDCATION			
Sl. No.	Particulars	No. of respondents	Percentage
1	SSLC	4	3.7%
2	Under Graduate	55	50.9%
3	Post Graduate	38	35.2%
4	Other	11	10.2%
	Total	104	100%

Among the respondents, as depicted in table, 50.9% belongs to the under graduates and 35.2% belongs to post graduates. This itself depicts the educational level of Chhattisgarhi's. In a place like Bilaspur which is considered as the most literate state, this depiction is not something unexpected

TABLE 4: WHICH BEST DESCRIBES YOUR EMPLOYMENT STATUS			
Sl. No.	Particulars	No. of respondents	Percentage
1	Employed full-time	33	31.4%
2	Employed part-time	19	18.1%
3	Homemaker	10	9.5%
4	Not employed, seeking a job	42	40%
5	Retired	1	1%
	Total	105	100%

As per the above table 40% of the respondents are not employed. The survey was done when corona had striken the world; as a result many lost their jobs. There is another 31.4% who are full time employed and 18.1% part-time employed. Only a 9.5% comes under homemaker group.

TABLE 5: DO YOU OWN OR RENT YOUR HOME			
Sl. No.	Particulars	No. of respondents	Percentage
1	Own	82	77.4%
2	Rent	24	22.6%
	Total	106	100%

According to the above table, around 77.4% owns a house. 22.6% of the respondents live in rental homes.

TABLE 6: HOW MANY CHILDREN UNDER THE AGE OF 18 LIVE IN YOUR HOME			
Sl. No.	Particulars	No. of respondents	Percentage
1	0	73	69.5%
2	1	16	15.2%
3	2	14	13.3%
4	3 or more	2	2%
	Total	105	100%

Around 69.5% has no children living in their homes. A very less number has children in their homes.

Sl. No.	Particulars	No. of respondents	Percentage
*TABLE 7: WHICH BEST DESCRIBES YOUR RELATIONSHIP STATUS? (PLEASE NOTE: CHILDREN HERE REFERS TO CHILDREN BELOW 18 YEARS)*
1	Married or cohabitating, no children at home	15	14.6%
2	Married or cohabitating with children at home	17	16.5%
3	Single, no children at home	59	57.3%
4	Single with children at home	11	10.7%
5	Divorced, no children at home	0	0
6	Divorced with children at home	0	0
7	Widow, no children at home	0	0
8	Widow with children at home	1	1%
	Total	**103**	**100%**

Accordingly

- Around 59 respondents belong to the single's group with no children athome.
- Around 16.5% belongs to the married or cohabitating group with children athome.
- Around 14.6% belongs to the married or cohabitating group with no children athome.
- Around 10.7% belongs to the group of singles with children athome.
- Fewer belong to other groups like widowed ordivorced.

Sl. No.	Particulars	No. of respondents	Percentage
**TABLE 8: ON A DAY-TO-DAY BASIS, HOW HAPPY ARE YOU? PLEASE USE THE BELOW SCALE**
1	1- extremely unhappy	1	1%
2	2	12	11.8%
3	3	37	36.3%

4	4	29	28.4%
5	5- extremely happy	23	22.5%
	Total	102	100%

As shown in the above table, around 36.3% are said to be moderately happy. 22.5% being extremely happy and another 28.4% are happy on the rate of 4/5.

TABLE 9: HOW BUSY DO YOU CONSIDER YOUR LIFE			
Sl. No.	**Particulars**	**No. of respondents**	**Percentage**
1	1- not at all busy	8	7.9%
2	2	14	13.9%
3	3	44	43.6%
4	4	27	26.7%
5	5- extremely busy	8	7.9%
	Total	101	100%

Around 80% of respondents are extremely busy or moderately busy. Only a few states that they are not so busy.

TABLE 10: HOW WOULD YOU DESCRIBE YOUR OVERALL LEVEL OF STRESS? PLEASE USE THE FOLLOWING SCALE			
Sl. No.	**Particulars**	**No. of respondents**	**Percentage**
1	5- extremely stressed	8	7.8%
2	4	15	14.7%
3	3	46	45.1%
4	2	24	23.5%
5	1	9	8.8%
	Total	102	100%

The pie table shows that around 60% are stressed and this is not something unexpected. IT field is a sector which takes lot of time and mental work that it in some way makes the employees life stressful. Especially when women has to take care of the household chores, family and children and son.

TABLE 11: WHERE YOU FALL ON THE FOLLOWING SCALE. COMPLETE THE SENTENCE; I AM…			
Sl. No.	Particulars	No. of respondents	Percentage
1	5- a total foodie	22	21.8%
2	4	24	23.8%
3	3	47	46.5%
4	2	5	5%
5	1- not at all into food	3	3%
	Total	101	100%

A majority of respondents are addicted to food moderately or fully. A very few belongs o the category of people who are not so interested in food. This shows the relevance of food industry in the era.

TABLE 12: WHERE YOU FALL ON THE FOLLOWING SCALE. COMPLETE THE SENTENCE; FOODIS A (AN)_____PART OF MYLIFE			
Sl. No.	Particulars	No. of respondents	Percentage
1	1- inconsequential	5	4.9%
2	2	14	13.6%
3	3	38	36.9%
4	4	24	23.3%
5	5	22	21.4%
	Total	103	100%

36.9% believes that food is moderately significant in their lives. Around 40% are on the view that food is very significant. Only a very few, around 13.6% believes that it is not so significant.

TABLE 13: WHERE YOU FALL ON THE FOLLOWING SCALE. COMPLETE THE SENTENCE;I CONSIDERMYSELF _____WHEN IT COMES TOFOOD			
Sl. No.	Particulars	No. of respondents	Percentage
1	1- very conservative	5	5%
2	2	9	9%
3	3	53	53%
4	4	15	15%
5	5- highly experimental	18	18%
	Total	103	100%

Around 18% of the respondents are highly experimental when it comes to food. Around 70% stand near to this opinion. Only a very few is very conservative.

TABLE 14: AMONG THE FOLLOWING WHAT DO YOU PREFER MORE			
Sl. No.	Particulars	No. of respondents	Percentage
1	Cooking from scratch	29	27.6%
2	Ready to eat foods	35	33.3%
3	Online food delivery	31	29.5%
4	Dining out	10	9.5%
	Total	105	100%

- 33.3% prefers ready to eatfoods

- 29.5% prefers online fooddelivery

- 27.6% prefers cooking fromscratch

- 9.5% prefers diningout

HOW OFTEN DO YOU EAT BY

In case of cooking from scratch, a good majority cooks food once daily or more. Only a few depends on otherways for food

In case of ready to eat foods; the dependence is on an appreciable amount. More people are inclined towards depending on them at least on weeklybasis

In case of online food deliveries, people have variant opinion on this regard. Many are dependent on regularbasis while many use this option when needed. There is none who does not at all depend onthese

In case of dining out, this has got a very low graph. Not many depend on this on regular basis. The workschedule, traffic of Bilaspur demands this result ofcourse.

TABLE 15: IS THERE ANY MAID OR COOK IN YOUR HOME			
Sl. No.	Particulars	No. of respondents	Percentage
1	Yes	32	30.5%
2	No	73	69.5%
	Total	105	100%

Accordingly, 69.5% have not hired any maids in their home at present. Only 30.5% have maids in their homes.

TABLE 16: HOW WILL YOU RATE THE SAFETY OF FOOD FROM OUTSIDE			
Sl. No.	Particulars	No. of respondents	Percentage
1	1	28	26.9%
2	2	35	33.7%
3	3	37	35.6%
4	More than 3	4	3.8%
	Total	104	100%

The majority group i.e. around 35.6% believes food from outside are safer. Around the same percentage believes that they are not that safe. This is something which is very much dependent on their experience. And it always varies.

6. CONCLUSION

7. In an era where food industry has good scopes to prove their excellence, this study was something mandatory. The place selected for the study being Bilaspur, a typical example for urbanized culture, the need for the development of food sector is made very much clear. The study emphasizes on the lifestyle of working women, the hurdles they face and thus making the relevance of food sector development more evident.

8. In this survey a study on dependence of working women on cooking, ready to eat foods, online food deliveries and dining out was taken note. The study paves way for the growing food sectors to concentrate on the need of the city. The merit and demerit here are the same. It is the busy life of this place and that could be made a merit by taking use of the food options. It becomes the demerit when the traffic, lack of space for cultivation etc. are not taken care. The specialty of a well-educated working group like the one taken for our survey is that the people here are broad minded to accept new innovations on the food industry. They are more attracted to convenient methods. Their busy and stressful working schedules have created this change.

9. People being well educated about healthy food habits; diet kitchens are all very much followed. Suppliers should concentrate more on the quality and being transparent about the ingredients to gain faith of the consumers.

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ARSENIC POLLUTION IN CHHATTISGARH AND ITS REMEDIATION

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Arsenic is one of the most abundant elements on earth. It is a naturally occurring omnipresent element with metalloid properties,getting detected at very low concentrations in all environmental matrices. Arsenic has been used in the production of so many useful pieces of stuff like agricultural products, veterinary medicines and some compounds of Arsenic has been employed for the treatment of myelomas also. As per WHO recommendation, the concentration of arsenic in drinking water beyond 10μg/L becomes toxic to human health. According to Sharma (2012), Chandrakar*et al.* (2016), Begum *et al.* (2016), Arsenic induces oxidative stress causing the death of plants. In plants, Arsenic causes morphological and physiological conditions involving, necrosis of leaf margins and tips, leaf wilting, root cell plasmolysis, diminished germination, reduction in the number of leaves and leaf area, discoloration and denodulation, suppression of starch hydrolyzing enzymes, reduced growth, distortion of chloroplasts membranes, repression in the photosynthetic activity, etc. Hong *et al.* (2014), Thompson (1993), Chen *et al.* (2009) have reported that arsenic has been found to be connected with the induction of various difficulties in the human organ system like nervous, cardiovascular, integumentary, immune, hepatic, respiratory, hematopoietic, endocrine, renal, development and reproductive system. Many studies have shown that it is able to cause epigenetic changes and genetic mutations in the human body. Duarte *et al.* (2009), Mahimairaja*et al.* (2005), Sullivan *et al.* (2010) have reviewed various physical and physicochemical methods for removal or mitigation of Arsenic from contaminated water and soil. Dey*et al.* (2016), Pandey and Bhatt (2015), Pandey and Sahu (2018) have performed experiments for remediation of Arsenic using bacteria. Tanvi*et al.* (2020), Mohd*et al.* (2019), Schneider *et al.* (2009) have described about some fungi which are capable of minimizing the adverse effect of Arsenic species by removing or transforming them into less harmful forms.

Keywords: Arsenic, Remediation, Soil, Fungi, Human health

1. INTRODUCTION

Arsenic is a metalloid found abundantly on earth's crust. With the atomic number of 33 it is a member of group 15 in modern periodic table. The only naturally occurring and stable isotope is As^{75}. It is naturally found in trace amount in almost all environmental matrices. Arsenic is mostly cyclized by water in the environment but sometimes in the volatile forms also. Its sulfide and oxyhydroxide forms with iron, sodium, calcium, and copper, are most commonly found in salts, sediments, soil and metal ores (Yunus*et al.*, 2016). It has both inorganic and organic form in the nature, among which the toxicity in increasing order is as follows: arsenobetaine (AsB), arsenocholine (AsC), di-methyl arsenic acid (DMA), mono-methyl arsenic acid (MMA), arsenate (As+5) and arsenite (As+3) (Hsueh*et al.*, 2002).

The high concentrations of arsenic heavily affect the plant life, various negative impacts have been seen in the form of decreased germination percentage, dry mass, radicle length, activities of catalase, superoxide dismutase (Chandrakar*et al*., 2016a), decrease in chlorophyll production (Gusman*et al*., 2013; Chandrakar*et al*., 2016b) and increase in oxidative stress(Nath*et al*., 2014). The crucial route of arsenic exposure to humansis drinking contaminated groundwater. According to WHO guidelines, the permissible limit of arsenic in drinking water is 10μg/L above which, the water becomes harmful to be utilized for drinking. The exposure of arsenic to the humans is connected with induction of various difficulties in human organ system like nervous, cardiovascular, integumentary, immune, hepatic, respiratory, hematopoietic, endocrine, renal, development, and reproductive system (Chandrakar*et al*., 2016a).In numerous studies it is exhibited that arsenic is capable of causing epigenetic modifications and genetic mutations in the human body (Jayasumana*et al*., 2013; Abdul *et al*., 2015). It can also cross the Blood-Brain barrier to cause damage to white matter (Mundey *et al*., 2013).

Humans can get arsenic exposure through inhalation, dermal contact, and ingestion too. The high concentration of arsenic in drinking water is known to have carcinogenic effects and to be related to lung cancer (Dauphiné*et al*., 2013). Neurological complications like peripheral neuropathy have also been reported to occur in case of arsenic exposure by drinking contaminated groundwater (Mukherjee *et al*., 2003). People working in ore mines with arsenic get exposed to arsenic by inhalation which causes respiratory complications over time and epidemiological study have shown the inhalation to be cause of increased morbidity(Argos *et al*., 2010; Palma-Lara *et al*., 2019) and mortality by cardiovascular problems(Navas-Acien*et al*., 2005).The extensive use of arsenic-containing pesticides, herbicides, and other agri products in agriculture has come up as another source of exposure. Arsenic from these agri products enters into the food chain affecting plants and animals including millions of human populations (Islam *et al*., 2017).

The two possible source channels for entering of arsenic into environment*viz.*hydrosphere; lithosphere and atmosphere are natural and anthropogenic activities, as arsenic is easily available on earth crust. The major natural sources of arsenic release into the environment are volcanic emissions (Bundschuh*et al*., 2020), geothermal fluids (Morales-Simfors*et al*., 2020), surface presentations of geothermal fluids like, hot springs, fumaroles, and geysers (Bundschuh&Maity, 2015). The ground water gets contaminated with arsenic by the natural process like weathering and leaching of rocks containing arsenic in it (Acharyya*et al*., 1999).The foremost anthropogenic sources for arsenic contamination of ground water include burning of fossil fuels, mining, use of arsenical fungicide, insecticide and herbicides in agriculture and wood preservatives (Panthi*et al*., 2021). Volatilization of As_4O_6due to burning of coal causes huge emission of arsenic into atmosphere (Bissen&Frimmel, 2003). The aforesaid anthropogenic sources have much less responsibility for the contamination of groundwater but its contribution can never be forsaken.

Almost 105 countries and more than 200 million people belonging to them have been known to be affected from groundwater arsenic contaminations till 2012 (Naujokas*et al*., 2013). India has no exception from above statement. India has 11 places including Chhattisgarh state, where groundwater is found to be contaminated with arsenic (Chakraborti*et al*., 2017). In the AmbagarhChauki block of Chhattisgarh 13 villages have arsenic above harmful concentration (Singhal*et al*., 2018). According to the study of Pandey& Bhatt (2015), a village named Kaudikasha of Ambagarhchauki block has arsenic concentration of 142.4-240 ppm in the soil the residents of the village have been heavily affected showing symptoms like keratosis and arsenicosis (Chakraborti*et al*., 2017).

2. REMEDIATION OF ARSENIC FROM ENVIRONMENT

As the problem of arsenic mediated pathogenesis is rising day by day, certain techniques for the remediation of arsenic from environment have been applied, which can be categorized as follows-

2.1 Physical Techniques

The very basic natures of matter have been utilized for the remediation of arsenic from various contaminated sources. Some geomaterials composed of quartz, kaolinite, and iron oxide mineral such as goethite (Kitbutrawat*et al*., 2017)and activated carbon (AC) (Girhe*et al*., 2021) have been applied to adsorb arsenic from liquid medium. A considerable number of affected populations of India and Bangladesh have been still using a conventional method called three Kolshi filter (Hossain*et al*., 2006). Bucket Treatment Unit (BTU), developed by DPHE-Danida, Government of Bangladesh is one of the majorly used techniques in household of arsenic affected area (Singh 2013). The 'Family filters' showing satisfying remediation efficiency can be made by easily available materials in households (Avilés*et al*., 2013).
      With the advent of technology, many synthetic membranes have been produced for remedial purpose. In this scenario, use of nanofilteration (Worou*et al*., 2021), microfilteration, ultrafilteration (Gokcek&Uzal 2019) and reverse osmosis (RO) technology (Abejón*et al*., 2015) have been found to be very efficient. These filters can also be modified by adding negative charge on its surface to reject multivalent arsenic ions (AsV) and allow only AsIII ions to pass through its pores (Worou*et al*., 2021). The efficiency ofabove mention techniques has been seen to evolve with the slight change in pH, temperature, and operating procedure. Solar oxidation and removal of arsenic (SORAS) technique is very easily operated to remediate up to 50-70% arsenic from water (Wegelin*et al*., 2000; Dey*et al*., 2014).

2.2 Physico-chemical Techniques

The physical techniques are very cost-effective and prepared from easily available materials. Their capacity to remediate arsenic from medium can be out-competed by addition of some chemicals, which makes the remediation process more efficient. Iron hydroxide co-precipitation technique causes entrapment of arsenic in its precipitate which also works as adsorbent (Otter *et al*., 2017). Making some modifications in Bucket Treatment Unit, Stevens Institute Technology came with new technique for arsenic remediation. In this technique, iron sulfate and calcium hypochloride were used to cause flocculation and sedimentation of arsenic from contaminated water (Ahmed 2001). The Kanchan Arsenic filter also called Biosand Filter (BSF) was developed by a group of researchers from the Massachusetts Institute of Technology (MIT) with some government bodies of Nepal that used rusted iron for arsenic adsorption and sand for filtration (Ngai*et al*., 2006; Naseri*et al*., 2017). Ion exchange is another technique which has been applied to arsenic remediation (Laatikainen*et al*., 2015).

2.3 Bioremediation Technique

The physical and physicochemical methods produce various byproducts which are harmful to nature. To minimize this hazard, living organism or products produced by them are used for

remediation process. These are known to mitigate harms of arsenic and removal of it from environment in a sustainable way.

Remediation using Plants (Phytoremediataion)

A vast diversity is found in the plant kingdom, some of which growing in the arsenic-contaminated regions get adapted to the high concentration of the heavy metal. These plants remediate the arsenic from environment in various ways like, phytoextraction, phytovolitilization,phytofiltration,phytodegradationand phytodesalination. The phytoextraction process has been recorded by Singh &Fulzele (2021) in *Calotropisprocera* L. which could reduce arsenic concentration from soil as well as from water. Islam *et al*. (2015) reported that *Micranthemumumbrosum* was able to accumulate 1219 ± 44.11µg arsenic per gram of leaves by phytofiltration process whereas *Eucalyptuscladocalyx* showed phytostabilization capacity for arsenic (King *et al*., 2008). According to Guarino*et al*. (2020),*Arundodonax* plant was efficiently phytovolatilizing up to 75% arsenic by transpiration. The genetically modified Liriodendron tulipiferaexhibited the phytodegradation efficiency against mercury. Phytodegradation is also called phytotransformation, which is degradation of pollutants inside or outside the plant body (Nedjimi 2021). Another newly discovered capacity of some plants has come into light, which is exhibited by some obligate halophytes. *Tecticorniaindica* (Willd.) subsp. *indica* and *Suaedafruticosa* (Forssk.) have been successful in phytodesalinate the soil,in which they grow, during field experiments conducted by Zorrig*et al*. (2012).

Zhao *et al*. (2002) identified three new species of arsenic hyperaccumulating*Pteris* (fern) genus as one species (*Pterisvittata*) was already known for the same. They discovered that the three new species i.e. *P. cretica, P. lingifolia,* and *P. rosa* were also capable of hyperaccumulating arsenic from the soil up to the extent *P. vittata* does. They also discovered that arsenic hyperaccumulation is an immanent characteristic of *P. vittata.*

Remediation using microorganisms

The microenvironment of microorganisms is largely affected by the presence of heavy metals like arsenic, some of them get resistant to them and find out a way to survive in the same microenvironment. In this way, the organisms develop some techniques to remediate heavy metals from the environment. Following organisms have been reported for the remediation techniques-

Remediation using Algae

Majorly the algae remove heavy metals from water by biosorption technique. According to a meta-analysis conducted by Lin *et al*. (2020), brown algae were found to be significantly capable of adsorbing heavy metals on their body walls. They show adsorption efficiency up to 1-10g/L, which is not influenced by temperature. Non-living biomass performed a better adsorption process as compared to the living one.

Remediation using Bacteria

Bacteria residing in heavy metal contaminated environment evolve some strategies to successfully survive and propagate. Pandey and Bhatt (2015) isolated two indigenous bacteria from arsenic-contaminated soil of Rajnandgaon district in the state of Chhattisgarh, India. Both of these bacteria were resistant to arsenate and arsenite as well, in the soil, one of these

was found to remediate up to 99% of arsenic from medium. In the work of Dey*et al*. (2016) *Bacillus sp.* and *Aneurinibacillusaneurinilyticus*bacteria have been identified to remediate arsenic from contaminated groundwater with 50% efficiency.

Remediation using Fungi (Mycoremediation)

In a study conducted by Wang *et al*. (2011) determining the influence of antimony and arsenic on soil micropopulations, fungi were found to be least affected.Fungi apply various strategies to deal with heavy metal contaminations i.e. biosorption, bioaccumulation, biovolatilization and biotransformation. The selection of effective biosorbent plays a crucial role in biosorption, the biosorbents usually used are microorganisms like fungi, bacteria, yeast, algae, weeds and agricultural waste products (Tanvi*et al*., 2020). Four species of *Aspergillusniger* isolated from metal contaminated soil of Hattar Industrial Estate, Pakistan have performed bioaccumulation with efficiency of 98% and 43% for Cadmium (Cd) and Chromium (Cr) respectively Khan *et al*. (2019). Another case of bioaccumulation for zinc and iron could be seen in the study of Umeo*et al*. (2019), on sixteen fungal strains of *Agaricussubrufescens*. Some of the wood rotting fungi can transform and consequently expunge arsenic from water (Kaewdoung*et al*., 2016). *Aspergillusflavus*, a rhizospheric fungi from an arsenic-contaminated rice field, could perform biotransformation to convert the soluble arsenic into arsenic particles (Mohd*et al*., 2019).Guimarães*et al*. (2019) obtained *Aspergillus sp.* and *Penicillium sp.* fungi from paddy field capable of volatilizing arsenic from liquid medium to gaseous form.

3. CONCLUSION

After reviewing above literature, we can infer that arsenic contamination is becoming a matter of great panic day by day. The natural, as well as anthropogenic source of its inclusion into the environment cannot be neglected. Arsenic shows its harmful effects by exposure through air, water, and soil into the life of each flora and fauna. For mitigation of problems raised by the concentrations of arsenic in the environment so many techniques have been applied. Each technique has its own pros and cons. Physical and physicochemical methods of remediation have been shown to consume much energy, be less cost-effective and its byproducts are seen giving a negative effect on the environment. For remediation of heavy metal, in a sustainable way is to be implicated through the biological methods, seem to be the better option. Application of indigenous microbiota for mycoremediation has gained more interest in recent years as it is a cost-effective, eco-friendly approach and with no adverse effects. The fungi can be used in the form of fungal mycelia, fungal mats, or fungal nanoparticles produced by the fungi.

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POSITIONING OF CHHATTISGARH AS A RELIGIOUS TOURISM DESTINATION

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Chhattisgarh state is one of the newly formed states in India with enormous potential for tourism. This land is gifted with natural beauty covering its major area with forests, rivers, waterfalls, caves, archaeological sites, etc. The Rich Culture, and heritage of Chhattisgarh is one of the major attractions. Likewise, there are many historically significant places that are religiously very important, and hold a strong mythological history. Ram van Gaman path with various religious significant spots is one of them. Other than that, there are many famous temples, mosques, churches, and gurdwara's which are popular among residents but have the potential for developing as a major tourist destination for domestic, and international tourists. This research was based on exploratory research design, and a qualitative approach. The research showed that it is vital to identify the potential religious destinations, and learn about their historical background. Maintenance of these religious monuments and infrastructural development of these destinations with a holistic approach would be an effective step. Growth in tourism will lead to the development of the region, andstate, and would be an effective source of generating economy and employment for the locals.

Keywords: Tourism, Religious Tourism, Pilgrimage, Chhattigarh, Tourist Destination.

1. INTRODUCTION

Religion is beliefs, rituals, and practices that a group of people follow. Religious or pilgrimage tourism is the type of tourism where individuals or group of people of various faith, belief and thoughts travel for their spiritual fulfillment, personal and spiritual growth and to offer their sacrificial gifts. Tourist also visit these religious destinations to learn more about its historical values and are interested in its architecture and design. It could also be a tour to the place for exploring the religious site and enjoying the related tourist activities for leisure purposes. Religious tourism is been practiced since the start of civilization and therefore also considered as one of the oldest form of tourism,Jackowski, A. (2000). Religious tourism is one of the most important form of tourism in India and therefore also categorized as special interest tourism (SIT), Sahoo, D. (2012). It is usually related to the followers of particular faiths who visit locations that are considered holy sites.Nyaupane, G. et al. (2015). It is purely a matter of the spiritual wellbeing of a human soul.Resonance (2022) It brings peace, stability, love, care, respect, and honor in oneself, and among others. There are many popular destinations in India like Ayyappan Sarnam in Kerala, Golden Temple of Amritsar, Churches of Old Goa, Vaishno Devi Temple of Jammu and Kashmir, Jama masjid of Delhi etc. which are visited by pilgrims and other tourist throughout the year. Ponniah, J. (2020).

Chhattisgarh is the 9th largest state in India that has rich lavish green forest covering 41.33% of land area, Bhatt, S. C,(2003). This region is filled with natures beauty, and attractions like National parks, wildlife sanctuaries, waterfalls, caves, archaeological sites, ancient temples,

dams, etc. Culture, and ethnic diversity are the uniqueness of Chhattisgarh. Tourism resources are available in every part of Chhattisgarh from north to south, and east to west. Being the state where Lord Rama Mother belonged makes it special attraction for spiritual tourists who can visit various historically important locations like Sitamadi-Harchauka, Rajim, Turturiya, Chandrakhuri, etc. throughout the state, Bajpai, (2021).

Chhattisgarh has been pronounced as "Mehtari" which means mother. This recognition has been given to the state due to historical evidences regarding the native place of Lord Rama's mother "Mother Kaushalya" who belonged here, Bajpai, (2021).It is also considered that Lord Rama has spent his maximum period of Exile in Chhattisgarh, and there are many associated places still prevailing. Mahamaya Temple of Ratanpur is one among 52 Shakthi peeth in Asia. Koshale, J. P. et al. (2020). There are many other temples which are popular, and have great spiritual attachment of people towards them. There are also various religious sites in Chhattisgarh that resembles the spiritual attachment of other religions like mosque, and dargah's of Muslims, Churches, and Cathedrals of Christians, Monasteries of Buddhists, Jain temples, andashrams, etc.

While considering the religious tourism resources availability in Chhattisgarh it provides an immense opportunity for the state to be positioned as a religious tourism destination with so many potential sites. Amidst a pandemic, where everyone is helpless, and are facing some or the other issue, only hope to an individual is his spirituality, and his religion, and their God. Therefore, it becomes relevant for every individual to think about it. It is indeed can be considered as colossal opportunity to develop this region as a major religious tourism destination which will benefit the faith of many, and will be useful in generating employment to the needy and also improve the economy of the state.

Other attractions that make these destination's more Holistic is the peaceful natural surroundings of forests, beautiful waterfalls, ancient caves, mountains, etc. Another positive aspect of Chhattisgarh is its simplicity in lifestyle among local people, and their friendly behaviour towards tourists (Home | Know India: National Portal of India, 2022). With such immense opportunities, and being a rich tourism resource, it is to be brought in to consideration that: what can be the reason for slow or average growth of tourism especially religious tourism in the state? How these reasons or problems can be resolved to attract more tourists? How this religious tourism can be beneficial in generating employment for the locals?

2. REVIEW OF LITERATURE

Religion is a devotion, faith, and practice of following a person or an energy or something unknown. It can be a person living or dead, it can be a statue or it can also be a faith on unseen. Religious tourism is also mentioned as special interest tourism, which is usually related to the followers of particular faiths who visit locations that are considered as holy sites. (Khan,2018). It is always considered that religion, and tourism are not two wheels of same vehicle but religion is completely based on devotion, faith, meditation, and considered to be holy. It is always mentioned that commercializing the religious places is indeed not expected (Lavinia, 2018). But another aspect of this statement is that a pilgrimage or tourist who visit a religious place will need accommodation, food, and transport as their basic needs, and moreovertourists would always appreciate if they can buy a memento or merchandise as a remembrance. In the modern world it has become necessary to have high end facilities even if it is religious matters. Due to lack of time everyone expectsgood connectivity, good accommodation, good food, and also would appreciate if any extra privilege is provided in

the package like visit to a nearby village, mountain trekking, visiting a waterfall, attending Yoga sessions, and meditation session in a natural surrounding or even spending time at an Ashram.

For pilgrimage, people are eagerly prepared to visit farawayplaces, and difficult locations, which are sometimes risky, Munro et al. (2021). Religious tourism is more about spirituality nowadays, foreigners visit India for the sake of learning, and training about spiritual behavior, and also to obtain knowledge about the history of various religions, Mukherjee et al. (2020). Visitors of a religious site can be people who have great faith, people with less faith but interest in visiting the locality, and people who have interest in learning about historical events associated with it. Therefore, it becomes important to provide a holistic package for these places in order to attract and cater maximum number of tourists.

3. SIGNIFICANCE OF THE STUDY

India is an integrative country with various religions practiced freely, and a land of faith, andreligion, and spirituality. There are many monuments, temples, and places which have been developed in past or has its relevance with a past event or has been procured or constructed for the purpose of offering prayer, and showing once gratitude towards almighty. Among these destinations or sites, few places are well developed, and have very heavy footfall, few places have average footfall and few have very less visitors. This can be based on various factors like the importance of the place as per religion, its popularity, locality, accessibility or its promotion.

Chhattisgarh also have many religious sites which come under the above-mentioned categories. Majority of them come under average, and less footfalls or visitors. The reason can be its locality, image of the state, development, accessibility, infrastructure, promotion, and many more. This has to be analyzed, and a better planning is required to upgrade these destinations, and sites. As the state of Chhattisgarh has ample potential with various number of temples, monuments, caves, sites related to religious practices, and evidences that shows great opportunity for it to be developed as a religious tourism destination, Dwivedi,(2016).

4. CONTRIBUTION OF THE STUDY

This study will be very vital in analyzing the opportunities, andthreats in order to sustainably develop the state of Chhattisgarh as a religious tourism destination.Its development will assist in the promotion of the destination, and it will lead to the development of the society, and locality associated with it. It will also create various employment opportunities in various field like transport, tourism, hospitality, merchandisinggoods, and other industries. Development of tourism in these places will help in building the economy of the state, and country.

5. OBJECTIVE OF THE STUDY

Following are the objectives of the study:
1. To identify various religious sites in Chhattisgarh.
2. To assess the spiritual importance of religious sites in Chhattisgarh.

6. RESEARCH METHODOLOGY

Research Method

An exploratory research design, and a qualitative research approach have been undertaken in this research study.The proposed study involves secondary methods of data collection about various religious sites in Chhattisgarh from the following Resources: Library, Internet, Government Offices, Newspapers, Religious Gurus, Other Sources. This study has attempted to explore the potential of various religious sites in Chhattisgarh to position the state as a religious tourism destination.

7. RELIGIOUS SITES IN CHHATTISGARH WITH ITS SPIRITUAL IMPORTANCE

There are various religious sites in Chhattisgarh which have huge potential and have significant spiritual importance to Position the state as religious tourism destination. In this study only the destination with maximum potential has been considered. During the study it was also found that

7.1 Maa Bambleshwari Temple

Dongargarh is one of the major pilgrimage in Chhattisgarh located in Rajnandgaon District. Falls, C. (2015). It is located around 125 kms from Swami VivekanandaRaipur airport, and around 211 kms from Dr, Babasaheb Ambedkar International airport Nagpur. It is very well connected by road, andtrain routes. This temple known as Badi Bambleshwari is located at a height of 1600 ft on a hilltop, and another temple known as Chhoti Bambleshwari is located near the foothills. There are around 1000 steps to climb on foot in order to reach the hilltop. These temples are regularly visited by pilgrims throughout the year but the major congregationflock the shrine during Navratri's, andRamanavamiJangde, P, (2021). A fair is also organised during Navratri's in the temple campus which operate for 24 hours. Other attraction of this destination is its only ropeway of Chhattisgarh. The view from the ropeway is amazing with ground covered by scenic water body, and greenery all around.Dongargarh has its name derived from mountain, and fort, as Dongar means "mountain", and Garh means "Fort". Mathyavar, and Saptshrangich, (2022). It is said that round 2200 years ago there was aking named Raja Veersen, a local king who was childless. He performed puja on the recommendation of a priest to the God's, and was blessed with a son within a year who was named Madensan. Another saying is that, King Vikram Aditya went for suicide to this temple but the God of this temple Devi Bambleshwariinterrupted, and stopped him.
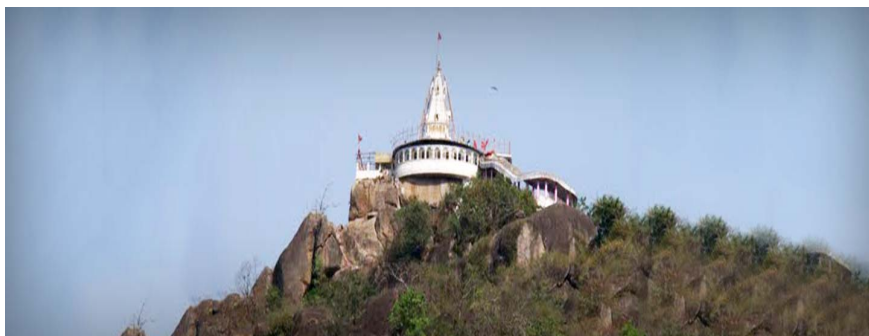
Figure 1: Maa Bambleshwari Temple
Source: www.tourtravelworld.com

7.2 Danteshwari Temple

Danteshwari temple is another major pilgrimage of Chhattisgarh in Dantewada of south Bastar district which is one, and half hour by road from Jagdalpur. Nearest domestic airport is Maa Danteshwari Airport at Jagdalpur which connects flight from Raipur, and Hyderabad.Jagdalpur railway station is also well connected with various regions of India. The junction of Dakhini, and Shankini river is the spot where Danteshwari temple is situated. This temple is although visited throughout the year by pilgrims but it is mainly populated during Bastar Dussehra season. Men visit the temple in traditional lungi compulsorily during the fest. Bajpai, S.et al. (2014). This temple was constructed around 800 years ago by kings of Bastar "chaulakyas" to honor their ancestral Goddess, "Maa Danteshwari". Garbh Griha, Maha Mandap, Mukhya Mandap, and Sabha Mandap are the four parts in which this temple is divided. Although the construction of the temple has been done several times but the sanctum still remains the same(2022).

Figure2: Danteshwari Temple
Source: www.india.com

7.3 Mahamaya Temple

Mahamaya devi temple is situated on Bilaspur-Ambikapur state highway around 25 km from Judicial capital of Chhattisgarh: Bilaspur(About Mahamaya Devi Mandir, 2022). It is well connected by road to various districts of Chhattisgarh. Railway has its major junction in Bilaspur i.e., the South Eastern Central Railway, which connects Bilaspur to almost every part of India. Bilaspur also have a Domestic airport which have flights for Delhi, Allahabad, Varanasi, Jabalpur, etc.

Mahamaya temple is another major Hindu pilgrimage in Chhattisgarh which is often visited by thousands of people who visit Bilaspur. It has water bodies attached to the temple which makes this place more scenic. Locals visit here before every new beginnings in their family. Pilgrims from all over visit barefoot to this temple during Navratri's in order to perform their sacrificial offerings. Kumar, A. (2019). This temple is one of the 52 shaktipeeth in the world, and once was the capital of Kalachuri kings,who were the followers of Shiva, and shakti. This temple is also being planned for restoration by the archaeological department. Misra, O. P. (2003).

Figure3:Mahamaya temple
Source: www.gosahin.com

Mahamaya Devi. Situated at 25 km away from the city of Bilaspur, Chhattisgarhon the Bilaspur-Ambikapur state highway, the Mandir, and the relics of scores of ancillary temples, domes, palaces, and forts, now rundown by the time, and natural forces – seem to tell a story.Once the capital of the Kalachuri kings, Ratanpur has almost a millennium of history. Mishra, P. L. (1969)

7.4 Bhoramdeo Temple

Bhoramdeo temple or the 'Khajuraho of Chhattisgarh', is situated in the peaceful and attractive Kabir Dham district of Chhattisgarh, located on the southern bank of Sakri River.It is around 125 kms from Raipur Swami Vivekanandairport, and is also well connected by rail and road. This temple was built between 7th, and 11th century amidst hilly ranges. Thakur, R., & Begum, S. (2021). It is an ancient Hindu temple, beautifully carved on the rocky stones in Nagar style dedicated to Lord Shiva.The temples are said to be built by King Ramchandra of the Nag Dynasty. Its resemblance to sun Temple of Konark, and Temples of Khajuraho attract plenty of visitors throughout the year.

Figure4: Bhoramdeo Temple
Source: www.stayfari.com

7.5 Sirpur

Sirpur is very peaceful village situated on banks of Mahanadi River, and is located around 78 kms from Raipur. This place attracts pilgrims from Hindu, Buddhist, and Jain religion. Kumar Tode, P. (2018). It is most popular for its Laxman temple built around 7thCentury, and still in very good condition. This temple is accompanied by a museum established by the Archaeological Survey of India, which houses a collection of rare statues, and other relics significant to the Shaiva, Vaishnava, Buddhist, and Jain faiths(Religious Points of Chhattisgarh, n.d.). Chhattisgarh tourism board organises dance, and music festival every year to promote this site. As per the climatic condition in Chhattisgarh, winter, and monsoons are the best time to visit Sirpur.

Figure5:Laxman Temple. Sirpur
Source: www.holidify.com

7.6 Rajim

The holy Conflux of three rivers Mahanadi, Pairi, and Sondur also known as Triveni Sangam, and Prayag of Chhattisgarh makes this place popular among pilgrims. It is very well connected by road, and the closest airport of Raipur is around 45 kms. This place is also known for its fifteen days long Kumbh mela organised every year between mid-February-March. It is one of the chosen destinations under Ram Van gaman circuit of Chhattisgarh. Tiwari, P. et al. (2015).

Figure6: Kumbh Mela, Rajim
Source: www.youtube.com

7.7 Girodhpuri Dham

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Girodhpuri is the birthplace of Great Satnami saint, Sant Shiromani Guru Ghasidas, who fought for social cause, and spoken for equality, and development. It is located around 135 kms from Raipur, and is well connected by road, and train. A very big fair is organised in Baloda bazaar district in the month of February -March, which is visited by thousands of Satnami pilgrims, and locals.Fazili, A. I.et al. (2006).

Figure7: Jaitkhamb, Girodhpuri Dham
Source: www.chhattisgarhtourism.co.in

7.8 Damakheda

Damakheda is a religious place of Kabirpanthi's located around 57 km from Raipur, and 48kms from Bilaspur. This place is popular for its Kabir Panth Ashram in which the couplets, poems, and choupai are written very artistically, andhas a 100-year-old history. It is said that 12th Guru of Kabirpanth, Guru Agardas swami established Kabir math here. Damakheda Magh mela is organised every year, and is visited by people from all over India, Shukla, S. (2002)

Figure 8: Kabir Panth Ashram
Source: www.balodabazaar.gov.in

7.9 Kunkuri Church

Kunkuri Church or Maha Girja Ghar of Kunkuri also known as Cathedral of Our Lady of the Rosary is Asia's second largest Catholic Church in terms of sitting capacity is located 40 kms from Jashpur.This church was built in 1962 with a sitting capacity of 500 people. Many

catholic Christian visits this church during Easter, good Friday, and Christmas season. Other than this people from various religion, and caste visit this churchfrom all over the country. Nearest airport to Jashpur is Ranchi airport which is around 150 kms, Josh, B. (2009).

Figure 9: Kunkuri Church
Source: www.jashpur.nic.in

7.10 Jama Masjid, Bhilai

Jama Masjid is the largest Mosque in Chhattisgarh which can accommodate more than 3000 worshippers in one gathering.Uniqueness of this mosque is its structure which is built in the shape of "Ya Allah". It is very well connected by air, train, and Road. Nearest airport is at Raipur which is around 45 kms. It mainly attracts worshippers from all over India during Ramadan, and Eid. Bhilai is famous for its steel plant, and has plenty of other attractions for visitors.

Figure 10: Jama Masjid, Bhilai
Source: www.theislamicheritage.com

8. CONCLUSION

Chhattisgarh state has been given a trade slogan "Full of Surprises" which is justifiable. A land full of tourism resources required for a destination to establish itself as a major tourist destination. It has wildlife sanctuaries, national parks, caves, waterfalls, monuments, temples, hills, mountains, rivers, etc. It is true that the state is just twenty-one years old, and has been developing since. Tourism board of Chhattisgarh has been very active, and vibrant in last decades, and expectation are increasing for this decade too. Many tourist spots have been identified under various government schemes at state, and central level and has been initiated or in pipeline. The major focus of the government has been on the religious tourism, and eco-tourism, as these are the types with maximum potential. Other tourism like rural tourism, adventure tourism, cultural tourism is also in consideration. (Gupta, T. C.et al.(2016). A sustainable development of the destinations is the focal point for the government. Tourism

cannot be promoted on the verge of destruction, instead carrying capacity of the destinations are estimated, and promoted accordingly, Jangde.P.(2021).

Religious places in Chhattisgarh are in plenty, and have its spiritual and historical importance too(Festivals of Chhattisgarh, n.d.). Taking this in to consideration a sustainable approach towards its development, and a strong marketing of the destination as a brand can be useful in positioning Chhattisgarh as a major religious tourist destination. A holistic package can be more attractive among all age groups, and sect. Development of infrastructure, and continuous stability in government policies are also important factors to be considered. Overcoming challenges, andoptimum utilization of opportunities can lead to the development of Tourism in Chhattisgarh.

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A REVIEW ON NANOPARTICLES: THEIR CLASSIFICATION, TYPES AND SYNTHESIS

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*N*anomaterials(NMs) have emerged as an amazing class of materials which are having one dimensional size, whose measure are 100 nanometres particles side by side to match the width of a human hair. In this article we have reviewed the classification of different types of nanomaterials depends according to their shape, size, dimensions, materials, physical and chemical properties. Nanomaterials are the promising materials that have unique properties and can be used for a wide range of applications that are expected to improve our lifestyles. Various nanomaterial synthesis methods, including top-down and bottom-up approaches, are also discussed.

Keywords: Nanomaterials, Top-down, Bottom-up.

1. INTRODUCTION:

'Nano' comes from the Greek word Nanos means dwarf, and 'particles' means some portion of matter, thus Nanoparticles represent a small portion of any matter, which has a one-dimensional size whose measures are 100 nanometres particles side by side to match the width of a human hair. After the formation of nanoparticles, the properties of those materials can change.

Nanoparticles have many specific properties, like having a greater surface area than larger particles, due to which the nanoparticles are more reactive to other molecules. The nanoparticles are of different shapes, sizes, and structures. It is spherical, cylindrical, tubular, conical, hollow core, spiral, flat, etc., or irregular and differs from 1 nm to 100 nm in size. The surface can be uniform or irregular with surface variations. Some nanoparticles are crystalline or amorphous with single or multi-crystal solids either loose or agglomerated (Machado S. et al., 2005).

2. CLASSIFICATION OF NANOPARTICLES

Nanoparticles can be classified into different types, depending according to their shape, size, dimensions, materials, physical and chemical properties.

2.1 Classification of nanomaterials based on their materials:

Most current nanoparticles can be divided into four material-based categories.

2.1.1 Carbon-based nanomaterials: These nanomaterials are mainly composed of carbon. These carbon-based nanomaterials exist in different forms and morphologies, such as hollow tubes, ellipsoids, or spheres. Fullerenes (C60), carbon nanotubes (CNTs), carbon nanofibers, carbon black, graphene (Gr), and carbon onions are included under

the carbon-based NMs category. Laser ablation, arc discharge, and chemical vapor deposition (CVD) are the important production methods for these carbon-based materials fabrications (except carbon black). Rejointment for composites, an electrode for solar cells, and organic LEDs scaffolds for bone growth**,** water purification, sensors, are the improved coating forms in electronics (Kumar N. et al., 2016).

2.1.2 **Composite based nonmaterials***:* These nanomaterials are synthesized by combining nanoparticles with other nanoparticles or merging with large bulk materials. Composite nanoparticles can also be confined with more complex structures such as metal-organic frameworks. Composite can be any combination of carbon-based or organic-based nanomaterials with any forms of metals, ceramic, or polymers bulk materials. Based on our desired properties for a specific application, these composite-based nanomaterials can be fabricated in various morphologies**.**

2.1.3 **Inorganic-based nanomaterials***:* These nanoparticles included metal and metal oxide, where nanoparticles are comprised of metals and their oxides. These Nanomaterials are composed of metals such as Au or Ag NPs, metal oxides such as TiO2 and ZnO NPs, and semiconductors such as silicon and ceramic*s.*

2.1.4 **Organic-based nanomaterials***:* These Nanoparticles are made mostly from organic matter but exclude carbon-based or inorganic-based Nanomaterials.
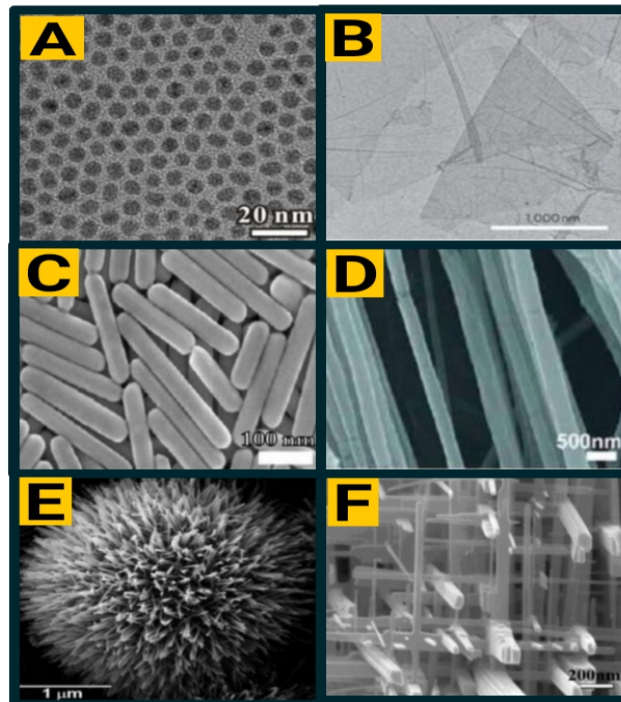
Figure 1 Nanomaterials with different morphologies: (A) nonporous Pd NPs (0D) (Zhang L. et al., 2012, Pan D. et al., 2009), copyright Zhang et al.; licensee Springer, 2012, (B) Graphene nanosheets (2D) (Li C. et al., 2012), copyright 2012, Springer Nature, (C) Ag nanorods (1D) (Zhang J et al., 2011), copyright 2011, American.

2.2 Classification of nanomaterials based on their dimensions

As its large production at the nanoscale range, these nanoparticles will continue to advantage for the economic growth of progressing countries and are currently beneficial in many applications of science and technology. These reopened the need for the classification of nanoparticles. The first idea of Nanoparticle classification was given by Gleiter et al. (Gleiter

H. et al., 2000). These classifications of nanoparticles are based on the dimensions of materials, which are outside the nanoscale range that is 0D, 1D, 2D, and 3D.

2.2.1 Zero Dimensional: These materials have all the dimensions within nanoscale i.e. no dimensions are larger than 100nm.e.g. Quantum dots, Nanodots, fullerenes.

2.2.2 One Dimensional: These are the material which having one dimension outside the nanoscale. i.e. one dimension is larger than 100nm.e.g. Nanowires, nanorods, nanotubes, nanopillars, carbon nanotubes (CNT).

2.2.3   Two Dimensional: These materials have two dimensions outside the nanoscale i.e. dimensions are larger than 100 nm. This class exhibits plate-like shapes e.g. Graphene, nanofilms, nanolayers, and nano-coatings.

2.2.4   Three Dimensional: These are materials not confined to the nanoscale in any dimension. i.e. all three dimensions are larger than 100nm.e.g. Graphite, diamond, bulk powders, dispersions of nanoparticles of nanowires.

Depending on crystalline forms and chemical compositions nanomaterials are classified into various categories (Tiwari J N et al., 2012). This classification of nanomaterials included the recently developed composites such as 0D, 1D, 2D, and 3D NMs, as shown in Figure 1 (Pokropivny V.V. et al., 2007).

2.3   Classification of nanomaterials based on their origin

Nanoparticles are classified into two types natural or synthetic, based on their origin apart from dimension and material-based classifications.

2.3.1   Natural nanomaterials are created in nature without direct or indirect connection to human activities. Natural nanoparticles are present in Earth's spheres (i.e., in the hydrosphere, atmosphere, lithosphere, and even in the biosphere). Earth has constituted nanoparticles that are naturally formed, and present in the Earth's spheres. The atmosphere is comprised of the troposphere, the hydrosphere which includes oceans, lakes, rivers, groundwater, and hydrothermal events, the lithosphere, which includes rocks, soils, magma, or lava at particular stages of evolution, and the biosphere, which covers micro-organisms and higher organisms, including humans (Hochella M.F. et al., Sharma V.K. et al., 2015).

2.3.2   Synthetic nanoparticles are useful in many applications such as in various environmental media. The major challenge among engineered NMs is whether existing knowledge is enough to forecast their behavior or exhibit a distinct environment-related behavior, different from natural NMs. Currently, various sources related to potential applications are used for the production of engineered NMs (Wagner S. et al., 2014).

3.   Types of nanoparticles:

3.1 Silver: Silver nanoparticles are some of the very interesting nanoparticles and are demandable in various filed like medical, food healthcare, consumers, and industrial purpose because of their physical and chemical properties. These particles have good antimicrobial efficiency against bacteria, viruses, microorganisms, and other eukaryotic these proved to be most effective (Gong P. et al., 2007, Mahendra R. et al., 2009). In comparison to other nanomaterials, silver nanoparticles are widely used as antimicrobial agents in sunscreen lotions, water treatment, textile Industries, etc. (Rai M. et al., Sharma V.K. et al., 2009). Plants like Capsicum Annuum (Bar H. et al., 2009) Azedarach India (Shankar S.S. et al., 2004), and Carica Papaya (Jha A.K. et al., 2010) can also be used for antimicrobial activity.

3.2 Gold: Gold nanoparticles (AuNPs) are also called gold colloids. These gold nanoparticles are also very useful, especially in the medical field. Gold nanoparticles are used to detect cancer cells and different types of cancer like oral and breast cancer. To identified the protein interactions on the exteriors of cancer cells, gold nanoparticles (AuNPs) are used. These particles are used as lab tracers to detect the existence of DNA in a sample. By using gold nanorods, and lasers, detection of cancer stem cells, diagnosis of cancer, and identification of different classes of bacteria can be done where gold nanoparticles react with them and destroy the cancer cells (Baban D. et al., 1998, Tomar A. et al., 2013)**.**

3.3   Allo*y*: Alloy is the impure form of some metals or the mixture of metal which is also a way of developing new materials that have a better use than their starting substance. Alloy nanoparticles show different structural properties than bulk samples (Ceylan A. et al., 2006). The main reason why Alloy nanoparticles at the nanoscale can have different properties is that they have the surface area and new type of quantum effects. Nanomaterials are already in commercial use, and some of the materials have been already available for several years. Because of their good conductivity, silver flakes are the most common particles used among other metal fillers (Junggwon Y. et al., 2008). By comparing metals and ordinary metallic nanoparticles, bimetallic alloy nanoparticles' properties are more attractive and better advantageous (Mohl M. et al., 2011)**.**

3.4   Magnetic*:* Magnetic nanoparticles are a class of nanoparticles that can be influenced using magnetic fields, such particles commonly consist of two components, a magnetic material like iron, nickel, and cobalt, and a chemical component that has functionality. Magnetic nanoparticles are known to be biocompatible i.e.maghemite and magnetite. These nanoparticles are used for drug delivery, targeted cancer treatment (magnetic Hyperthermia), gene therapy, stem cell sorting, and manipulation for DNA analysis, they have been actively considered (Fan T.X. et al., 2009)

4. Nanoparticle Synthesis:
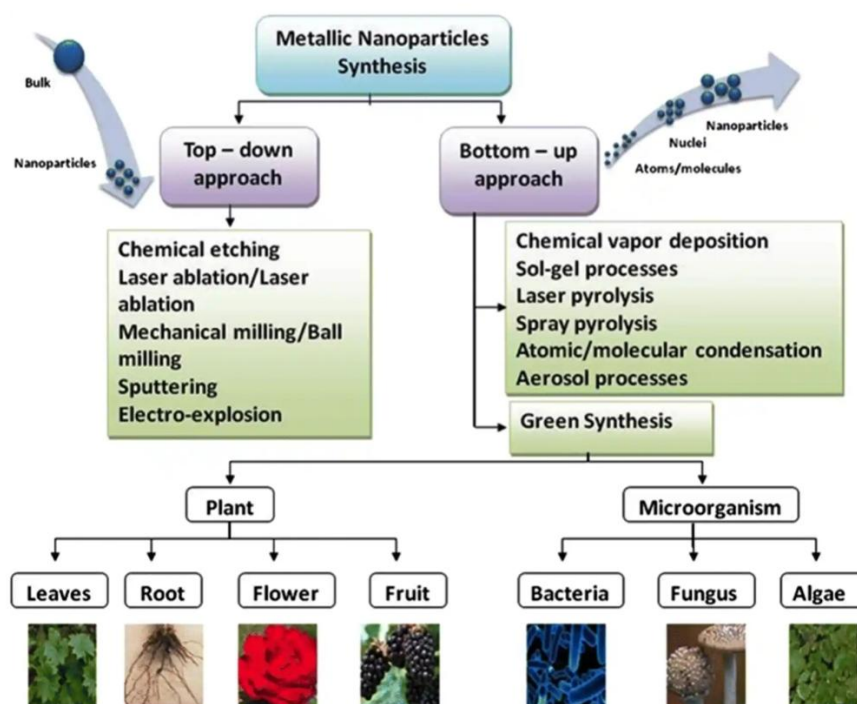
Figure 2 depicted from R. Nagarajan, "Nanoparticles: Building Blocks for Nanotechnology," in Nanoparticles: Synthesis, Stabilization, Passivation, and Functionalization, American Chemical Society, 2008, pp. 2-14

The nanoparticles are synthesized by various methods and categorized into bottom-up or top-down methods.

4.1   Bottom-up method: The bottom-up method is the miniaturization of material components to atomic level with further self-assembly process, which leads to the formation of the nanostructure. During the self-assembly process, the physical forces operating at nanoscale combines basic units into a large stable, and fixed structure. The synthesis of the bottom-up approach involves atom by atom, molecule by molecules, or cluster by cluster manipulation and starting materials are either in a liquid state or in a gaseous state. The approach is based on the principle of molecular recognition. Molecular recognition means self-assembly, growing more and more things of one kind from themself. Self-assembly is the **process of interaction of individual units of material into highly arranged/ordered structures/patterns**. It imparts unique properties to both inorganic and organic structures, so its generated, via non-covalent interactions. The bottom-up approach is capable of producing devices in parallel and much cheaper than the top-down method. This is also is called the constructive method which is the build-up of material from atom to clusters to nanoparticles. Sol-gel, spinning, chemical vapor deposition (CVD), pyrolysis, and biosynthesis are the most commonly used bottom-up methods for nanoparticles.

ATOMS   CLUSTER   NANOMATERIALS
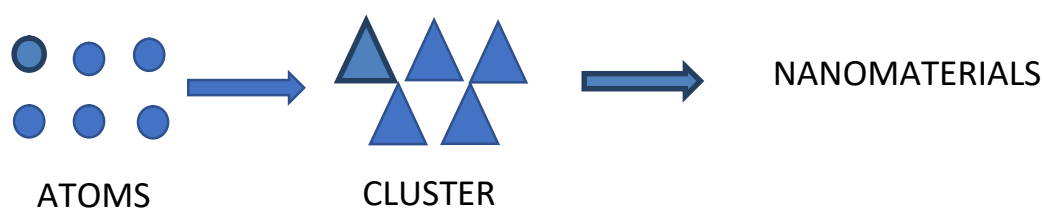
4.1.1 **Sol-gel:** It is a wet-chemical technique widely used for the fabrication of nanostructured ceramic materials and thin films. The sol-gel process involves the conversion of precursor solution, usually metals salt or metal alkoxide into a nanostructured inorganic solid through an inorganic polymerization reaction catalyzed by water. In other words, the sol-gel process changes from a liquid state to a gel state through a polycondensation reaction. A Sol-gel consists of a 3D continuous network of sol-gel particles, which enclosed a liquid phase. The gel is a solid macromolecule submerged in a solvent. Due to its simplicity, Sol-gel is the most preferred bottom-up method, as most of the nanoparticles can be synthesized from this method. It is a wet-chemical process containing a chemical solution acting as a precursor (Ramesh S., 2013). Phase separation is carried out to recover the nanoparticles by various methods such as sedimentation, filtration, and centrifugation, and moisture is further removed by drying (Mann S. et al., 1997).

4.1.2 **Spinning**: The various operating parameters such as the liquid flow rate, disc rotation speed, liquid/precursor ratio, location of feed, disc surface, etc. determine the characteristics of nanoparticles synthesized from the spinning disc reactor (SDR) method. The reactor is generally filled with nitrogen or other inert gases to remove oxygen inside and avoid chemical reactions. It has a rotating disc inside a chamber/reactor where the physical parameters such as temperature can be controlled (Tai C.Y. et al., 2007). The disc is rotated at different speeds where the liquid i.e. precursor and water is pumped in. The spinning causes the atoms or molecules to fuse and after that, it is precipitated, collected, and dried (Mohammadi S. et al., 2014).

4.1.3 **Chemical Vapour Deposition (CVD):** Chemical vapor deposition is the bottom-up approach and deposition method used to produce high-quality, high-performance, solid materials, typically under vacuum. These processes involve chemical reactions that take place between organometallic or halide compounds to be deposited and the other gases to produce nonvolatile solid thin films on substrates. In this typical chemical vapor deposition experiment, the water substrate is exposed to one, or more vitality precursors, which react and decompose on the substrate surface to produce the desired deposits. In the chemical vapor deposition process, solid materials are deposited from vapor by a chemical RXn occurring in the vicinity of a normally heated substrate surface. The resulting solid materials are in the form of a thin film powder or single crystal. CVD can also produce a synthetic diamond and almost any metallic and nonmetallic element. The deposition is carried out in a reaction chamber at ambient temperature by combining gas molecules. A chemical reaction occurs when a heated substrate comes in contact with the combined gas (Bhaviripudi S. et al., 2007). This reaction produces a thin film of product on the substrate surface that is recovered and used. The substrate temperature is the influencing factor in CVD. CVD is a crucial material preparation method, which plays an essential role in precious

metal thin films and coatings. The advantages of CVD are highly pure, uniform, hard, and strong nanoparticles. The disadvantages of CVD are the requirement of special equipment and the gaseous by-products are highly toxic (Search H, Journals C).

4.1.4 Pyrolysis: Laser pyrolysis is a process in which a continuous wave CO2 laser is used to heat flowing reactant gases, resulting in molecular decomposition to form vapors to initiate nucleation, followed by the growth of nanoparticles. The high-power laser beam generates elevated localized temperatures, which trigger the nucleation and growth of nanoparticles. The nanoparticles are collected by catcher equipment with a filter. Pyrolysis is the most commonly used process in industries for the large-scale production of nanoparticles. It involves burning a precursor with flame (Kammler B.H.K. et al., 2001). The combustion of by-product gases is then air classified to recover the nanoparticles. Some of the furnaces use laser and plasma instead of flame to produce high temperatures for easy evaporation (Bruchez M. et al., 2016). This method is advantageous for producing high-quality, small-sized particles with narrow size distribution. This method is a simple, efficient, cost-effective, and continuous process with a high yield.

4.1.5 Biosynthesis: Biosynthesis is also called green synthesis, and this is an environmentally friendly approach for the synthesis of nontoxic nanoparticles. Green chemistry is the utilization of a set of principles that reduces or eliminates the use or generations of a hazardous substance in the design, manufacture, and application of chemical products. This synthesis uses bacteria, plant extracts, fungi, etc. This synthesis of nanoparticles has unique and enhanced properties that find their way in biomedical applications (Kuppusamy P. et al., 2014).

4.2 Top-down method
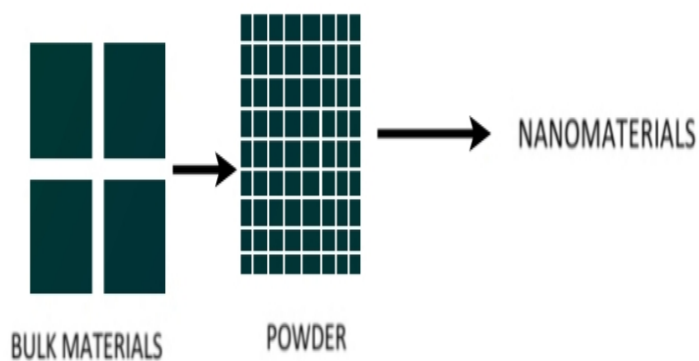
The top-down approach of synthesizing nonmaterial's uses a larger initial structure, that can be controlled, during the processing of nanostructure. The top-down method begins with a pattern generated in a large-scale material, which can be reduced to nanoscale after a sequence of operations is performed over them. These methods are required for building their setup, quite expensive, and the growth process is slow. Hence these methods are suitable for large-scale production, and laboratory experimentation. Top-down approaches are based on the grinding of materials, and these processes are subtractive. The parts of mechanical devices used to shape objects are stiff and hard so, these methods are not suitable for soft samples. This approach anticipates nanodevices that must be built by pieces in several stages, much like manufactured them. Top-down is also called a destructive method, where reduction of bulk material to nanometric scale particles takes place.

4.2.1 Mechanical milling: In Mechanical milling, the bulk material is grounded down to the nanoscale with strong mechanical forces applied by the milling technique. The fundamental principle in mechanical attrition is the energy imparted to the sample during impacts between the milling media. This model represents the moment of collision, during which particles are trapped between two colliding balls within a space occupied by the mass of the powder particle. From the various top-down methods, mechanical milling is the most extensively used to produce various nanoparticles. During synthesis, different elements are milled in an inert atmosphere (Yadav T.P. et al., 2012). The influencing factors in mechanical milling are plastic deformation that leads to particle shape. Fracture leads to a decrease in particle size, and cold-welding leads to an increase in particle size. Balls rotate with high energy inside a vial/ container and then fall on the solid, thus crushing the soils into nano-crystallites.

4.2.2 Nanolithography: The word "litho" means stone lithography means carving a stone or writing on a stone. It is a top-down approach in which a sample is patterned by removing some part of it or sometimes even organizing some material on a suitable substrate. It is the study of fabricating nanometric scale structures with a minimum of one dimension in size and range of 1 to 100 nm. The various nanolithography processes are optical, electron-beam, multiphoton, nanoimprint, and scanning probe lithography. Generally, lithography is the process of printing a required shape or structure on a light-sensitive material that selectively removes a portion of the material to create the desired shape and structure. The main advantages of nanolithography are it produces a single nanoparticle to a cluster with desired shape and size. The disadvantages are the requirementof complex equipment and the cost associated with nanoparticles (Hulteen J.C. et al., 1999).

4.2.3 Laser ablation: The laser ablation method is another method to heat the materials. In this method, a laser pulse is used to heat the material, and evaporated per pulse is termed as ablation rate. This method is extensively used for the preparation of nanoparticles and particulate films. This process involves a laser beam is used as the primary excitation source for evaporation of metal precursors from the surface and generating clusters directly from a solid sample. A high-energy pulsed laser beam hitting the target material generates temperatures that vaporize the substance quickly. The hot metal vapors are directed in a pull. Laser Ablation Synthesis in Solution (LASiS) is a common method for nanoparticle production from various solvents. A laser beam condenses a plasma plume that produces nanoparticles (Amendola V. et al., 2009). As LASiS provides a stable synthesis of nanoparticles in organic solvents and water that does not require any stabilizing agent or, chemicals it is a 'green' process. It is a reliable top-down method that provides an alternative solution to conventional chemical reduction of metals to synthesis metal-based nanoparticles.

4.2.4 Sputtering: A sputtering deposition is a type of physical vapor deposition technique and is also known as thin-film deposition technology. Sputtering is **a process through which microscopic particles of a target material get ejected from its surface after the bombardment of energetic ions of gas or gaseous** plasma. Momentum exchange between atoms and ions of the element causes sputtering. Furthermore, sputtering in surface physics is termed as a cleaning method for the preparation of high-purity surfaces and as a method for analyzing the chemical composition of surfaces. Several things can possible in the process of sputtering.

- Reflection
- Absorption

- Sputtering
- Ions implantation

Sputtering' is the *deposition* of *nanoparticles* on a *surface* by *ejecting particles* from it by *colliding* with *ions* (Shah P et al., 2006). Sputtering is usually a deposition of the thin layer of nanoparticles followed by annealing. Determination of the shape and size of the nanoparticles is obtained from the thickness of the layer, temperature, duration of annealing, substrate type, etc. (Lugscheider E. et al., 1998).

4.2.5 Thermal decomposition: The specific temperature at which an element or compound chemically decomposes is called the decomposition temperature. Thermal decomposition is an endothermic chemical decomposition, that is produced by a heat treatment that breaks the chemical bonds in the compound (Salavati-niasari M. et al., 2008).

5. **Physical properties of nanoparticles:** Nanoparticles show different properties compared to larger particles of the same materials. In nanoparticles forces of attraction between surfaces can appear to be weak on a larger scale, but on nanoscale they are strong. Nanoparticles consist of three layers:
   - The surface layer,
   - The shell layer, and
   - The core.

The surface layer usually has a variety of molecules such as metal ions, surfactants, and polymers. Nanoparticles may contain a single material or may consist of a combination of several materials. Nanoparticles can exist as suspensions, colloids, or dispersed aerosols depending on their chemical and electromagnetic properties. Nanoparticles have a high surface area to volume ratio (specific surface area).

The properties of nanoparticles are dependent on their size, for instance, copper nanoparticles are smaller than 50 nm than super hard materials and do not exhibit the properties of malleability or, ductility of bulk copper. Other changes that are dependent on the size of nanoparticles are superparamagnetic exhibited by magnetic materials, quantum confinement by semiconductor Q-particles, and surface plasmon resonance in some metal particles. Research has also demonstrated that absorption of solar radiation in photovoltaic cells is much higher in nanoparticles than in the thin films of continuous sheets of bulk material. This is because nanoparticles are smaller and can absorb a greater amount of solar radiation.

Nanoparticles exhibit enhanced diffusion at elevated temperatures due to their high surface area to volume ratio. This property of nanoparticles allows sintering that takes place at lower temperatures in the case of larger particles. While this diffusion property exhibited by nanoparticles may not affect the density of the product, it can lead to agglomeration (Amendola V. et al., 2009).

There are three main physical properties of nanoparticles, and are interrelated: (1) they are highly mobile in the free state (e.g., in the absence of some other additional influence, a 10-nm-diameter nanosphere of silica has a sedimentation rate under the gravity of 0.01 mm/day in water); (2) they have enormous specific surface areas (e.g., a standard teaspoon, or about 6 ml, of 10-nm-diameter silica nanospheres has more surface area than a dozen doubles-sized tennis courts; 20 percent of all the atoms in each nanosphere will be located at the surface); and (3) they may exhibit what is known as quantum effects. Thus, nanoparticles have a vast range of compositions depending on the use of the product.

Advantages: Nanotechnology can revolutionize a lot of electronic products, procedures, and applications, therefore there are lots of advantages of nanoparticles some are (Mohsen J. et al., 2008, Rawat M. et al., 2006):

- Nanoparticles can have better stability of unstable active ingredients and excellent biocompatibility.
- The nanoparticle has easy large-scale upgradability.
- It has occlusive property increases skin hydration and hence, increased penetration of the drug.
- It enhances solubility bioavailability and protection from toxicity.
- Nanoparticles protect from chemical, physical, and biological degradation.
- Nanoparticles with a diameter less than 200nm are not screened out of circulation by the liver and spleen.
- Nanoparticles ends of illness i.e. cancer, heart disease
- It also stops the aging process and painless childbirth.
- New dosage forms, and better exploration of less-used drug administration routes for efficient therapeutic outcomes.
- Particles size and surface characteristics of nanoparticles can be easily manipulated, to achieve both passive and active drug targeting.

Applications of nanoparticles: Because of their many useful properties, nanoparticles are used in almost every field. A list of some of the applications of nanoparticles to biology or medicine is given below.

- Nanomaterials have more surface atoms which make the catalytic activity. For example, white nano gold possesses excellent catalytic properties and fluorescent biological labels. It also involves the slow and selective release of drugs to the targeted organs (Salata O.V, 2004, Bruchez, M. et al., 2016, Chan W.C.W et al., 1998, Wang S. et al., 2002).
- Nanomaterials are used as drugs for the treatment of cancer and TB (Mah C. et al., 2000, Panatarotto D. et al., 2003).
- Quantum wires have electrical conductivity. Nano radios are produced by using carbon nanotubes, and pathogens can be detected (Edelstein R.L. et al., 2000).
- Gold nanoparticles injected into the body react with the protein, and the protein concentration can be detected by passing a laser beam externally (Nam J.M et al ., 2003).
- Gold nanoshell is used as a scanning probe which gives the magnified image of cells in a body probing of DNA structure (Mahtab R. et al., 1995).

- Embedding of nanoparticles on fabrics make them stain repellents. Socks embedded with silver nanoparticles remove the bacteria and makes them odour free and also helps in tissue engineering (Ma J. et al., De. La. Isla A. et al., 2003).
- Gold coated nano shell containing silicon core are administered near the tumours. When infrared light is irradiated on the skin externally, the gold nano shells absorbs the light and converts in to heat which destroys the cancer cell responsible for tumour it is destruction of tumour via heating (hyperthermia) (Yoshida J. et al., 1999).
- It is used as materials for joint replacement and also in the manufacture of some component like heart valves, contact lenses, dental implants, biological molecules and cells can be separated and purified (Molday R.S. et al., 1982)
- From the use of nanoparticles Phagokinetic studies can be done(Parak W.J. et al., 2002).
- Contrast of MRI can be enhancement. Fuel consumption in automobiles can be reduced by using specially designed nano particles as fuel additive. Incorporation of small amount of nano particles in car bumpers make the stronger than steel.

6. **CONCLUSION:** Nanoparticles are small substance which is different than their bigger form. Nanoparticles are useful in the advancement of modern technology and are important for mankind. These could be our basis for the next big human technology breakthrough, and we must do more research on nanotechnology, as it can be seen from the above example that it can be useful for many applications such as in electrical, medical, space field, and also in different fields of science and technology.

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Search H, Journals C, Contact A, Iopscience M and Address I P Nanoparticle Synthesis by Ionizing Source Gas in Chemical Vapor Deposition Nanoparticle Synthesis by Ionizing Source Gas in Chemical Vapor Deposition 77 4–7.

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BIODIVERSITY& SECONDARY METABOLITES OF FEW IMPORTANT ETHNO-BOTANICAL PLANTS USED IN SKIN DISEASES BY LOCAL INHABITANTS OF DURG (C.G.)

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Plant species used in cure of skin disorder among the indigenous communities of Durg district of Chhattisgarh state was conducted. Skin is considered as largest visible organ of human so directly comes in exposure to different diseases, thus people of all ages suffered mostly by ordinarily infections on skin. Most of the plant species described in the present paper are used in the treatment of Cuts, Burns, Wounds, Itching, Chicken-Pox, Ring Worm, Pimples, Scabies, Eczema, Leprosy, Abscess, Psoriasis, Inflammation, Rashes etc. Survey and documentation was done on the ethno-medicinal plants used by the tribal and local inhabitants ofDurg district of Chhattisgarh, before such valuable indigenous knowledge fade away. A total of 35 plant species were documented by the help of local health healer for the treatment of skin disorder which belonging to 23 families of monocots and dicots.

Keywords: Indigenous Knowledge, Folk Medicine, Skin Disorder, Chhattisgarh

1. INTRODUCTION

India has century's old legacy of medicinal plants and herbal medicines for curing human sickness (Tiwari, 2015). Approximately 80% of the people in developing countries dependent on traditional medicines for their primary healthcare estimate by World Health Organization (WHO) (Kingston, 2009, Verma, 2016). There are estimated to be many effective plant-based formulation, used in folk medicine and known to tribal and local communities in Chhattisgarh. Medicinal plants are only easily available health care substitute for the most of the population in rural and tribal areas. In Chhattisgarh the knowledge accrued by the tribals through generation's shows the in-depth understanding of the forest resources and since medicinal plants are used in pharmacological research and drug development (Tiwari, 2015). In the present paper an attempt to document on medicinal plant species used to cure skin disorder by tribal and local communities.

Secondary metabolites were also reported in these medicinal plants. The medicinal plants are rich of secondary metabolites which provides a type of defense to plants that's why

they are very important properties of a plant. Secondary metabolites are plant derived organic molecules which have less nutritional value. However, they affect the various physiological processes in body and play role in defense mechanism to protect the body against diseases (Costa et al., 2012). Terpenoids, alkaloids, glycosides, tannins, steroids, saponins, phenolic compounds, flavonoids etc. are important secondary metabolites produced in plants.

2. LITERATURE REVIEW

Rahul Dev Yadav et al. (2011), works on phytochemical analysis of *Pogomia pinnata leaves.* Anupam Kumar Tiwari (2015), Indigenous knowledge for treating skin disease in some selected district of Chhattisgarh. Rahimullah Shaikh (2015), Analysis of phytochmical & secondary metabolite of *Cassia tora.* D. Chauhan et al. (2015), Estimation of secondary metabolites of ethnomedicinal plants. S. Verma (2016), Medicinal Plants used in treating skin disease, etc.

3. EXPERIENTIAL WORK

Durg situated at 21.1623˚N latitude and 81.4279˚E longitude. The district covers an area of 2,238 km². The Durg district is situated on the east bank of river Shivnath. The town of Bhilai is home to the Bhilai Steel Plant is neighboring city of Durg . Bhilai-Durg is the second largest urban area in Chhattisgarh after Raipur. Bhilai is a major industrial city in India as well as an education hub of central India.
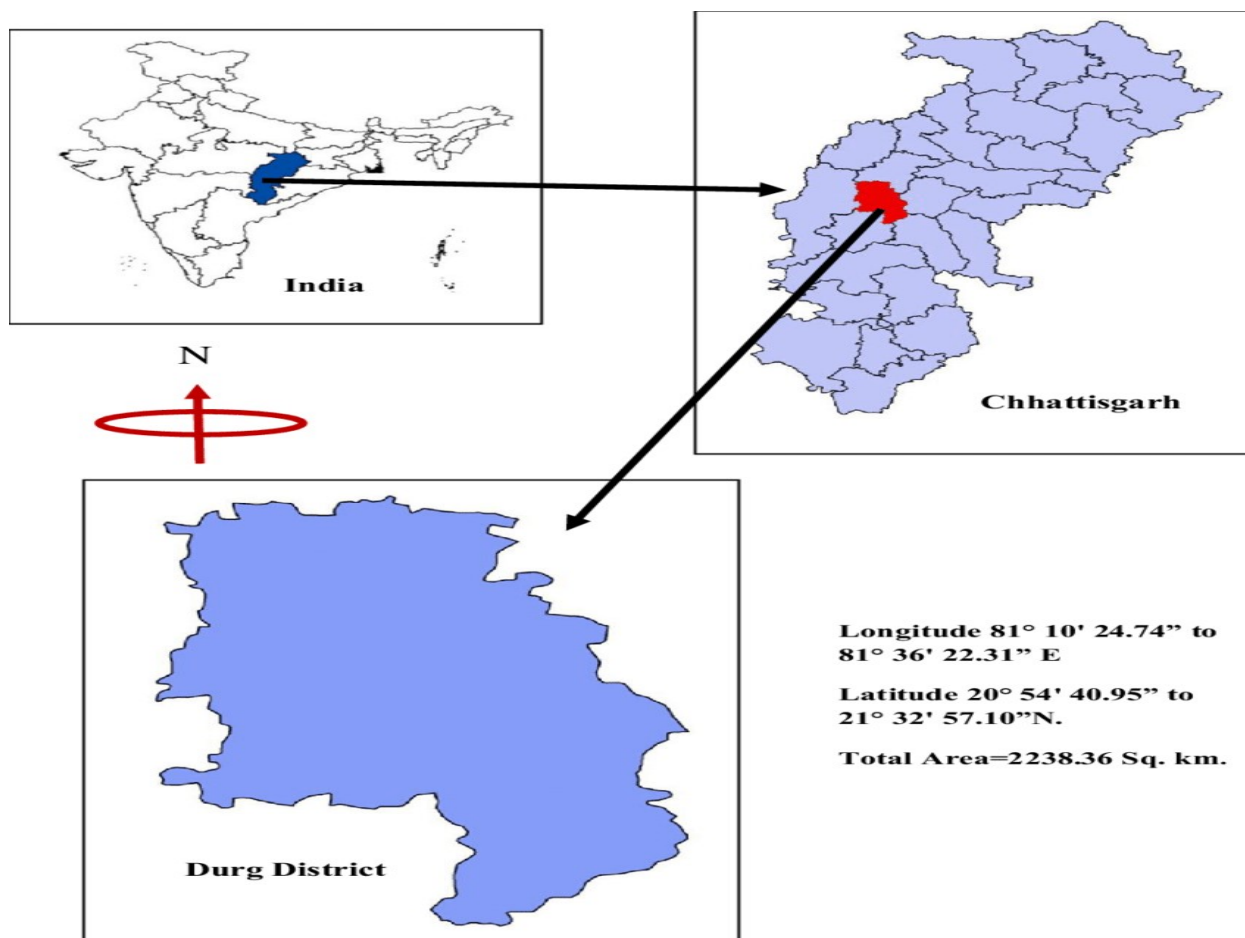
3.1Collection of plant material: The present research work was carried out at Durg district of Chhattisgarh. We have conducted an comprehensive field survey in the district with its neighboring districts in ten survey sites to collect specimens and documented knowledge about ethno-medicinal plants used by the local people to cure skin disorder. The medicinal plant species used by the traditional practitioner are arranged alphabetically followed by botanical name, local name, family, habit, plant part used, and skin disorder.

3.2 Sample extraction: The collected plants were dried in room temperature in collected polythene carry bags. As they dries they are converted into powder by the help of mortar and pastel and placed separately in labeled polythene bags.Aqueous extract, extract in organic solvents viz. ethyl alcohol, methyl alcohol, acetone, and chloroform due to diversified nature of solute which dissolve in these solvents. In the taken paper we have given the result of aqueous solvents. in this work we have taken only five plants only on the basis of their easy availability in the district.

Qualitative phytochemical analysis: The extract was tested following standard biochemical methods as described below –

Test for protein:
Biuret's test, Million's test, Ninhydrin test were done.
Test for Carbohydrates:
Fehling's test, Benidict's test, Molisch's test, Iodine test were done.
Test for Alkaloids:
Mayer's test, and Hager's test were done.
Test for Glycosides:
Liebermann's test, Salkowaski's test, Keller-Killiani test, Borntrager;s test were done.
Test for Fatty acid and Fixed oil:
Emulsion test was done.
Test of phenol:
Folil-ciocalteau test and ellagic acid test were done.
Test for Tannins:
Ferric chloride solution test for Tannins was done.
Test for Saponins:
Froth test, and Foam test were done.
Test for Flavonoids:
Lead acetate test and Shinoda test were done.
Test for Steroids:
Sulfuric acid test, napthol-sulfuric acid test, Liebermann's test, and Mandelin's test were done.

4. RESULTS AND DISCUSSION

During the survey, total 35 plant species were collected from different location of Durg district which are used as herbal medicine for the treatment of skin diseases. The 35 species are belonging to 23 families of monocot and dicot out of them 10 trees, 15 herbs, 5 shrubs, and 5 climbers are categorized. Most recorded plants were herbs. The most dominant families were Papilionaceae and Liliaceae with 4 species each, followed by Ceasalpiniaceae with 3 members, Combretaceae, Euphorbiaceae, Solanaceae and Verbinaceae with 2 members while rest with 1 member reported in Acanthaceae, Amaranthaceae, Asclepiadaceae, Asteraceae,

Cannabaceae, Caricaceae, Cleomaceae, Convolvulaceace, Cucurbitaceae, Lamiaceae, Lythraceae, Meliaceae, Moraceae, Papaveraceae, Sapotaceae, Zingiberaceae respectively.

The recorded ethno-medicinal plants were used in treatment of various skin disorder as form of paste of herbal remedies to apply externally. Leaf was mostly used plant part (18 species) for treatment of skin diseases. This was followed by seed (6 species), root (4 species), latex (4 species), whole plant (3 species), Flower bud (2 species), stem and bark (1 species).

Among 35 plants which were used in about 20 diseases was recorded. It was seen that most common application was reported in wound by 19 plants, which is followed by itching 11 plats, Leprosy by 5 plants, in burn, cut and ring worm 4 plants, Psoriasis with 3 plants, Eczema and Scabies with 2 plants and rest 11 diseases were treated with single plant.

**Table 1: Showing Botanical Name, Local Name, Family, Habit, Part Used, and Diseases**
S. N	**BOTANICAL NAME**	**LOCAL NAME**	**FAMILY**	**HABIT**	**PLANT PART USED**	**SKIN DISORDER**
1	*Abrus precatorius L.*	Ratti	Papilionaceae	C	Seeds	Scratches, Sores, Wound
2	*Achyranthus aspera L.*	Apamarg	Amaranthaceae	H	Roots	Itching, cut,Wound, Ring worm
3	*Allium cepa L.*	Pyaj	Liliaceae	H	Bulb	Wound
4	*Aloe vera L.Burm.*	Ghitkumari	Liliaceae	H	Leaves	Wound, Skin irritation
5	*Argemone maxicana L.*	Satyanashi	Papaveraceae	H	Leaves, Roots	Itching, Burn
6	*Azadirachta indica A.Juss.*	Neem	Meliaceae	T	Leaves	Chiken pox, Itching, Wound
7	*Barleria prionitis L.*	Vajradanti	Acanthaceae	S	Leaves	Wound
8	*Cannabis sativa L.*	Bhang	Cannabaceae	H	Leaves, Seeds, Flower	Eczema, cut
9	*Carica papaya L.*	Patpita	Caricaceae	T	Latex	Spot, Scars
10	*Cassia fistula L.*	Amaltash	Caesalpiniaceae	T	Flower bud	Leprosy, Wound
11	*Cleome viscose L.*	Hulhul	Cleomaceae	H	Leaves	Wound
12	*Crinum latifolium L.*	Sudarshan	Liliaceae	H	Leaves, Rhizome	Wound, Burn
13	*Curcuma longa Linn.*	Haldi	Zingiberaceae	H	Rhizome	Wound, Cut, Rashes
14	*Cuscuta reflexa Roxb.*	Amerbel	Convolvulaceae	C	Leaves, stem	Itching, Ringworm
15	*Dalbergia sissoo*	Shisum	Papilionaceae	T	Seeds	Itching, Burn

	Roxb.					
16	*Datura metel L.*	Dhatura	Solanaceae	S	Leaves, Root	Leprosy, wound
17	*Euphorbia hirta L.*	Dudhi	Euphorbiaceae	H	Latex	Wound
18	*Ficus racemosa L.*	Gular	Moraceae	T	Leaves, Latex	Cut, Wound
19	*Gloriosa superb L.*	Kalahari	Liliaceae	C	Leaves	Leprosy, Small pox
20	*Hemidesmus indicus(L.)*	Anantamul	Asclepiadaceae	C	Whole plant	Scabies
21	*Lowsonia inermis L.*	Mehndi	Lythraceae	S	Leaves	Swelling, Wound
22	*Mimusops elengi L.*	Bakul	Sapotaceae	T	Leaves	Wound
23	*Momordica charantia L.*	Karela	Cucurbitaceae	C	Leaves	Itching, Ring worm
24	*Ocimum sanctum L.*	Tulsi	Lamiaceae	H	Leaves	Burn, Wound
25	*Pogomia pinnata (L.)Pierre*	Karanj	Papilionaceae	T	Seeds	Itching
26	*Ricinus communis L.*	Arandi	Euphorbiaceae	S	Seeds	Inflammation, Psoriasis
27	*Senna occidentalis (L.)Link.*	Kasamarda	Caesalpiniaceae	H	Leaves	Ring worm, Eczema
28	*Senna tora (L.)Roxb.*	Charota	Caesalpiniaceae	H	Leaves	Ring worm, Itching, Psoriasis, Leprosy
29	*Solenum nigrum L.*	Makoi	Solanaceae	H	Leaves	Itching, Abscesses
30	*Sphaeranthus indicus L.*	Gorakmundi	Asteraceae	H	Whole plant	Wound, Leprosy
31	*Tactona grandis L.F*	Sagoun	Verbinaceae	T	Latex,Bark	Itching
32	*Tephrosia purpurea (L.)Pers.*	Sarphonkha	Papilionaceae	H	Whole plant	Pimples, Wound
33	*Terminalia arjuna (Roxb.)Weight & Arn.*	Arjun	Combretaceae	T	Bark	Wound, Psoriasis
34	*Terminalia chebula Retz.*	Harra	Combretaceae	T	Fruit	Scabies, Wound
35	*Vitex nergundo L.*	Nirgundi	Verbinaceae	S	Root, Leaves, Seeds	Itching

ABBREVIATION – T=Tree, H=Herb, S=Shrub, C=Climber

Table 2: Qualitative phytochemical screeing Aqueous extract												
Name of plants	**Primary metabolites**			**Secondary metabolites**								
	Protein	Carbohydrate	Fatty acid & fixed oil	Glycosides	Alkaloids	Phenols	Steroides	Terpene	Terpenioids	Tannin	Saponins	Flavonoids
Azadirachta indica	-	-	-	+	+	-	+	+	+	+	+	+
Curcuma longa	-	-	-	-	+	+	+	-	-	+	+	+
Ocimum sanctum	-	-	-	+	+	+	-	-	-	-	-	+
Pogomia pinnata	+	-	-	+	+	+	-	+	+	+	-	+
Senna tora	+	-	-	+	-	+	+	-	+	+	+	+

ABBREVIATION
– (+) =Presence
(-) =Absence

Figure 1: Habit of different plant species
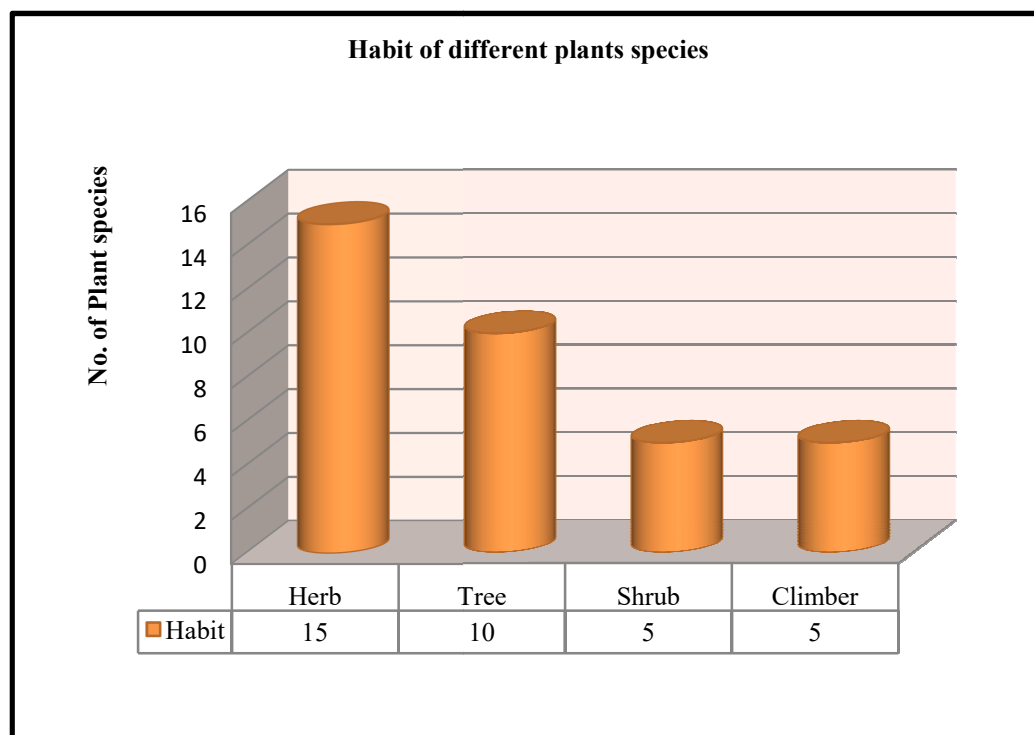
S.No.	Habit	No.of Plants
1	Climber	5
2	Herb	15
3	Shrub	5
4	Tree	10

Table 3: Total no. of plant species belonging to different families			
S.NO.	**Family Name**	**S. No. of Plant species.**	**Total No. of Plant species.**
1	Acanthaceae	7	1

2	Amaranthaceae	2	1
3	Asclepiadaceae	20	1
4	Asteraceae	30	1
5	Caesalpiniaceae	10,27,28	3
6	Cannabaceae	8	1
7	Caricaceae	9	1
8	Cleomaceae	11	1
9	Combretaceae	33,34	2
10	Convolvulaceae	14	1
11	Cucurbitaceae	23	1
12	Euphorbiaceae	17,26	2
13	Lamiaceae	24	1
14	Liliaceae	3,4,12,19	4
15	Lythraceae	21	1
16	Meliaceae	6	1
17	Moraceae	18	1
18	Papaveraceae	5	1
19	Papilionaceae	1,15,25,32	4
20	Sapotaceae	22	1
21	Solanaceae	16,29	2
22	Verbinaceae	31,35	2
23	Zingiberaceae	13	1
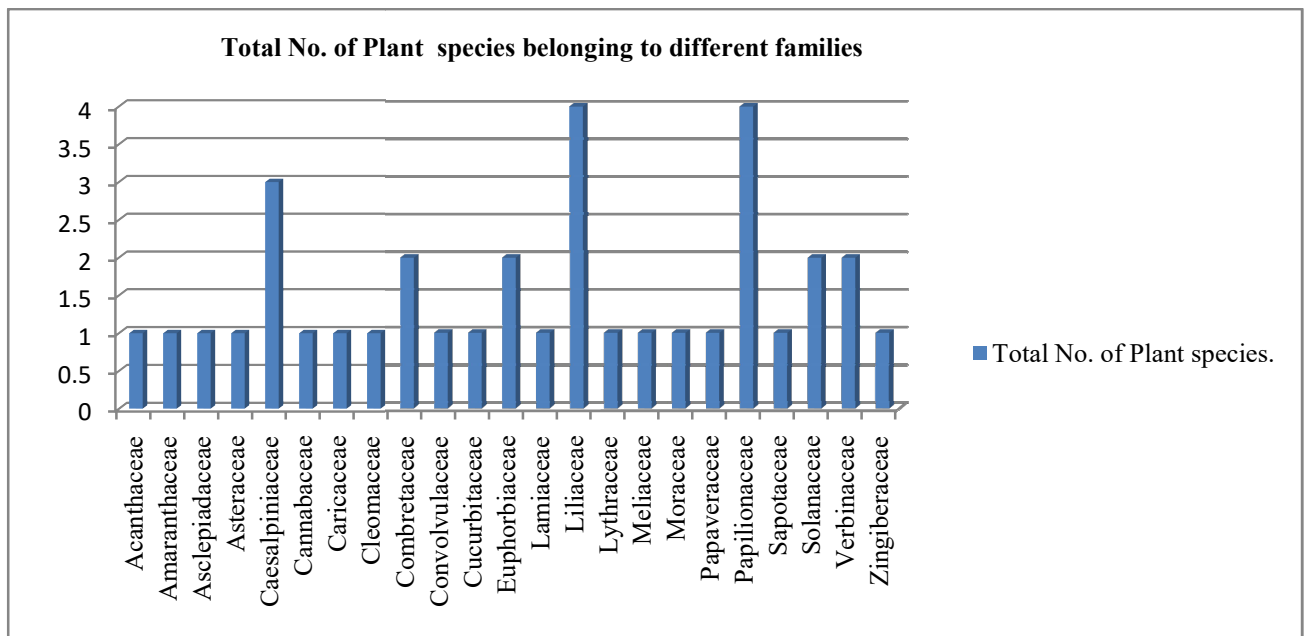
Figure 2: Total No. of Plant species belonging to different families

S.NO.	Skin disorder	Sl. No. Of the Plants	No. of Plants
	Table 4: No. of plants used in different skin diseases		
1	Burn	5,12,15,24	4
2	Chicken pox	6	1
3	cut	2,8,13,18	4
4	Eczema	8,27	2
5	Inflammation	26	1
6	Itching	2,5,6,14,15,23,25,28,29,31,35	11
7	Leprosy	11,16,19,28,29	5
8	Pimples	32	1
9	Psoriasis	26,28,33	3
10	Rashes	13	1
11	Ring worm	2,23,27,28	4
12	Scabies	20,34	2
13	Scars	9	1
14	Scratches	1	1
15	Skin irritation	4	1
16	Small pox	19	1
17	Sores	1	1
18	Spot	9	1
19	Swelling	21	1
20	Wound	1,2,3,4,6,7,10,11,12,13,16,17,18,21,22,24,30,33,34	19

No. of Plants used in different diseases
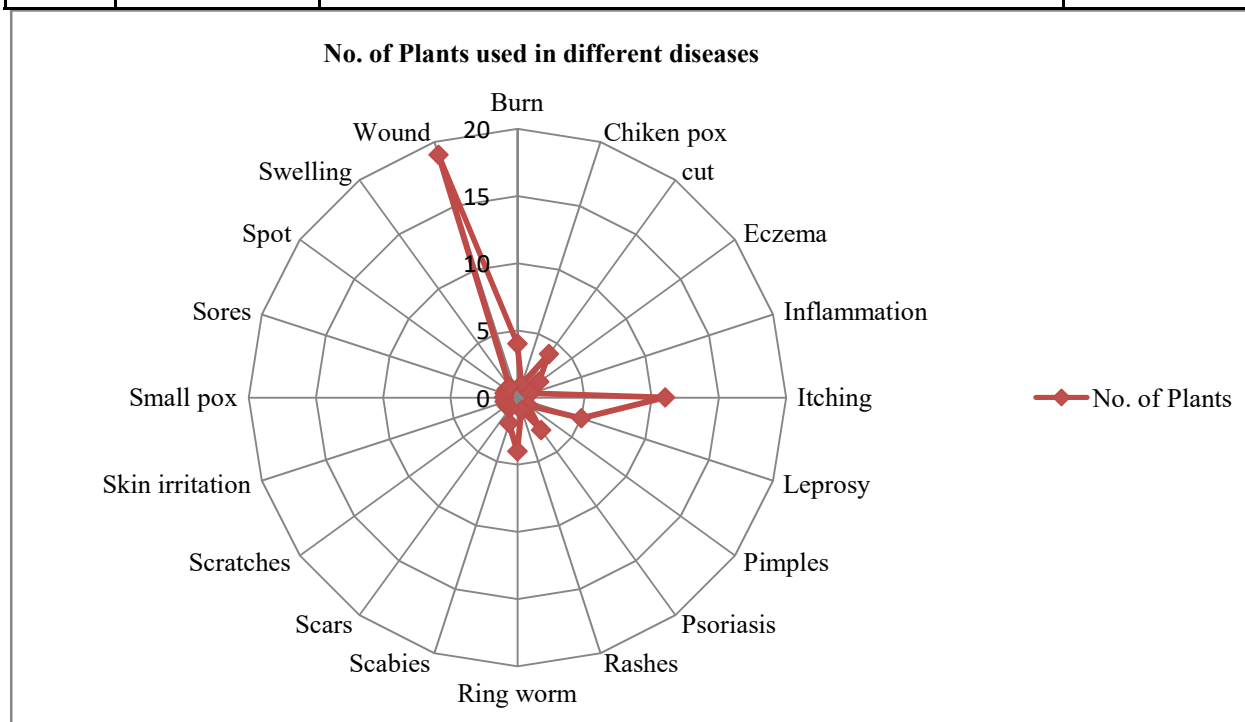
Figure 3: No. of Plants used in different diseases

5. CONCLUSION

The present study highlights the ethno-botanical medicinal uses of the 35 plants belonging to 23 families illustrating family biodiversity with phytochemical analysis for primary and secondary metabolites was carried out in five plants. Presence of secondary metabolites like alkaloids, phenols, glycosides and flavonoids in all the five plants indicates a direction of its medicinal and antioxidant properties which will be the target of our future work to get a destination.

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BIOCHEMICAL AND ANTIMICROBIAL ACTIVITIES OF AgNO$_3$ TREATED ETHANOLIC EXTRACTS OF *Ganodermalucidum*

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In recent years, varieties of mushrooms have been identified and the number of mushrooms being cultivated for medicinal purposes. Fresh *Ganoderma lucidum* fruiting bodies were collected from Belgahana, Bilaspur District, Chhattishgarh during August and September 2020 and were tested for biochemical and antimicrobial activities from ENT screened microbes. Protein, Carbohydrate, Tannins and Terpenoids are present in ethanol, methanol, water of crude and silver nitrate treated extracts. The crude extract of *Ganoderma lucidum* and AgNO$_3$ from ethanol, methanol, and aqueous was revealed good antimicrobial activity against test organisms. Ciprofloxacin has used for standard was shown good zone of inhibition (20 to 28mm). The Ethanol extract of AgNO$_3$ treated with of *Ganoderma lucidum* has shown effective inhibition zone against all the organisms. Methanol extract of crude and AgNO$_3$ of *Ganoderma lucidum* shown inhibitory effect against test organisms (*candida albicans, Enterococcus faecalis, Pseudomonas aeruginosa and staphylococcus aureus*). Ethanolic extract of AgNO$_3$ treated *Ganoderma lucidum* has shown good inhibitory effect against ENT infected microbial species while in crude extract it shown low inhibition of zone.

Keywords: Biochemical screening, Antimicrobial activity, Ganoderma lucidum

1. INTRODUCTION

In recent years, varieties of mushrooms have been identified and the number of mushrooms being cultivated for medicinal purposes (Smith et al., 2002; Chang and Wasser, 2012). *Ganoderma lucidum* (Family - Polyporaceae), is a medicinal mushroom, commonly known as Reishi, this mushroom is a valuable herb due to its biological activities such as, immuno - modulatory, cardiovascular, respiratory, anti-tumor, antiviral, antihepatotoxic effect (Ahmed et al., 2019). Extracts of mycelia of *Ganoderma* species showed an antibiotic effect against organisms such as *Pseudomonas syringae* and *Bacillus subtilis* (Basnet et al., 2017). *Ganoderma* contains a variety of bioactive compounds including a range of proteins, triterpenoids, and other lipids, polysaccharides and nucleotides (Kamble et al., 2011).

Bioproducts of *Ganoderma lucidum* have multi beneficial effects for human welfare. These are widely used as traditional medicinal ingredients for the treatment of various health problems. . It's major compounds with significant pharmacological activities are, triterpenes, ganoderic acid and polysaccharides (Wang et al., 2020). A new class of compounds with medicinal and nutritional features extractable from either the fruiting bodies or the mycelium of mushrooms have been referred to as "mushroom nutraceuticals" (Quereshi et al., 2010).

Mushroom contain vitamins A and C or ß carotenes and a wide variety of secondary metabolites such as phenolics compounds, terpenes, phenols, and steroids, all have protective effects because of their antioxidant properties (Valverde et al., 2015). The present work is to

carry out experiments to screen antibacterial potential of different extracts of *Ganoderma lucidum.*. Present study is strongly suggestive that *Ganoderma lucidum* can beused as antimicrobial agent in the development of new drug for the treatment of various infections caused by bacterial pathogenesis and harmful activity of excess free radicals in humans (Kamra and Bhatt 2012).

2. MATERIALS AND METHODS

2.1 Collection and extraction of *Ganodermalucidum*

Fresh *Ganoderma lucidum* (Figure 1) were collected from Belgahana, Bilaspur District, Chhattishgarh during August and September 2020. The *Ganoderma lucidum* were washed systematically and dried out in sunlight. The mycelia of *Ganoderma lucidum* were grinded to powder and were used for the extraction.

Figure 1: *G. lucidum* samples in the present work

2.2 Mycelial Extracts

Dried mycelia were extracted in different solvent such as ethanol , methanol, water separately using hot extraction method, twenty gram of *G. lucidum* powder was dissolved in 200 ml of 70% ethanol and kept the Soxhlet apparatus for the hot extraction process soxhlet apparatus. The extract was then stored in a refrigerated condition for further use.

2.3 Synthesis of AgNO₃ treated extracts from *G.lucidum* extracts

1 ml of ethanol extract of *G. lucidum* was added to the 1 mM silver nitrate solution and kept the solution in sunlight for 5 to 6 hrs and finally, the reddish-brown colour change was observed. 1 ml of ethanol extract of *G. lucidum* was added to the 1 mM silver nitrate solution. The same procedure was carried out for the remaining four different volumes of *G. lucidum* extracts and silver nitrate solution.

2.4 Preliminary screening

Various extracts were used for preliminary screening for biochemical such as protein, carbohydrates, tannins, amino acids, phlobatanins, terpenoids, steroids, phenols.

Test of proteins

To 2 ml of the extract, 2 ml of Biuret reagents is to be added. An appearance of violet color ring indicates the presence of protein.

Test for Carbohydrates

To 2 ml of extract add 2 drops of Molisch's reagent and mix the solution. Nearly 2 ml of Conc. H_2SO_4isto be added drop by drop from the sides of test tube. A reddish violet color ring appearance at the junction of two layers indicates the presence of carbohydrates.

Test for Amino acids

To 2 ml of the extract, 2 ml of Ninhydrin reagent is to be added and keep the solution in hot water bath for 15 minutes. The formation of purple color indicates the presences of aminoacids in the sample.

Test for Tannins

To 5 ml of extract, few drops of 1% of lead acetate are to be added. A yellow colored precipitate formed in the test tube shows the presence of tannins.

Test for Phlobatinins

To 2 ml of extract add 1% aqueous HCl and boiled for few minutes. A red precipitate formed and deposited in the test tube is an evidence for the presence of phlobatinins.

Test for Terpenoids

To 2 ml of extract add 2 ml of Chloroform and 3 ml of Conc. H_2SO_4. Formationof a monolayer of reddish brown coloration of an interface shows a positive result for the terpenoids.

Test Microorganism

Some microorganism screened from Ear, Nose, Throat infected samples used in current research work are *Candidaalbicans, Enterococcusfaecalis , Pseudomonas aeruginosa and Stathylococcus aureus* were used as the test organisms . A loopful of these culture were inoculated onto nutrient agar broth and separately incubated at 37^0C for 24 hr.

3. ANTIMICROBIAL ACTIVITY USING ZONE METHOD

Antimicrobial activity has been conducted based on agar well diffusion method. Freshly prepared Mueller Hinton broth has been prepared and inoculated with selected broth cultures. The broth was inoculated into growth medium. The Mueller Hinton agar growth medium has prepared in the petri-plates wells of 8mm size were made in the growth media with sterile borer. About extract were added to the wells of growth media. Petri-plates were incubated at 37^0 C for 24 hr. The zone of inhibition was measured for each extract after incubation. Standard ciprofloxacin solution was used as a standard.

4. RESULTS AND DISCUSSIONS

The present investigation reported that ethanol, methanol, and aqueous extracts of *Ganoderma lucidum* contain protein positive in crude extract. $AgNO_3$ extract of *Ganoderma lucidum* indicated moderately positive in methanol extract. Carbohydrate indicated positive in ethanol, and AgNO3 extracts, but highly positive in methanol extract, and moderately present in aqueous extract. Tannins showed moderately positive in methanol and aqueous extract in AgNO3. Amino acids and phlobatinis absent in all extract. Terpenoids are strongly present in $AgNO_3$ of methanol extract and moderately present in $AgNO_3$ of aqueous extract. Protein, Carbohydrate, Tannins and Terpenoids are present in all the selected extracts.

Name of the compound	Ethanol extract		Methanol extract		H2O extract	
	Crude	AgNO3 extract	Crude	AgNO3 extract	Crude	AgNO3 extract
Protein	+	+	+	++	+	+
Carbohydrate	+	+	+++	+	++	+
Tannins	+	+	+	++	+	++
Amino acids	-	-	-	-	-	-
Phlobatinins	-	-	-	-	-	-
Terpenoids	+	+	+	+++	+	++

Table 1: Biochemical screening of Ganoderma *lucidum* extracts

Note: +++ is strongly positive (Color with more intensity); ++ is moderately positive (color intensity medium); + is weekly positive (color intensity low); - is negative

The crude extract of *Ganoderma lucidum* and AgNO$_3$ from ethanol, methanol, and aqueous was revealed good antimicrobial activity against test organisms. Ciprofloxacin has used for standard was shown good zone of inhibition (20 to 28 mm). The ethanol extract of AgNO$_3$ of *Ganoderma lucidum* has shown effective inhibition zone against all selected organisms. Methanol extracts of crude and AgNO$_3$ shown inhibitory effect against test organisms like *candida albicans, Enterococcus faecalis, Pseudomonas aeruginosa and staphylococcus aureus*. Ethanolic extract of AgNO$_3$ shown good inhibitory effect against ENT infected microbial species while in crude extract it shown low inhibition of zone.

Table 2: Measurement of zone of inhibition of AgNO$_3$ and crude extracts of *Ganoderma lucidum*.

Name of microorganims	AgNO$_3$			Crude			Blank	Standard	AgN
	Aqueous	Ethanol	Methanol	Aqueous	Ethanol	Methanol			
Candida albicans	10	14	13	0	10	10	0	20	10
Enterococcus faecalis	9	13	12	0	0	0	0	30	0

Pseudomo nas aeruginos a	10	11	11	0	0	9	0	19	0
Stathyloc occus aureus	10	12	11	9	9	9	0	28	0

The antimicrobial studies conducted with four extract viz, Ethanol , Methanol, Aqueous and AgNO$_3$ of *Ganodermalucidum* showed wide variation with respect to their effect, from present study it was proved that the ethanol extract with AgNO3 was very efficient to control all the four test organisms. The ethanol extract with AgNO$_3$ has maximum antimicrobial activity against test organisms, however the methanol extract with AgNO$_3$ indicated inhibitory effect for all test organisms, and however in crude extract it indicated inhibitory effect in test organisms except *Enterococcus faecalis*. In aqueous extract with AgNO$_3$ indicated zone inhibition of all test organisms while in crude extract it indicated inhibition against *Staphylococcus aureus*. Present study showed that the ethanol extract possesses more potential as an antimicrobial agent.

Ganoderma lucidum are good sources for the treatment of numerous diseases and in many countries, these natural resources were used in their treatment system from ancient time (Islam et al., 2018). Recently, these become a principal target of investigation for searching a novel biologically active compound to develop many natural antibiotics that have been used for different infectious diseases (Godzieba et al ., 2020). Cytotoxic effects of *Ganoderma lucidum* extracts represent the pharmacological and medicinal activities and it is evaluated by a widely used, easy, and cheapest.

5. CONCLUSION
Protein, Carbohydrate, Tannins and Terpenoids are present in ethanol, methanol, water of crude and silver nitrate treated extracts. The present study showed that the ethanol extract possesses more potential as an antimicrobial agent. Further purification, *in vitro* and *in silico* studies has to be conducted for better understanding of usage of *Ganodermalucidum* in the treatment in ENT species.

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THE RELATIONSHIP BETWEEN MARKETING MIX FACTORS AND DECISION TO STUDY MANDARIN CHINESE

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The objectives of this study were to study 1) the relationship between Marketing mix factors and decision to study Mandarin Chinese 5) Marketing mix factors affecting decision to study Mandarin Chinese A sample of 400 people was selected using questionnaires as a study tool. The collected data were analyzed using percentage and mean t-test statistics. ANOVA analysis was performed using F-test, (One-way ANOVA), Correlation and Multiple Regression Analysis. (MAHAMUD, &SUTTIKAN, 2020)

The results of the study revealed that most of the respondents were female, aged less than 21 years, status: single, currently or graduated with a bachelor's degree, occupation, student/student/student. and monthly income is less than 15,001 baht. The marketing mix is at a very important level. The decision-making process is very opinionated. The results of the hypothesis testing of personal data on different statuses affect the decision-making process in choosing to study Mandarin in different Thais. Marketing mix factors were related to Thai people's decision to study Mandarin. marketing promotion service process physical environment Overall, it was related to the decision-making process in choosing to study Mandarin Chinese of Thai people. high degree of correlation in the same direction Marketing mix factor Product distribution channel marketing promotion and physical environment Influencing the decision-making process in choosing to study Mandarin Chinese of Thai people at a statistically significant level of .05.

Keywords: marketing mix, decision making, teaching Mandarin

1. Introduction

Chinese is one of the most important languages.and will likely be even more important in the future. Because the People's Republic of China is a country with a history of more than 5,000 years. and transmitted from generation to generation to the present The People's Republic of China is also a country. A superpower that has influence both socially, economically and politically at both regional and global levels. It is a country with the highest economic growth in the world and the Chinese population. It is still the number 1 in the world. Therefore, if Thai people have knowledge of Chinese language, it will be a tool for communication, research and knowledge exchange. can build cooperation in business, trade, development in various fields effectively This will give Thailand a competitive advantage over other countries in the region (Wilkinson, 2000). [1]

Currently, Thailand is moving in the same direction. Disclosure of Cabinet Resolutions on April 28, 2020 relating to the Ministry of Education that the meeting agreed on the principle of the project to promote potential development and increase the capacity of students For sub-district quality schools, 8,224 schools within the budget limit of 51,904 million baht and aim for the development of 8,224 schools by targeting to develop 8,224 schools under the Office of the Basic Education Commission (OBEC) (primary level 7,079). schools and 1,145 secondary schools) to have quality and standards according to the context of their own community This will reduce inequality and increase opportunities for equal access to quality education in all areas of the country. and focus on the participation of all sectors in the community, namely government, private sector, home (family), other temples/religious places and schools, which will create a sense of belonging in the community and make the school a center in the community. Indeed, there are five driving directions, one of them. is the development of teaching and learning Chinese(Ministry of Education , 2021)[2]Based on the above information,(MAHAMUD, &SUTTIKAN, 2020) the students are interested in studying the decision to open a Mandarin teaching institute in Thailand by studying the marketing mix that in choosing to study Mandarin will allow them to know the factors that affect the decision to study Chinese. middle of the target audience To use the information obtained from this study as a guideline for planning to open a Mandarin teaching institute in Thailand next. The objective of this study was to study the marketing mix factors of choosing to learn Mandarin for studying the decision to study language. Mandarin Chinese to Compare Decisions to Study Mandarin Classified by Personal Data (Cushman, 1989) [3]

2. **Scope of study**

Content: A study of the decision to choose to study Mandarin Chinese of Thai people. Based on 7P marketing mix theory, consisting of product, price, distribution channel marketing promotion, staffing, physical environment The service process and the theory of decision making consist of the acceptance of demands. looking for alternatives evaluating options purchase decisions and purchase-related decisions Post-purchase behavior, demographics The samples used in the study were 400 people who were interested in studying or studying Mandarin, selected for the duration of the study between June and September 2021.

Management of front and back staff As a customer He didn't care that the service had to divide employees into front and back. Don't care who's wrong But customers must receive good service, quality, without defects. If there is a problem, customers will definitely blame the front service staff.

Service re-use and good relationship Customer demand information, deliver good service.

costomer		Staff employment		backside employment

Show the relationship between customers and employees.   Ali, Amin, &Cobanoglu, 2016) [4]

Research Methodology [5]

A study on the decision to study Chinese Mandarin in Thai people. The objective of this study was to study the marketing mix [6]factors of choosing to study Mandarin Chinese. Deciding to study Mandarin

Chinese Comparison of decision to study Mandarin by personal data Relationship between marketing mix factors and decision to study Mandarin Chinese and marketing mix factors influencing the decision to study Mandarin Chinese.[7] The study data can be used as a guideline for improving teaching and learning to increase the number of Mandarin learners. The methodology for the study was set as follows:

Resources used in the study
   3. **There are two types of data sources in this study:**

Primary Data is the data obtained from the questionnaire for collecting data. from the population interested in studying or the population studying Mandarin by being a person who responds to the examSecondary data is data obtained from textbooks. Study reports, related documents and internet

Population and samples used in the studyPopulation used in the study Those who are interested and who are studying Mandarin Chinese 400 samples were selected for this study. W.G.Cochran (Cochran, 1954) [8] unidentified sample size was calculated at the 95% confidence level as follows:

$$n = P(1-P)(Z^2)/(e^2)$$

$$n = (.50)(1-.50)(1.96^2)/(.05^2)$$

$$n = (.5)(.5)(3.8416)/.0025$$

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[6]Wang, C., &Parkvithee, N. (2018). The Influence of Marketing Mix on Customers' Decision-Making for Small and Medium-Sized Chinese Language Schools (SMEs) in Thailand. International Journal of Management, IT and Engineering, 8(4), 196-214.

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n = .9604/.0025

n = 384.16

In the calculations, 385 samples were obtained, but in order to prevent mistakes that may occur in answering the questionnaire Incomplete information The researcher therefore used a sample of 400 people.

4. Research study results

Study subject The decision to choose to study Mandarin Chinese by Thai people The sample studied was the population who chose to study Mandarin Chinese of Thai people. 400 questionnaires were used as a data collection tool and 400 were returned. An analysis of the relationship between marketing mix factors and the decision to study Mandarin Chinese in Thais was used. In terms of purchasing decisions and purchasing-related decisions, an analysis of the relationship between marketing mix factors and the decision to study Mandarin Chinese in Thai people as a whole

Marketing mix factors	The relationship between Thai people's overall decision to choose to study Mandarin			
	r	Sig	Ralated	Level
Product	.567**	.000	medium in the same direction	6
Price	.547**	.000	medium in the same direction	7
Distribution channel	.583**	.000	medium in the same direction	4
Marketing Promotion	.638**	.000	same direction high	1
Staff	.579**	.000	medium in the same direction	5
service process	.635**	.000		2
			same direction high	
Physical environment	.626**	.000		3
			same direction high	
Average overview	.752	.000	same direction high	

** Statistically significant at the level   .01 (2-tailed)

The marketing mix factors were related to the decision to choose to study Mandarin Chinese of Thai people as a whole. The overall average had a high correlation in the same direction (r) = .752. Consider the relationship from the r relationship coefficient in descending order. In the following order, the marketing mix factors in marketing promotion and the decision to choose to study Mandarin Chinese of Thai people overall, high level of correlation in the same direction (r) = .638. Marketing mix in process. Overall, the level of correlation was high in the same direction (r) = .635. The marketing mix factors in the physical environment and the decision to study Mandarin of Thai people in Overall, high level of correlation in the same direction (r) = .626 The marketing mix in terms of distribution channels and the decision to study Mandarin Chinese in Thais Overall, the relationship level was moderate in the same direction (r) = . 583 Marketing mix factors in terms of employees and the decision to choose to study Mandarin of Thai people overall, the level of relationship is moderate in the same direction (r) = .579. The marketing mix in terms of products and the decision to choose to study Mandarin Chinese in Thais overall, the level of correlation in the same direction (r) = .567. The marketing mix in terms of price and the decision to study Mandarin Chinese of the Thai people. Thailand as a whole, the level of correlation was moderate in the same direction (r) = .547.

5.   Results, Discussion and Recommendations

A study on the decision to study Chinese Mandarin in Thai people. aims to study The importance of the marketing mix factors in the decision to study Chinese Mandarin in Thais To study the decision-making process in choosing to study Mandarin Chinese of Thai people To compare the decision-making process in choosing to study Mandarin Chinese by Thai people. according to personal information and to study the relationship of marketing mix factors and the decision-making process in choosing to study Mandarin Chinese of Thai people. 400 sets of questionnaires were used as data collection tools and statistical data were used for data analysis, i.e. percentage, mean, t-test, F-test (One-Way ANOVA), Correlation and Multiple Regression Analysis.

From the results of the data analysis can be concluded. as follows: recommendations from the studyIn this research, the marketing mix and decision-making in learning Mandarin of the target group were identified.

The students have suggestions to be useful for those who are interested in opening a Chinese language institute in Thailand as follows.

1. Operators of Mandarin teaching institutes should pay attention to the arrangement of teaching courses that are suitable for the objectives of the learners. Set clear guidelines for teaching and learning at each level. Invite experts to come together to create teaching materials that are based on international standards and in accordance with learners' objectives, for example, providing specific teaching courses for people who want to pass the "HSK" test (i.e., a Chinese language proficiency test for students who want to pass

the "HSK" test. that do not use Chinese as their primary language) at each level, learning skills according to the needs of the learners

2. The entrepreneurs of the Mandarin teaching institutes should have public relations to introduce the institutions. to educational institutions, private agencies or organizations, or to organize a special lecture Entry as a special teacher at a Chinese language school Use people who have successfully studied as a guide. other students

3. Operators of Mandarin teaching institutions should set tuition fees that are appropriate for their course of study. It is a rate that can compete with other institutions.

4. Operators of Mandarin teaching institutes should choose a location to open an institute in a community with convenient transportation, or located in a shopping mall with a particular study area, or close to an electric train or building. The location of many large businesses or near the economic district is convenient for students.

5. Mandarin teaching institute entrepreneurs should select teachers who are knowledgeable, proficient in Chinese language, Chinese culture, including Chinese traditions, and have teaching techniques that are easy to understand. Choose service personnel who are courteous and friendly.

6. The entrepreneurs of the Mandarin teaching institutes should arrange the study schedules that are available for learners to choose according to their convenience. There is a systematic process related to learning, providing services with speed and accuracy.

7. The operators of Mandarin teaching institutions should establish a classroom environment that is conducive to teaching and learning and to promote effective teaching and learning processes. by arranging the classroom to be the right size for the group of learners as well as having a board Important teaching and learning publications to stimulate learning needs and confidence in course decisions

Suggestions for the next study

The next study should explore how service quality affects learners' satisfaction in learning Chinese. It is a guideline to develop and improve teaching and learning. It also creates satisfaction for students as well

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A IoMT FRAMEWORK FOR HEALTHCARE MONITORING SYSTEM USING CLOUD

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Health is a basic necessity, and access to high-quality health care is a human right. Cloud computing groups the many more computing and Networking Technologies and makes an idea that provides a base for better reliable and cost-efficient business applications for corporate purposes. Cloud computing provides a good structure and a good cost for the organization with reduced administration. Recent advances in sensor communication, sensors, and microelectronics are focused on monitoring and managing chronic diseases and search potential emergencies. Health monitoring can be managed by one or both: the cost of main challenges and citizen-centered care. This likewise permits a specialist to make electronic visits, including no transportation with full correspondence from the specialist to the patient. They can see each other, which permits the specialist to see the diseases just as mention to the patient what it should have been finished. In this paper we discussed about home hospitalization framework dependency on the IoT, and cloud based health care monitoring system.

Keywords: Cloud Computing, Chronic Diseases, Microelectronics.

1.   Introduction

Many primary health care clinics located in the rural areas do not have any electronic systems at all & continue to operate paper- based systems, resulting in patient records being kept by patients themselves. The impact of the use of multiple systems is that it is difficult and costly to develop a national overview of patient statistics. On a more basic level, it is extremely difficult for individual institutions within the healthcare sector to share information between each other. With options available to government to improve the efficiency & effectiveness of its delivery process of primary health care, mobile & wireless technologies offer some exciting opportunities for a low cost, high reach service. There is strong evidence that mobile technologies could be instrumental in addressing slow response rates of existing system for rural areas. The paper proposes an approach where the health status of a patient is retrieved and delivers health-promoting messages in a non-interruptive fashion through a wireless body-area network; they can communicate with medical services. However, a multidisciplinary endeavor such as cloud is required to achieve their potentials for healthcare system that lead to the emergence of a new type of advanced service for healthcare. The proposed approach makes cloud based healthcare system more realistic and feasible in terms of providing expert-based medical care.

In medical areas, utilizing pervasive medical gadgets furthermore, their availability with the advanced networks or/and the Internet brought new dreams for human medical diagnoses, treatments and monitoring, wireless body area network (WBAN), and remote observing of patients' health. The pervasive gadgets or clinical sensors are associated with the particular parts of patients' bodies, to quantify the obtained clinical data, for example, blood pressure, sugar level, pulses, and other medical signs, and the noticed medical data will be transmitted to the medical help or medical counsel, through the availability of remote media including cellular networks, where they got medical data will be inspected for additional determination. Robotized medical logical instruments, for example, electrocardiogram analyzers are additionally accessible for medical data investigations progressively habits and

are accounted as a part of the telemonitoring framework [1] (A. Neloy, 2019). As telemonitoring frameworks are not the new innovative arrangements in the observing of patients' health, a few medical healthcare services frameworks have been conveyed to monitor the indoor or on the other hand/and remotely found patients' health status to survive the emergency cases and to battle against and analyze the critical diseases before they become worst. To be more improved, the innovations called cloud computing frameworks are proficient and adaptable solution for existing network furthermore, have been assuming tremendous parts in medical services frameworks as far as data monitoring, procurement, and capacity. Through utilizing and conveying public cloud registering innovation for medical services, the general preparing of medical services frameworks is much proficient and simple to manage. It implies that the hospitals can simply utilize the administrations of public cloud to support the continuum of medical services and furthermore can deal with the administration and other required IT requirements that can possibly recover the continuous data of patients immediately, really synchronized what's more, safely divided between the frameworks (and clients), and adaptable in instances of responsibility, and the data is consistently be available when required. In consideration, through utilizing of cloud computing framework, a health association is ready to deal with its overall organizational structure, as an solution arises with the intelligible ideal medical care framework.

Further, in cloud computing, the public cloud is productive in the observing of data and managing of services, for pervasive medical care frameworks and be considered suitable for the issue of versatility and security. As the recovering of medical data has extraordinary worth and needs to be secured during transmission over the Internet, subsequently a few medical associations have not been achieving upon the public cloud stages, because of the security issues and to acquire the high-security level during data trades. In short, public cloud services are effective and solid; however they still include potential weaknesses since they are called freely open for all. To determine the issues of safety, private cloud computing is a critical and confided in arrangement for medical data trades, with the fulfillments of data privacy and approved admittance; additionally, medical associations can likewise use their other significant resources.
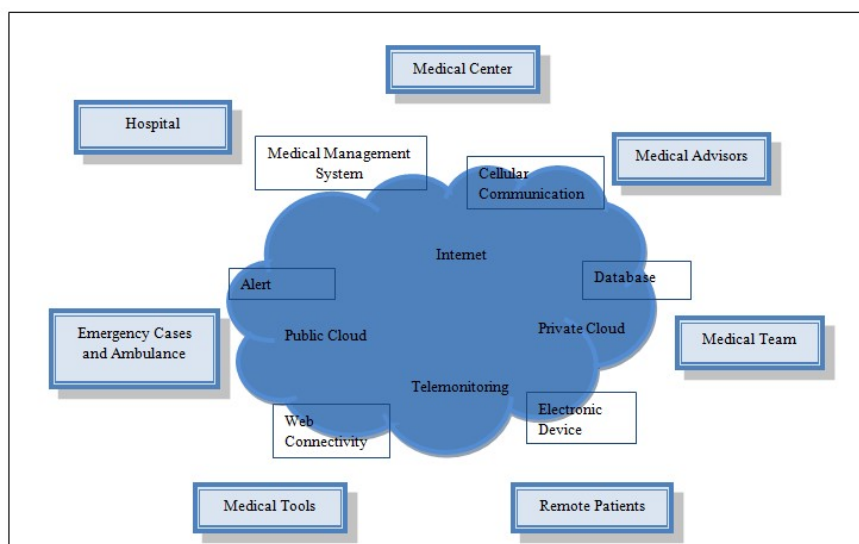
Fig. 1. Typical cloud computing structure for healthcare systems.

2.   Noteworthy contribution in the field of proposed work

This paper proposes a home hospitalization framework where patient fundamental signs and ecological components of hospitalization rooms are observed utilizing the IoT, and Cloud computing. This section presents the main works dependent on these innovations, which offer frameworks and solution for monitoring of patient health and natural components. In recent years, the IoT, and Cloud computing have been used to monitor patient health as depicted in many exploration works, because of the capacity of these innovations to give speedy, safe, and minimal expense solution [21–23]. At [24] for example, an IoT-based smart medical services framework is planned that gathers patient data from various sensors and permits a specialist to monitor patient physiological parameters remotely, and analyze diseases rapidly, and gives cautions to both the guardian and the doctor by conveniently sending SMS or messages. In Ref. [25] an e-health framework for elderly's health monitoring dependent on IoT was proposed, where this framework periodically collect physiological and general health parameters of the elderly utilizing the My signals stage and an Android application that assumes the part of Cloud server and empowers the elderly and their families to monitoring their health and communicate with medical services providers. An IoT-based application has been suggested that clarifies the advantages of the idea. [26]. This application aims to provide reliable, accurate, and immediate heart rate monitoring to utilize embedded wearable gadgets, mobile edge gadgets, and Cloud services.

In recent years, the utilization of smart phones and tablets has expanded in health monitoring applications, where they are utilized as mobile computing devices and as Cloud, servers that process the information and send it to the Cloud [27–30]. A mobile application was utilized at [31] to monitoring the patient's heart progressively as an application through the beat rate sensor, which estimates the patient's heartbeat and then sends it to storage in a remote database. This application also sends notifications to the doctors if an issue is found in the heartbeat. A mobile application was also used to develop a framework for observing fundamental signs at work [32]. With respect to checking natural components, it has been talked about in many examinations. At [33] for example, the direction was given on the most proficient method to utilize innovation for ecological monitoring. At [34] a complex event preparing engine was acquainted with monitor the environment based on IoT that recognizes oddities continuously. In Ref. [35] is offered a smart framework for monitoring and internal ecological management dependent on environmental sensors and Cloud computing, where this framework collect information identified with inward gases and then it stores and process ecological information in the Cloud, and this framework empowers users to monitor the environment and get warnings if air quality surpasses as far as possible, through an web based monitoring platform. At a natural monitoring framework for inside warm comfort has been proposed to investigate the warm comfort of people in indoor environments, depending upon the IoT.

3.   Proposed methodology

3.1 Work Flow Diagram

The flow chart below depicts our proposed system's workflow and indicates how we address the primary issue of active health monitoring. The flow chart of with us proposed model is showed sequential manner in this diagram. It all begins with a single quick tap, which turns on our device and system. Our equipment is designed to read the user's vital signs and send the data to our cloud. These input readings are processed in our cloud and given to the patient and doctor panels according to their preferences. After reviewing the prediction, doctors can offer medical advice to patients using our web-based interfaces, and patients can ask their doctors questions via our website. Patients can access their historical records and doctors'

advice in an organized manner, and designated doctors can provide replies and feedback to the patient's panel. Finally, you can log out to bring all of the processes to a stop.
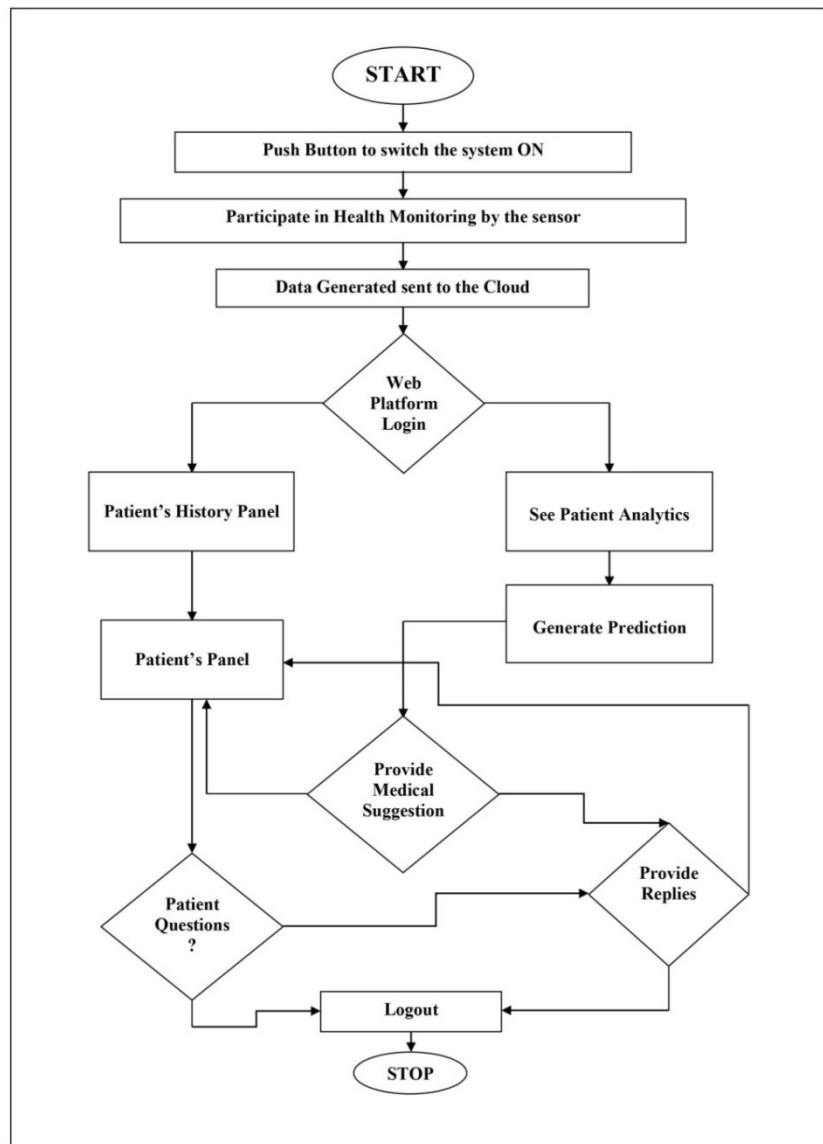
Fig. 2. Flowchart of Proposed Methodology

This system has three phases:

1. Data Accession
2. Data Analysis and Symptoms detection
3. Cloud Application and Notification
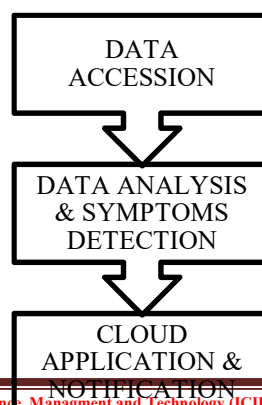
Fig.3. System Phases

3.2 Device Description

Arduino: It is a Microcontroller board contained CPU, RAM, ROM, High Power Supply (7V-12V), Programming and I/O Connectivity. It is cost less, simple and easy to use and coding also easy in it. It provides interface with analog sensors and electronic components.

ESP8266 Wi-Fi Module: ESP8266 (NodeMCU) is a Wi-Fi module self contained SoC (System on a Chip). It has 32 Bit RISC Processor and clock speed Max 160 MHz. 2.5V-12V Power Supply and TCP/IP Protocol Stack. It is mainly used for the Arduino applications.

Pulse Measure Sensor AD-8232: It is a simple sensor which is used in many places. The basic sensor has three pins namely, Ground, VCC and the Input Signal (A0 signal). The pulse sensor represents that the order to find the heartbeat rate. Thus the sensor is in heart shape in its nature.

Oxygen Measure Sensor MAX-30102: The MAX30102 Oximeter heart is an Arduino compatible and inexpensive sensor that permits calculation oxygen rates.

Temperature with Humidity Measure Sensor DHT-11 : The DH11 is a basic, ultra low cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin.

Sensing Pads ECG : An electrode is a conductive pad that is attracted to the skin and enables recording of electrical current, No electricity is sent into the body. An ECG leads is a graphical description of the electrical activity of the heart and it is created by analyzing several electrodes.

4.   Expected outcome of the research

This section describe the method involved with implementing the proposed home hospitalization framework, where a top to bottom look is given to the implementation of the hospitalization room's ecological monitoring process and the implementation of the patient's health monitoring process, and the presentation of the mobile applications for various actors in this framework, as well as talking about the attributes and benefits of this proposed framework and its evaluation utilizing the System Usability Scale (SUS).

In this paper, a home hospitalization framework dependent on the IoT, and cloud computing have been proposed. This framework permits patients to recover and get treatment in their homes and among their families, where the patients' health and the natural elements of the hospitalization, rooms are monitoring intermittently, through a vital signs sensing unit and ecological sensing units that are introduced in the hospitalization rooms and mobile applications produced for this reason. This framework additionally enables doctors, patients, and their family members to manage and monitor hospitalization activities through their mobile applications. The home hospitalization framework proposed in this paper is recognized by its minimal expense, reliability, and security in expansion to its capacity to tackle the issues presently saw emergency in hospitals, as it can significantly reduce the burden on them. This framework has received excellent acknowledgment by patients and doctors the same concurring to the results of the usability evaluation.

As future work, changes will be made to this framework to make it more appropriate to the isolate activities of Covid patients, as we will develop for the patients' mobile application to empower them to measurevital signs without help from anyone else, and we will add video correspondence between the patients and their managing doctors utilizing this application. We will develop also a smart band that the Covid patients will wear. This wristband estimates the patient's temperature and heartbeat in real time and sends them to the Cloud for storage and analysis, to save the patient rapidly if their health condition is not well. This wristband also sends the directions of the patient's area utilizing GPS to the Cloud progressively to interfere if the patient violates the isolate.

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CONVERSATIONAL LEARNING SYSTEM USING CUSTOM NAMED ENTITY RECOGNITION FOR HOME REMEDIES

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Mild health inconveniences are a regular part of life but can be overwhelming to a lot of people. In such cases, there is a need for social and emotional guidance outside the hospital setting. Simple health-related issues can be cured at home by following certain home remedies. It is difficult for common people to identify the right information from the vast amount of data available on the internet about biomedical texts. The difficulty increases if the person is not technologically adept at using gadgets. There is a need for an easy-to-use system that works just by conversing with it. In this paper, we have implemented a conversational system that uses Custom Named Entity Recognition model trained with diseases that can be cured with home remedies and a knowledge base to identify the remedies by taking into account the symptoms. The model is trained from the dataset created using a corpus that addresses 22 diseases based on their symptoms. The model is evaluated on various performance measures.

Keywords: Named Entity, Home Remedies, Question-Answer System, Natural Language Processing, Conversational System

1. INTRODUCTION

The Healthcare industry does not have to be involved in minor health inconveniences that can be easily treated at home with a few easy remedies. In today's world, many people, especially elders do not have the knowledge and skills to use a gadget to search the internet. Hence, they may not be able to get the right information accurately and reliably related to their health and/or psychology, that they are looking for. This can also be harmful in some cases as they are susceptible to misleading information online. A conversational system would be the right choice for such a need as users will be able to report their inconvenience and get some suggestions. Current systems and chatbots do not provide the right information on a health-related question and instead, just read out the results from Google search or a relevant page from Wikipedia. The reason for such poor performance is because these systems are very generically designed and are not trained for domain-specific needs like minor heath related terms or their remedies.

Automatic text classification is required in many scenarios today to dig information from a vast resource of structured and unstructured data. Text classification is the process of classifying the text to a particular category based on a segment or keywords in the text. Named entity recognition identifies the names from the given text which can then be used as keywords for further processing. The generic named entity recognition models are trained to identify the names occurring in text like locations, things, actual names and so on. This generic logic falls short when we try to identity domain-specific names like banking, healthcare and others. In such cases, we require a custom named entity recognition model trained using the domain-specific keywords.

In this paper, we propose a conversational system that will respond with accurate and specific information on health-related queries and will also be faster and more convenient for the users. The relevance and accuracy of our system are achieved by training the system with keywords from home ailments using a custom named recognition model. The corresponding remedy is then pulled using from the knowledge base which has the mapping of symptoms of health issues and their remedies.

2. LITERATURE REVIEW

Named entity recognition (NER) is used in a variety of applications. To eliminate the oversights in the construction domain Word2Vec was used to construct the labels from the specification documents after manual extraction of relevant lines and then passed through NEW based on Bi-LSTM model to extract structure assembly domain terms(Moon *et al.*, 2021). Biomedical elements of both plant names and diseases names were normalized to extract important information from medical articles hence creating a comprehensive dictionary using NER (Cho, Choi and Lee, 2017). Language Translations using neural machine translation (NMT) was improved by tagging domain terminologies in the required language as named entities (NE) and then trained (Li *et al.*, 2018). Language Translation from Chinese to Uyghur was optimized using tagging of the entities across the languages hence automating Uyghur corpora (Anwar *et al.*, 2020). Entities from five Nigerian languages were annotated based on regional newspapers and a web app was created to recognize the named entities of any text (Oyewusi *et al.*, 2021). Telugu and Kannada language entities such as person name, organization, date and location were discerned through NER using LSTM models (Amarappa and Sathyanarayana, 2015; Reddy *et al.*, 2018). Others trained Sinhala language corpus on Bi-LSTM-CRF NER model (Azeez and Ranathunga, 2020). A BERT-based biomedical model was created in Arabic medical literature by and IOB2 encoding format was used for tagging (Boudjellal *et al.*, 2021). Cantemist data which is corpora related to Cancer data in Spanish was tagged for important medical information helping in leading to faster clinical prognosis (Miranda-Escalada, Farré, Eulàlia and Krallinger, 2020). Nouns were tagged using morphological rules which are the Affixes of nouns, verbs and adjectives from Malay language newspapers(Zamin and Bakar, 2015). Medieval Spanish literature corpora from 12th to 15th century was annotated to recognize person name, nicknames, deity names and geographic places mentioned in the text (Díez Platas *et al.*, 2021). To mitigate the risks of cyber threats from information sources researchers annotated corpora on National Vulnerability Database and helped in cybersecurity monitoring (Mendsaikhan *et al.*, 2020). Chemical entities were recognized from corpora by training on bidirectional LSTM model, sequence labelling and by optimizing hyperparameters (Hemati and Mehler, 2019).

NER models have been further compared and enhanced in various studies. A survey on various methods used for NER in a plethora of Indian languages corpora and intimated precision, recall and F-measure of 12 Indian languages and different NER approaches used in these papers (N. and Bhadka, 2017). Others surveyed various NER techniques applied for different Indian and non-Indian languages (Patil, Patil and Pawar, 2016). Annotating Turkish sentences were used to prove SkipGram performance was proved to be better than CBOW, increasing vector dimensions did not improve NER performance on classification tasks and word embeddings with its root form proved to enrich performance (Ertopçu *et al.*, 2017). Comparison on different paid and free NER libraries and tools, they further tested these on satellite domain corpora to recognize its entities and automated dataset collection through API calls of Google News (Jafari *et al.*, 2020).

Spacy is an open-source library for Natural Language Processing and it has NER capabilities build in. For monitoring finance-related crimes such as money laundering dataset of corpora were taken from French Financial News and trained on spaCy (Jabbari *et al.*, 2020). The "Fastent" system for custom NER process was created with the main goal of automating the process of dataset generation, annotating the text and model training and was achieved by scraping related words entered by the user on Reddit and other websites. This was trained on Spacy (Stepanyan, 2020).

3. METHODOLOGY

3.1 Data Collection and Processing

In our approach we first take the raw medical textual data that contains terms related to minor inconveniences and ailments. More than 1000 lines were collected which were related to diseases or symptoms that can be cured at home. We also made sure to collect different symptoms that are related to the same disease for better identification of the main disease. Pre-processing is done on the raw data to clean it of stop words.

3.2 Data Annotation Process

    a) *Named entities tag*: For the named entity part, we used two tags to identify the symptoms. The BODY_PART tag was used to identify the various body parts in the text like the head for example and the SYMPTOM tag was meant to capture the names in the text referring to the ailments like ache, tiredness etc.

    b) *Annotation Tool*: Annotation is a manual labelling of unstructured data. Noisy labels lead to an even unreliable NER model. Using the online annotation tool we break the textual data into the named entities using the respective tags. The format of the output from the online annotation tool as is below

{"content":"full-text-referring-to-a-particular-health-issue",
"entities":[[start-index,end-index,"ner-class",0, "rgb(146, 215, 150)"]]
}

spaCy accepts training data as a list of tuples. Each tuple should contain the text and a dictionary. The dictionary should hold the start and end indices of the named entity in the text, and the category or label of the named entity. The format is slightly different and hence the output of the annotator tool was fed to a script to modify the format as required by spaCy.

('full-text', {'entities': [(start-index, end-index, 'ner-class')]})
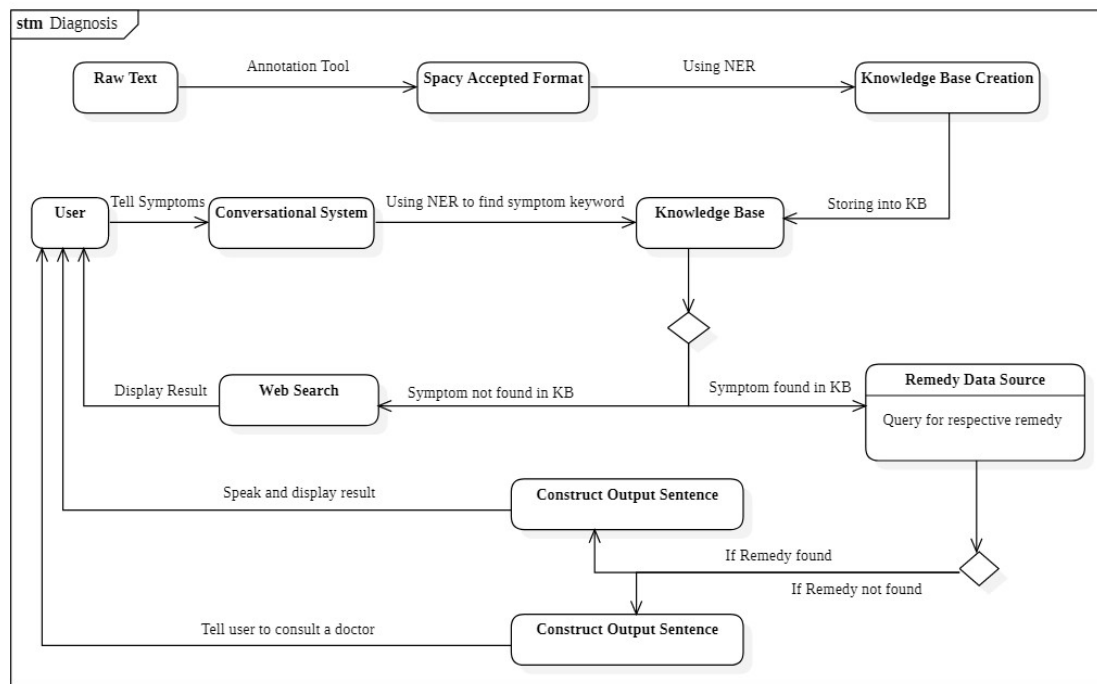
Figure 1: Custom NER based Conversational system

3.3 Custom Named Entity Recognition Model

The spaCy library allows you to train NER models by both updating an existing spacy model to suit the specific context of your text documents and also to train a fresh NER model from scratch. spaCy has inbuilt pipeline NER for Named entity recognition In our case, the medical entitles we require aren't present in the inbuilt NER pipeline, so we will have to retrain the NER part of the model with custom medical entities.

We used the existing en_core_web_sm model. The en_core_web_sm is a CNN model which by default has Part of Speech Tagger, Dependency parser NER functionalities. We retrain the NER part of this model with the new medical entities.

Load the NER pipeline for entity re-training.Over 200 iterations with dropout of 50%. Shuffle the training data in every iteration. Update the CNN model with new entities in every iteration.

```
 1  VERTIGO
 2  may feel dizziness
 3  you might have a loss of balance
 4  can start feeling sick
 5  may feel unbalanced
 6  can experience nausea
 7
 8  MOUTH ULCERS
 9  you may experience a burning sensation when eating spicy foods
10  can cause a reduced appetite as eating will be uncomfortable
11  having a dry mouth is also very common if you have mouth ulcers
12
13  FOOD POISONING
14  you may experience stomach cramps
15  you might start passing diarrhea
16  fever is also very common
17  may feel nauseous
18  vomiting a few times is also normal
19
20  SCALP ACNE
21  your scalp may feel very itchy
22  painful bumps on your head that are red in color
23  many people experience a burning skin sensation with scalp acne
24  sometimes the bumps naturally, or by itching, burst and excrete pus
25
26  ACID REFLUX
27  a burning sensation in your chest, usually after eating
28  regurgitation of food or sour liquid
29  difficulty in swallowing food while eating
30  it is also very common to have disrupted sleep as it can wake you up
31
32  KNEE PAIN
33  they cause difficulty in walking
34  they cause difficulty in standing and sitting
35
36  CUTS
37  it causes bleeding
38  it causes wounds
39  they cause bruise
```

Figure 2: Preprocessed text

```
 4  ('may feel unbalanced', {'entities': [(9, 19, 'symptom')]}),
 5  ('can experience nausea', {'entities': [(15, 21, 'symptom')]}),
 6  ('you may experience a burning sensation when eating spicy foods', {'entities': [(21, 62, 'symptom')]}),
 7  ('having a dry mouth is also very common if you have mouth ulcers', {'entities': [(51, 63, 'symptom'), (9, 18, 'symptom')]}),
 8  ('you might start passing diarrhea', {'entities': [(16, 32, 'symptom')]}),
 9  ('fever is also very common', {'entities': [(0, 5, 'symptom')]}),
10  ('may feel nauseous', {'entities': [(9, 17, 'symptom')]}),
11  ('vomiting a few times is also normal', {'entities': [(0, 8, 'symptom')]}),
12  ('your scalp may feel very itchy if you have scalp acne', {'entities': [(43, 53, 'symptom'), (20, 30, 'symptom')]}),
13  ('painful bumps on your head that are red in color', {'entities': [(0, 26, 'symptom')]}),
14  ('many people experience a burning skin sensation with scalp acne', {'entities': [(53, 63, 'symptom'), (25, 47, 'symptom')]}),
15  ('sometimes the bumps naturally, or by itching, burst and excrete pus', {'entities': [(46, 67, 'symptom')]}),
16  ('acid reflux causes a burningÂ\xa0sensationÂ\xa0in your chest, usually after eating', {'entities': [(21, 52, 'symptom'), (0, 11, 'symptom')]}),
17  ('regurgitationÂ\xa0of food or sour liquid', {'entities': [(0, 21, 'symptom')]}),
18  ('difficulty in swallowing food while eating', {'entities': [(0, 29, 'symptom')]}),
19  ('it is also very common to have disrupted sleep as it can wake you up', {'entities': [(31, 46, 'symptom')]}),
20  ('knee pain causes difficulty in walking', {'entities': [(17, 38, 'symptom'), (0, 9, 'symptom')]}),
21  ('they cause difficulty in standing and sitting', {'entities': [(11, 45, 'symptom')]}),
22  ('cuts causes bleeding', {'entities': [(12, 20, 'symptom'), (0, 4, 'symptom')]}),
23  ('it causes wounds', {'entities': [(10, 16, 'symptom')]}),
24  ('they cause bruise', {'entities': [(11, 17, 'symptom')]}),
```

Figure 3: Annotated preprocessed text

3.4 Knowledge Base Creation

Using the keywords extracted by the custom NER model and the remedies for the ailments collected from various sources the knowledge base is created. The knowledge base is of the key-value pair which maps symptoms to their remedies.

The created system is then ready to accept user queries. The queries are passed to the custom NER model to identify keywords. The keywords are given to the knowledge base and the remedies are pulled out if available. The remedies are then converted as a proper output sentence and given out to the user through a text to speech engine. If the keywords are not available in the knowledgebase the regular internet search is done and the results provided to the user

4. RESULTS

We gathered over 25 unique sentences related to various symptoms and diseases from different elderly individuals and tested it against our custom NER model. This helped us to evaluate our model's performance and accuracy when a completely new input data is provided to our system

We have used Precision, Recall and F1 score as evaluation of the system.

$$\text{Precision} = \text{TP} / (\text{TP} + \text{FP}) \qquad (1)$$

$$R\mathit{ecall} = \text{TP} (\text{TP} + \text{FN}) \qquad (2)$$

$$\text{F1} = 2 * \text{Precision} * \text{Recall} / (\text{Precision} + \text{Recall}) \qquad (3)$$

The actual dataset contains 14=3 body parts and 27 symptoms for a total of 40 positives.In our model, we got 35 correct out of 40 and so we say True Positives or TP = 35. We also got 4 of words not listed as a body part of symptom but our program identified it as a class and so it is False Positives or FP = 4. Our model failed to identify 5 of the symptoms/body parts and missed it. We classify that as False Negatives or FN = 5.

Questions
I am feeling dizzy in the moring
I have dry cough and cold
I had a lot of hairfall yesterday
I have a bad stomach ache
Knee pain problem/ Joint pain
skin inflammation
I can't breathe properly when i sleep at night
I feel light-headed
My fingers hurt
Why does my heart beat too fast sometimes
sometimes my skin hurts, but there ain't no rash
Sore throat
Numbness in legs
I feel like puking right now
I feel fatigued / exhausted / tired
eye dryness
why iam burping more
I have headache
Body pain since yesterday night
what to do for dust allergy
Constant lower back pain throughout the day
Why are my teeth falling out
Fingernails turning yellow
bleeding in the gums
I don't feel much hunger
bodyache and tiredness
bad breath
excessive skin dryness

Figure 4: Model Results
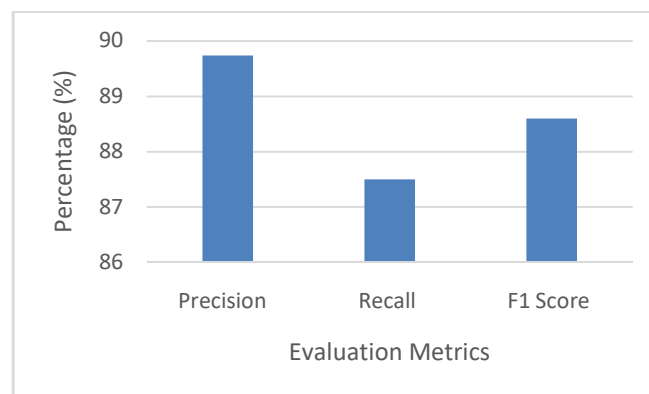
Figure 5: Evaluation Metrics

5. CONCLUSION

The proposed system can be used in home remedies and psychological domain to help the users get solution without having to use the internet on their own. More content can improve the accuracy of models, and more keys, like synonyms, can be included which make the system more efficient and improve this conversation learning system by providing more communicative features. The purpose of this survey is to examine recent studies focused on deep learning NER solutions to promote the development of new researchers' Comprehensive knowledge of the field.

This system can be effectively improved by replacing the existing artificial neural networks with memory networks in order to increase performance and to make the system more stable and efficient. More conversational material can be added to enhance the response generation capability of the system. Training the system with different synonyms can help the system recognize a wide range of input data.

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STATISTICAL APPROACH FOR EXTRACTIVE TEXT SUMMARISATION

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The extractive text summarisation technique is used for the extraction of important points of documents by using a subset of the sentences present in the original document. The sentences of the documents are extracted and are given a score. The model for text summarisation is created by using the sentences extracted and their respective scores. The sentences of the document are arranged according to their score. The model created is then used for giving out summaries and the final results of the text summariser are evaluated using metrics to measure the accuracy of the model. The model is created using the statistical techniques. The text summarisation problems falls into the category of Natural Language Processing which is concerned with the interaction between computers and the human languages. Once the summary of the document is outputted using evaluation parameters such as precision, recall and F-score we find out how much the summary differentiates from that actual summary that was manually created.

1. Introduction

Text summarisation [1,2] is the process of creating a summary consisting of important points from the primary set of documents which conveys the entire tone of the documents using various techniques so that the documents can be presented in a much more readable format and compact manner in a short span of time. In the past several years there has been a large increment in the amount of data being generated from businesses, science, engineering, social media and various other fields on a daily basis, the collection of document can have size as large as Terabytes or Petabytes. The easy availability of large collections of documents through the internet has made it easy to access them but made it very difficult to manually go through the collection of documents hence automated text summarisers are used for creating a summary consisting of the important points such that these points can give out most amount of the information about the documents saving valuable time, money and preserving its information content and overall meaning [3]. The summary also allows the user to focus on what is important since the original collection of documents consists of large set of text and only a certain amount of information is required hence a lot of the unnecessary information needs to be discarded and the desired information needs to be displayed to the user which can prove to be a difficult task while distinguishing the two sets of information, but if successfully implemented it allows the user to focus on only what is necessary. The tool for creating the summary is called an automatic text summariser and the process is called text summarisation. The text summariser can work on a single document which is called single document classification and it can work on multiple documents as well which is called mute-document classification. The type of summary provided by the summariser can be of two

types which are generic or query based. The generic summary consist of a general summary of the document whereas the query based summary satisfies a user based query.

The extractive summarisation technique [4, 5, 6] aims to produce the summary composed of the subset of the most relevant sentences present in the input documents. The basic architecture of the summariser includes content selection followed by information ordering and then sentence realization, finally we obtain the summary of the document. The statistical approach has been used to create the summariser. The collection of documents used for making the text summariser is called the DUC dataset, which is an unannotated collection of documents hence making the entire process multi-document based summarisation. The sentences then are extracted and pre-processed using linguistic techniques [7] such as removal of stop word, punctuations and sentence segmentation. The sentences are arranged according to their rank which have been calculated using their statistical features. The model then outputs the summary of the documents. The summary shows the top most percentage of sentences as selected by the user. The aim of the present proposed work is to create a statistical based text summariser capable of text extraction without having any dependency on the language of the text and annotation of the corpora.

2.   Related Work/Literature Survey

The exponential growth of the internet and advancement in digital technology over the past decade or two has inundated data on web and its overwhelming availability is widespread. The huge volume of information available losses it feasibility of efficient use unless automatic methods to understand, index, classify, clear and concise way of availability to user is not there. The method should save time and resources. Text summarisation technique [8] generates a compressed version of one or more documents and attempting to give meaning to the document. Text summarisation is of prime importance due to its application to wide fields such as summaries of books, sporting event highlights, stock markets etc. Data in structured and semi structured form usually organized in the form of spread sheets, tables, databases and maps etc. has become critical. These data sets have been published and used by government, social networking sites and other companies for improving services, framing public policies, improve business models and make well informed decisions [9]. Google used schema.org markup language to index data sets, documents, images and products [10].

The automatic text summarisers can be broadly divided into two broad categories called the abstractive text summarisation and the extractive text summarisation [11]. The abstractive text summarisation involves paraphrasing sections of the source document and requires natural language generation tools and may reuse clauses and phrases from original document. Its creation is more difficult and complex task as extractive summarisation involves concatenation of several sentences which may be selected without modification. Summaries are   either generic or query-focused and summarisation task can be supervised or unsupervised. Training data set is needed in a supervised system and unsupervised systems do not use any training data for they generate the summary by accessing only the target documents. Summary can be based on input, output content, details purpose, language [12] and summaries can be indicative and informative summaries. The main aim of the text summarisation is improving the quality of the produced summary using different methods.

A.   Statistical Based Approach

Statistical based approach aims to extract information from the input documents using statistical features. This allows the summariser to be language independent and also do not require any sort of annotated corpora. There exists several different kinds of statistical features such as the TF-IDF, Cue phrases, title words, sentence location etc. The features serve as weights which have been assigned to the sentences, a higher weight indicates a better rank. The summary of the document consists of subset of sentences which have a good rank or score.
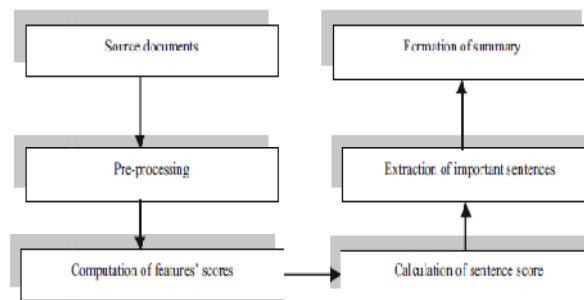
Figure 1. Automatic extractive text summarisation system using statistical techniques [7]

B. Discourse Based Approach

Discourse based approaches use linguistic techniques for automatic text summarisation. Discourse relations for example cause, contrast and elaboration are considered critical for text interpretation as they indicate how the sentences are interrelated to form summary. Discourse relations establish rapport between sentences and parts of text. Discourse formalism adduced different resulting structures, namely trees and graph.

C. Topic Based Approach

Topic based approaches as name suggests relate what the document theme [13] is about and represented by events occurring in documents. The topic can be represented in different ways such as topic signature, enhanced topic signature, thematic signatures, templates and modeling document content structure.

D. Graph Based Approach

Graph based method can be used for depicting the text structure and relation between sentences by representing the sentences as nodes and relation between sentences as an edge. The method can be used to extract significant, appropriate and informative text in a compressed version. Preprocessing is required in this technique to remove stop words, tokenize sentence etc., followed by ranking of sentences based on importance. The relation between sentences is computed to recognize relevant structure. Finally the sentences are extracted for summary based on their ranking and relevance.

E. Machine Learning Approach

Machine learning approaches are efficient and effective for automatic text summarisation.

1) Naïve Bayes Approach: Naive Bayes approach [14] is supervised learning method and consider sentence selection as classification problem. Using binary class to

determine whether sentence is to be included in summary or not. The features used are word frequency, sentence length, position of paragraph which is responsible for a part of sentence to be part of summary. If S denotes the number of sentences and s denotes a particular sentence with features $F_1, F_2, \ldots F_k$, then naïve bayes formula is;

$$P(s \in S | F_1, F_2, \ldots F_k) = \frac{\prod k_{j=1}(P(F_j | s \in S) | P(s \in S)}{\prod k_{j=1} P(F_j)} \tag{1}$$

P (s∈S) is a constant, P= $(F_j | s \in S)$ and P (F_j) can be directly estimated from training set by counting occurrences. P (s∈S$| F_1, F_2, \ldots F_k$) represents the probability of the sentences to be included in summary based on the given features possessed by sentence.

2) Artificial Neural Network: Artificial neural network method has been used to select sentences in extractive summarisation [15].There are three phases of ANN which are training phase, feature incorporation and sentence selection. The training phase identifies the types of sentences to be included in the document summary. A human input is required for the same, the system learns the pattern of summary sentences relation among features is determined, removing common and unimportant features is done then. This ensures important feature stay in summary.

3) Fuzzy Logic Method: Fuzzy logic method [16] can use features like similarity to title, keyword, sentence length etc. as input to fuzzy system as knowledge of IF THEN rules are required for summarisation and value 0 to 1 assigned to sentences. The value thus determined the rank of each sentence for final summary.

3.   Research Objectives/Aim of the Study

The aim of the study is to create an extractive text summariser capable of delivering a summary which includes a subset of sentences from the original document such that the summariser is able to satisfy the following needs:

1) To create an extractive text summariser which is language independent, hence capable of summarising texts written in any language, this is achieved by using statistical methods and features in order to rank the data. The features used include TF-IDF score, cue phrases and heading title, hence making them independent of the language being used in the document. This technique is not possible in machine learning text summarises since those models are dependent on the language and hence the extractive text summariser can work on a wider variety of languages as compared to other models.

2) To summarise unannotated documents hence there is no need to classify the documents or provide labels and values to the various sentences as it can out to be a cumbersome process in which each sentence of the document needs to labelled. The process of manually labeling can be extremely time consuming and the automatic labeling might not be able to provide fully accurate labels hence it makes the entire process very difficult.

This also is achieved by using the statistical features that do not require any dependency on the words of the documents.

3) To reduce the complexity of the text summariser the features or attributes of the sentences are statistical based hence they are quite easy to compute and hence take lesser computing time as compare to machine learning based techniques since they require small number of iterations to compute.

4) The text is subjected to preprocessing techniques so that the memory consumption and the noise in the data can are reduced to a minimum.

5) The summariser should be able to summarise multiple documents and should return the desired summary with user defines compression rates

4.   Research Design

A. Features

The statistical features used to make the entire model are independent of the language used since we do not need to depend on the individual words as features. The various different scores or features used for the ranking of the all the sentences are given as follows:

1) TF-IDF: The term frequency of a word is denoted by f_{ij} which tells us about the number of occurrences of a particular word 'i' in document 'j'. The logarithmic term frequency has been used along with smoothing so that in case the frequency of the word is very high it would not lead to extremely large TF-IDF score. In case f_{ij} is zero the entire logarithmic term is zero, hence the equation for the

$$f_{ij} = \begin{matrix} 1 + log_e f_{if} & f_{ij} > 0 \\ 0 & f_{ij} = 0 \end{matrix} \qquad (2)$$

The inverse document frequency describes that the words occurring in a few documents are much more useful in distinguishing the documents from the remaining textual documents. The total number of documents are represented by N and the total number of documents in which the word 'i' occurs is denoted by N_i. The IDF equation has been subjected to smoothing so that zero division error does not occur and the equation is given as:

$$IDF = 1 + log_e \frac{1+N}{1+N_i} \qquad (3)$$

The term frequency and inverse document frequency are multiplied in order to get the TF-IDF score. A high score in TF-IDF is obtained by having a high term frequency and a

low document frequency of the term in the set of documents, such words are very useful in distinguishing the documents. The equation of the TF-IDF if given as:

$$TF - IDF = \begin{cases} \left(1 + log_e f_{ij}\right) * \left(1 + log_e \frac{1+N}{1+N_i}\right) f_{ij} > 0 \\ 0 f_{ij} = 0 \end{cases} \quad (4)$$

2) Cue Phrases: The cue phrases are linguistic expressions which are capable of explicitly signaling discourse structure. The cue phrases are heavily dependent on the genre of the document The number of cue phrases in each sentence are added to the weight of the sentence score, hence the score of the sentence increases with increase in number of cue phrases present in that particular sentence. The Fig.2 some of the cue phrases that have been used in the text summariser in order to calculate the score of the sentences:

3) Heading Title: The number of similar words between the head title of each document and the corresponding sentences are added to the total score of the sentence, hence this gives us the information as to how much each sentence is related to the topic.

The score of the sentence is calculated by summating the different features. The i corresponded to the sentence number and n refers to the total number of sentences where each sentence is ranked according to their $totalscore_i$ and the equation for it if given as:

$$totalscore_i = (TF * IDF)_i + Cuephrases_i + Headingtitle_i \quad (5)$$

B. Architecture

The basic architecture of the text summariser consists of following three sections

1) Content selection: It is the process of extracting sentences based upon the usefulness to the user, hence the non-essential textual data is discarded.

2) Information ordering: content selection followed by information ordering in which each of the sentences are ranked according to the score calculated, a better score implies a better rank and that increases the chances that the sentences is present in the summary.

3) Sentences realization: The sentence realization orders the sentences of the summary in orderly manner so that the summary output is coherent in nature.
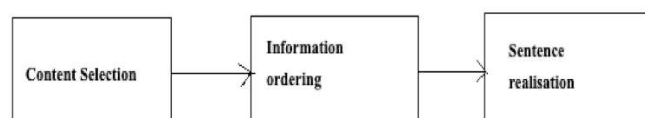
Figure 2. The text summarisation basic architecture

C. Methodology

The statistical based methodology has been used for creating the summariser which has different several phases as given by:

1) The DUC dataset from the year 2004 to 2007 serves as the input to the text summariser. The dataset is collection of unannotated documents consisting of textual data regarding various fields collected in the various different years. The dataset has been written in the XML format hence only certain information is required to create the automatic text summariser. The input documents have the .txt extension.

2) The dataset is then read using the python language in such a manner such that only the heading and text of the document is extracted and the remaining information is discarded. The heading and the text of the documents extracted are stored in difference variables.

3) Once the document texts are obtained they are subjected to sentence level tokenization by using the NLTK library. The tokenizer used in order to break the documents into sentences is called the 'english.pickle' tokenizer.

4) The headings and sentence extracted both are subjected to preprocessing so that linguistic techniques can be applied on them:

   a. All the text is converted to lower case, so that same words in lower and uppers cases are not treated differently which otherwise decrease the accuracy of the summariser and increases the noise in the system.

   b. All the special characters and punctuation marks are removed from the text since they do not add any values to the text summarisation process and take up unnecessary CPU processing time as well as memory.

   c. All the stop words are removed using the NLTK library using its corpus package. The stop words are referred to as the commonly used words in a particular language such words do contain much information about the documents and take additional memory and valuable processing time.

   d. After preprocessing the data the various scores are calculated and the total score of each sentence is obtained. The sentences are ranked according to their scores and the summary of the data is the collection or subset of the sentences with highest score. The number of sentences in the summary depend upon the compression rate as defined by the user.

D. Tools and Technology

The tools and technology required in order to build the extractive text summariser can be divided into two major sub categories that are software and hardware.

1) Software: The software requirements for building the extractive text summariser include:

a) Python: The Python language is used in order implement the text summariser due to its ability of rapid development of applications and programs. The python language has a simple syntax hence making it easy to code. The Python language consist of extremely rich library such as NLTK, SKLEARN and PANDAS which help us to read and manipulate data in an easy manner.

b) NLTK library: This particular library allows us to process textual data in a very timely manner. This library consists of a collection of libraries and programs for statistical processing for text written in various languages in the python programming language.

c) english.pickle tokenizer: The tokenizer is required to successfully split the document into its respective sentences.

2) Hardware: The hardware used for building the extractive text summariser includes:

a) Central Processing Unit (CPU): The CPU used for running the text summariser is a Quad-Core Intel Core i5 with a clock rate of 3.2 GHz

b) Random Access Memory: The main memory of the computer is an 8 GB 1867 MHz DDR3.

c) Graphic card: The graphic card used is an AMD Radeon R9 M380 with 2 GB memory.

5. Results and Discussions

The extractive text summariser is being evaluated using the precision, recall and F-score metrics. Precision is defined as the ratio of correctly predicted positive observations by the model to the total number of predicted positive observations. The equation for precision is given as follows:

$$Precision = \frac{TP}{(TP+FP)} \qquad (6)$$

Recall (Sensitivity) is defined as the ratio of correctly predicted positive observations by the model to the all the observations in the actual class which are positive. The equation for recall is given as follows:

$$Recall(Sensitivity) = \frac{TP}{(TP+FN)} \qquad (7)$$

F Score is the weighted average of Precision and Recall. Therefore, this score takes both false positives and false negatives into account. Intuitively it is not as easy to understand as accuracy, but F is usually more useful than accuracy, especially if you have an uneven class distribution. Accuracy works best if false positives and false negatives have similar cost

Table 1. Evaluation Metrics Table

Dataset	Average Precision	Average Recall	Average F-score
2004 DUC	0.82	0.76	0.79
2005 DUC	0.79	0.75	0.77
2006 DUC	0.84	0.80	0.82
2007 DUC	0.81	0.79	0.80

True Positives (TP) is the number of classes that are predicted positively and in actuality is also   positive
True Negatives (TN) is the number of classes that are predicted negatively and in actuality the class is also negative.

Positives (FP) is the number of classes that are actually negative and the predicted class is positive in nature. False Negatives (FN) is the number of classes that are actually positive and the predicted class is negative in nature. Once all the metrics have been calculated their average is taken and they presented in a tabular form as given below.

$$F - Score = \frac{(2*precision*recall)}{(precision+rec\quad)} \tag{8}$$
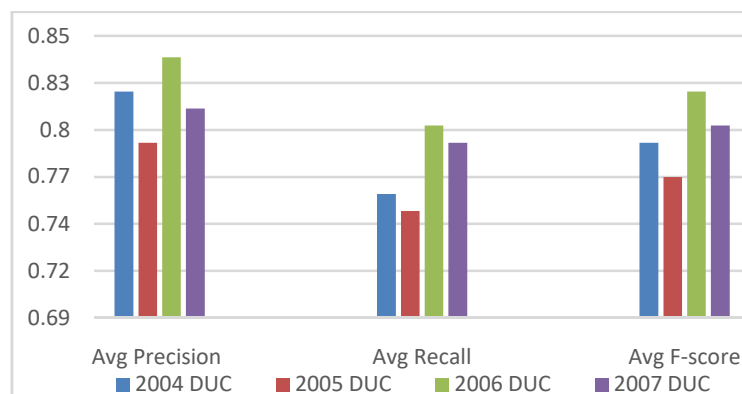
Figure 3. The graphical visualisation of the datasets and there scores.

Once the summary of the document is outputted using evaluation parameters such as precision, recall and F-score help us to distinguish the difference between the actual summary and the summary that was manually created.

6.   Analysis

From Table 2, it is clear that precision which illustrates the accuracy of the classifier, is highest for the 2006 DUC dataset, also for the same 2006 DUC dataset, the recall which tells about the actual positives given out by the classifier is highest. F-score which is indicative of the balance of precision and recall and is the primary factor for achieving

maximum efficiency of the classifier is highest for same data set. This clearly demonstrates that the 2006 DUC dataset happens to be the optimal option for the classifier.

7.   Conclusion and Future Scope

The extractive text summarisation is a big research field and has a lot applications. In this particular paper we have described many known extractive text summarisation based including the statistical as well as the machine learning based. The statistical method has allowed us to extract the summary from the DUC dataset with high accuracy. The highest accuracy was presented in the DUC dataset of the year 2006 followed by 2007. The extractive text summariser allows us to extract sentences irrespective of the language being used and with short computation time. The extractive text summariser can be subjected to more pre-processing and various other statistical features can be used in order to increase the accuracy of the system.

Text summarisation is has been a very old field and there exists great interest in this field across the globe due to its vast applications, so the text summarisation continues to improve in order for creating text summarisation approaches or develop efficient summarisation approaches such that summary of higher quality can be generated. The performance of text summarisation in today's world is still moderate and summaries generated are not perfect because they lack consistency and coherency. Therefore the text summarisation system can be made exceptionally good by combining current existing systems with other system so that they can perform better. The extractive text summariser can be subjected to more linguistic techniques and various other statistical and non-statistical features can be used in order to increase the accuracy of the system.

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DEFICIENCIES IN THE QUANTITY OF PADDY TO BE STORED IN THE SERVICE COOPERATIVE SOCIETIES OF BALOD DISTRICT OF CHHATTISGARH STATE AND ITS SOLUTION

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Decrease in the quantity of paddy in the service cooperative societies because the lack of timely transportation so paddy has to be stored for a long time. The storage arrangement is done according to the capacity in the cooperative societies and stock is increasing due to not transportation at the right time because the storage systems in the societies are not sufficient as well as the storage is done in unscientific method and under the open sky. There is a shortage of concrete platform and sed. Sensitive food grains like paddy should not be stored for a long time so loss in the produce due to dryness, rain, insect-pests, rats and theft, due to which there is a qualitative and quantitative loss in the yield, That loss has to be bear by the society, because the societies have to receive no payment for that loss from the government nor any percentage of the shortfall is accepted by the government. They have to make storage arrangement only from the amount of expenditure received and if the amount of expenditure is insufficient then amount of commission is used for storage arrangement. It is true that the storage system in the societies are inadequate so the quantity of decrease paddy. In this paper successful efforts can be made to overcome by making the government aware of the findings and suggestions, so that adequate storage arrangements can be made, there will no reduction in the quantity of paddy, and the societies will be benefited.

Keywords - Paddy, shortage, storage system, service cooperatives societies, transport,unscientific method.

1. INTRODUCTION

Service Co-operative Society is a type of Co-operative Department; It has its origin under Section 55 of the Service Co-operative Societies Act 1960. Paddy procurement is done by the government through the service cooperative society, and in return the service cooperative society receives a commission. The area of the research paper has been taken as Balod district. At present there are 122 Service Co-operative Society and 4 Sub Centres in Balod District . Paddy procurement work is done everywhere, hence it is also known as Paddy Procurement Center. There are total 126 procurement centres in Balod district There is a district marketing union in the Balod district, whose chief is the district marketing officer, and under his control four collection centers have been set up **(Dewangan et al., 2021)**. where paddy is collected from the societies and stored in the collection center and controls all the service cooperative societies of the district level. Two or three villages are included in a society; villages are included in society according to the transport facility. Members are elected for the executive in the society; there are a total of 11 members, in which there is a chairman (male or female), a vice-president (male or female) and 8 other members. The societies are divided into four categories:-

Table 1: Category of paddy

Category	Description
A Class	turnover more than 6 crores
B Class	turnover up to 3-6 crores
C Class	turnover up to 1-3 crores
D Class	turnover less than 1 crore

Mainly the source of income of service cooperatives is obtained by providing food, seeds, chemicals and cash to the farmers. Since Chhattisgarh is an agricultural state, most of the farmers here reside in villages. Due to which it is impossible for the government to reach the farmers directly, so it appoints the Cooperative Department as an agency and does the work of buying paddy from the farmers through the service cooperative societies. Instead the societies got commission is given at the rate of Rs 32 **(Dewangan et al., 2021)**. Now it come the matter of storage, because storage plays an important role in the purchase of paddy. Storage is essential. The storage in the societies is done by making a platform of sacks filled with straw in the open sky, which is harmful for the food item. Each society has a storage capacity, but has to store more than that which is called buffer limit. It is necessary to do this, because the purchase of paddy from the farmers cannot be stopped, if the procurement is stopped then it can have a direct impact on the farmers. Farmers may have to bear huge losses. If the buffer limit is reached, the district marketing station has to lift it within 72 hours **(Dewangan et al., 2021)**. and collect it at the collection center and the paddy stored in the societies is also lifted by the millers registered with the district marketing station. But the lifting is not done on time and due to not being able to lift at the right time, the paddy has to be stored for a long time, due to which the paddy becomes dry, moisture due to rain, damage by insects and rodents, loss by rats, theft and so on. Due to lack of concrete platforms, the quantity of paddy gets reduced, due to which the societies have to face a lot of losses. For the storage of service cooperative societies by the government, the expenditure amount is received at the rate of Rs.12 (Rs. 9. General expenditure and Rs.3. Administrative expenditure) per quintal **(Dewangan et al., 2021)**. which is not sufficient. They have to make complete arrangements for storing the same amount, which is impossible. They have to cover their expenses from the commission received. They are left with nothing in the form of income, due to which they have to stop the work of buying paddy in their society. The importance of the selection of the present research paper is that with this the government will try to make adequate and safe storage arrangements in the service cooperative societies and efforts will be made by the government to solve the problems like shortage in the quantity of paddy due to insufficient storage. . From which the beneficiaries (collection centres, societies and farmers) will be able to benefit. The purpose of the present research paper is to find out the shortcomings in the quantity of paddy due to lack of transportation time in service cooperatives and inadequacy of storage system and make suggestions for redressal by apprising the government.

2. Review of Research Literature

Role of Chhattisgarh State Cooperative Marketing Federation in procurement and collection of paddy - A study, presented in the research, it has been told that farmers are not getting proper price for their produce. Procurement of farmers' produce is done through service cooperatives and agricultural produce markets, but due to lack of proper grading of produce, they are not getting proper price, farmers have to depend only on the evaluation of traders. The price paid is considered to be fair value **Gupta Umesh, et al. (2009).**

Role of State Agricultural Marketing (Mandi) Board in the development of Chhattisgarh State, in the research presented by C.G. The objectives of the formation of the State Agricultural Marketing Board have been explained and their working methods have been described, how the Agricultural Produce Market operated under the Board is providing marketing facilities to the farmers for their produce. To what extent the beneficiaries are getting benefited from the formation of Mandi Board **Rathore, Ankaksha, et al. (2017)**.

Effect of agricultural development on farmers, problems of agricultural development have been made aware of in the present research study. Problems such as lack of electricity supply, lack of effect of seeds, lack of warehouses, problems of agricultural marketing etc. are the major problems which are present in agricultural development even today. It states that slow recovery is essential so that all sections of the society can be benefited from the process of development **Charadiya, Bherulal, et al. (2012)**.

Evaluation of the grain storage method adopted by the farmer, Dharwad University, in the present research study, it has been told about the method adopted by the farmer, to what extent the farmers are benefiting from the me **Hosakoti, Shaila S., et al. (2011)**.

3. **Research Objective**

   To analyze the problems related to the storage of agricultural produce (paddy) in service cooperative societies and the shortcomings in the quantity of paddy to be stored and to conclude and submit suggestions for redressal.

4. **Research Hypothesis**

   H_0:- Problems related to storage in service cooperative societies and deficiencies in the quantity of paddy stored are favourable.

   H_{A1} :- Problems related to storage in service cooperative societies and deficiencies in the quantity of paddy stored are unfavourable.

5. **Research Methods**

   The present study in the present research paper is based on secondary data. Reports from the session 2013-2014 to 2020-2021 have been collected from the Secondary Data District Marketing Association, Balod (Chhattisgarh). There is no need of illustration in the research paper as it has limited overall. Descriptive and analytical research method has been used in the research paper. The analysis of the data will be done on the basis of statistical methods, percentage and drug method and after reaching the result, conclusions will be presented and suggestions will be presented.

6. **Data Analysis**

   Analysis of data In Balod district, information related to paddy procurement, farmer registration and paddy disposal in the past years, on the basis of secondary data of District Marketing Association Balod from 2013-2014 to 2020-2021, total paddy purchase quantity (in tonnes), procurement centers The quantity of paddy disposal (in tonnes) and the quantity of shortfall received (in tonnes) in the procurement centers have been analyzed.

Table 2 : Year wise number of paddy service cooperative societies, procurement centers, registered paddy area and number of farmers registered in the district
(Information related to paddy procurement, farmer registration and paddy disposal in Balod district in the past years, District Marketing Association Balod CG.)

Year	Number of service cooperative societies	Number of paddy procurement centers	Total registered paddy area (hec.)	Total number of farmers registered

	in the district	in the district	in the district	in the district
2013-2014	69	110	150650.28	102538
2014-2015	69	110	127912.33	86667
2015-2016	69	110	132647.78	90144
2016-2017	69	110	141144.17	97960
2017-2018	69	110	146221.87	105885
2018-2019	69	110	150222.74	111933
2019-2020	69	110	153835.39	124491
2020-2021	69	110	154424.23	130880

Table 3: Year wise area of paddy sales in the district and number of farmers selling paddy
(Information related to paddy procurement, farmer registration and paddy disposal in Balod district in the past years, District Marketing Association Balod CG.)

Year	Total area sold paddy in the district (hec.)	Number of farmers selling total paddy in the district
2013-2014	134180.66	80675
2014-2015	111172.06	83244
2015-2016	89797.07	73447
2016-2017	134775.47	92615
2017-2018	130357.10	92414
2018-2019	144849.02	107055
2019-2020	149689.42	119684
2020-2021	151977.85	127280

Table 4: Year wise total quantity of purchase, quantity of total disposal (in tones) and percentage of shortfall received in procurement centers in the district
(Information related to paddy procurement/farmer registration and disposal of paddy in Balod district in the past years, District Marketing Association Balod Chhattisgarh)

Year	Total Paddy Purchase Quantity (in Ton)	Total Dismantling Volume (in Ton)	Quantity of Shortage Received (in Tons)	percentage of shortfall achieved
2013-2014	4,96,468.45	4,92,110.29	4358.16	.88
2014-2015	4,11,336.64	4,09,670.45	1666.19	.41
2015-2016	3,32,249.16	3,32,189.66	59.50	.018
2016-2017	4,46,490.30	4,46,485.94	4.36	.00098
2017-2018	3,84,244.02	3,84,244.02	3.036	.00079
2018-2019	4,95,983.40	4,95,967.27	16.128	.0033
2019-2020	5,01,604.26	5,01,483.83	120.43	.024
2020-2021	5,21,715.76	5,12,584.30	Remediation work in progress.	Remediation work in progress.
N = 8				$\sum X$= 1.34

Percentage of shortfall received per annum = $\frac{X}{Y}*100$

X = Quantity of shortfall received per annum

Y = Total Paddy Purchase Quantity (in Tons) per year

$$\text{Percentage of Average shortage} = \frac{\Sigma X}{N}$$

$$= 1.34/8$$

$$= .17 \text{ percent}$$

X = Percentage of total shortfall achieved

N = total number of years

7. Conclusions and Suggestions

From the above research it is concluded that the quantity of paddy stored in service cooperative societies is decreasing. The reason for the shortfall is the lack of transportation in time. Due to which paddy has to be stored for a long time, for which immediate arrangement is not possible. Because the arrangement by the societies is done on the basis of capacity and amount received, and the amount of expenditure received by the government is insufficient. The stock increases due to lack of lifting at the right time, due to which the yield decreases due to dryness, rain, insects and rodents, due to which there is a qualitative and quantitative loss in the yield, the societies have to bear the loss, Because no percentage of the loss caused by the government to the societies is acceptable. In Chhattisgarh, storage is done by unscientific method. It is true that there are problems of storage in the service cooperative societies of Balod district and the quantity of paddy is decreasing, and the reason for the shortfall is not lifting at the right time and inadequate system. Hence my research hypothesis is true.

Suggestion

1. The off take should be at the right time so that the percentage of shortfall does not increase. 2. For the adequacy of the storage system in the service cooperative societies, more and more concrete platforms and seeds should be constructed, so that the paddy can be stored safely for a long time. 3. Service cooperative societies are getting Rs.12 per quintal by the government. The amount of expenditure (Rs 9. General Expenses and Rs. 3 Administrative Expenses) should be increased so that adequate arrangements can be made. 4. The demand of rice from the headquarters should be on time so that the millers can lift the paddy at the earliest. 5. To avoid temperature, insects, rodents, rats and ants, both scientific and unscientific methods should be used for storage. Deficiency can be overcome by making adequate arrangements.

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FIXED POINT THEOREM FOR COMPATIBLE CONDITION OF INTEGRAL TYPE IN FUZZY METRIC SPACES

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In our research paper, we will find a fixed point theorem in fuzzy metric spaces for weakly compatible maps which satisfy integral type inequality. The result obtained by using the notion of non – compatible maps of the property (E.A) in the fuzzy metric spaces.

Keywords: Complete fuzzy metric spaces, weakly compatible mappings, fixed points.

1. INTRODUCTION

Here we give following definitions and lemmas which are useful for our result.

Definition 1.1[8] A binary operation $*$: $[0,1] \times [0,1] \to [0,1]$ is *continuous   t-norm* if $*$ is satisfying the following conditions :

    (i) $*$ is commutative and associative,

    (ii) $*$ is continuous,

    (iii) $a * 1 = a$ for all $a \in [0,1]$,

    (iv) $a * b \le c * d$ whenever $a \le c$ and $b \le d$ for all a, b, c, d $\in [0,1]$.

Definition 1.2[2] A 3- tuple (X, M, $*$) is called a *fuzzy metric space* if X is an arbitrary set, $*$ is a continuous t-norm and M is a fuzzy set on $X^2 \times (0, \infty)$ satisfying the following conditions:

For all x, y, z $\in$ X and s, t > 0

(FM-1) M(x, y, t) > 0,

(FM-2) M(x, y, t) = 1 if and only if x = y,

(FM-3) M(x, y, t) = M(y, x, t)

(FM-4) M(x, y, t) $*$ M(y, z, s) $\le$ M(x, z, t + s),

(FM-5)M(x, y, .) : (0, ∞) $\to$ (0,1] is continuous.

Then M is called a fuzzy metric on X. The function M(x, y, t) denote the degree of nearness between x and y with respect to t.

Definition 1.3[2] Let (X, M, $*$) be a fuzzy metric space. Then

(a)   A sequence $\{x_n\}$ in X *converges* to x in X if and only if $\lim_{n\to\infty}M(x_n, x, t) = 1$ for each $t > 0$.

(b)   A sequence $\{x_n\}$ in X is called *Cauchy sequence* if and only if $\lim_{n\to\infty}M(x_{n+p}, x_n, t) = 1$ for each $p > 0$ and $t > 0$.

(c) A fuzzy metric space $(X, M, *)$ is said to be *complete* if and only if every Cauchy sequence in X is convergent in X.

Definition 1.4 Two self mappings A and S of a fuzzy metric space $(X, M, *)$ are said to be *commuting* if $M(ASx, SAx, t) = 1$, for $t > 0$ and for all x in X.

Definition 1.5[9] Two self mappings A and S of a fuzzy metric space $(X, M, *)$ are called *compatible* if $\lim_{n\to\infty}M(ASx_n, SAx_n, t) = 1$, whenever $\{x_n\}$ is a sequence in X such that $\lim_{n\to\infty}Ax_n = \lim_{n\to\infty}Sx_n = x$, for some x in X.

Definition 1.6 Let A and S are two self mappings of a fuzzy metric space $(X, M, *)$. A point x in X is called a *coincidence point* of A and S if and only if $Ax = Sx$. We shall call $w = Ax = Sx$ a point of coincidence of A and S.

Definition 1.7[4] Two self mappings A and S of a fuzzy metric space $(X, M, *)$ are called *weakly compatible* if they commute at their coincidence points. i.e. if $Au = Su$ for some $u \in X$, then $ASu = SAu$.

Definition 1.8 Two self mappings A and S of a fuzzy metric space $(X, M, *)$ are said to be *non compatible* if

$\lim_{n\to\infty}M(ASx_n, SAx_n, t) \neq 1$, whenever $\{x_n\}$ is a sequence in X such that $\lim_{n\to\infty}Ax_n = \lim_{n\to\infty}Sx_n = x$, for some x in X and for all $t > 0$.

Definition 1.9[1] Let two self mappings A and S of a fuzzy metric space $(X, M, *)$ we say that A and S satisfy *E.A. property* if there exists a sequence $\{x_n\}$ in X such that $\lim_{n\to\infty}Ax_n = \lim_{n\to\infty}Sx_n = x$, for some x in X and for all $t > 0$.

Lemma 1.10[6] Let a fuzzy metric space $(X, M, *)$. If for all $x, y \in X$ and $t > 0$ with positive number $q \in (0, 1)$ and $M(x, y, qt) \geq M(x, y, t)$, then $x = y$.

The theorem used by P. Vijayraju and Z.M.I. Sajath for weakly compatible self mapping in fuzzy metric spaces, we generalized it in the integral form with the help of E. A. property.

2. EXPERIENTIAL WORK

Theorem 2.1 Let $(X, M, *)$ be a fuzzy metric space and let f and g be two weakly compatible self mappings of X with E. A. property such that for each $x \neq y$ in X, $t > 0$ and for $q \in (0, 1)$

(i) $f(X) \subseteq g(X)$

$M(gx, gy, qt)$ $\min \{ M(fx, fy, t), M(fx, gy, t), M(gx, fx, t), M(gx, fy, t), M(gy, fy, t)\}$

(ii) $\int \varnothing(t)\, dt \geq \int \varnothing(t)\, dt$

0   0

(iii)   f(X) or g(X) is a complete subspace of X, then f and g have a unique common fixed point.

Proof: Since f and g satisfy the E. A. property, there exist a sequence $\{x_n\}$ in X such that

$$\lim_{n\to\infty} fx_n = \lim_{n\to\infty} gx_n = x_0 \qquad \text{for some } x_0 \in X.$$

Suppose that f(X) is complete, then there exist $u \in X$ such that

$$\lim_{n\to\infty} fx_n = fu, \text{ therefore } \lim_{n\to\infty} gx_n = fu \ [\text{by (i)}].$$

Now we claim that fu = gu.

Let(hyp.) fu ≠ gu, then

$$\overset{M(gxn,\ gu,,qt)}{\int} \emptyset(t)\ dt \quad \geq \quad \overset{\min\{M(fxn,\ fu,\ t),\ M(fxn,\ gu,\ t),\ M(gxn,\ fxn,\ t),\ M(gxn,\ fu,\ t),\ M(gu,\ fu,\ t)\}}{\int} \emptyset(t)\ dt$$

0   0

$$= \quad \overset{\min\{M(fu,\ fu,\ t),\ M(fu,\ gu,\ t),\ M(fu,\ fu,\ t),\ M(fu,\ fu,\ t),\ M(gu,\ fu,\ t)\}}{\int} \emptyset(t)\ dt \qquad [\text{ asn}\to\infty]$$

0

$$= \quad \overset{\min\{1,\ M(fu,\ gu,\ t),\ 1,\ 1,\ M(gu,\ fu,\ t)\}}{\int} \emptyset(t)\ dt$$

0

Hence we have, $\overset{M(fu,\ gu,,qt)}{\int} \emptyset(t)\ dt \quad \geq \quad \overset{M(fu,\ gu,\ t)}{\int} \emptyset(t)\ dt \qquad$ for t > 0.

0   0

Therefore fu = gu (by lemma1.10). Since f and g are weakly compatible. So fgu = gfu and therefore fgu = ffu = gfu = ggu.

   Now, we show that gu is a common fixed point of f and g.

Let(hyp.) gu ≠ ggu, then by (ii)

$$\overset{M(gu,\ ggu,,qt)}{\int} \emptyset(t)\ dt \quad \geq \quad \overset{\min\{M(fu,\ fgu,\ t),\ M(fu,\ ggu,\ t),\ M(gu,\ fu,\ t),\ M(gu,\ ffu,\ t),\ M(ggu,\ fgu,\ t)\}}{\int} \emptyset(t)\ dt$$

0   0

$$\text{min } \{ M(gu, ggu, t), M(gu, ggu, t), M(gu, gu, t), M(gu, ggu, t), M(ggu, ggu, t)\}$$
$$= \int_0 \varnothing(t) \, dt$$

$$\text{min } \{ M(gu, ggu, t), M(gu, ggu, t), 1, M(gu, ggu, t), 1\}$$
$$= \int_0 \varnothing(t) \, dt$$

$$M(gu, ggu,,qt) \qquad M(gu, ggu, t)$$

Hence we have, $\quad \int_0 \varnothing(t) \, dt \quad \geq \quad \int_0 \varnothing(t) \, dt \qquad\qquad$ for $t > 0$.

This gives a contradiction. So our hypothesis is false. Hence gu = ggu.

Finally, we show that the fixed point is unique. Then by (ii)

$$M(u, v, qt) \qquad M(gu, gv,,qt) \quad \text{min } \{ M(fu, fv, t), M(fu, gv, t), M(gu, fu, t), M(gu, fv, t), M(gv, fv, t)\}$$
$$\int_0 \varnothing(t) \, dt = \int_0 \varnothing(t) \, dt \qquad \geq \qquad \int_0 \varnothing(t) \, dt$$

$$\text{min } \{ M(u, v, t), M(u, v, t), M(u, u, t), M(u, v, t), M(v, v, t)\}$$
$$= \int_0 \varnothing(t) \, dt$$

$$\text{min } \{ M(u, v, t) , M(u, v, t), 1, M(u, v, t), 1\}$$
$$= \int_0 \varnothing(t) \, dt$$

$$M(fu, gu,,qt) \qquad\qquad M(u, v, t)$$

Hence we have, $\quad \int_0 \varnothing(t) \, dt \quad \geq \quad \int_0 \varnothing(t) \, dt$

Therefore u = v ∎

Example 2.2 Let X = [1, ∞). Define g, f : X →X by gx = x and fx = 2x – 1, for all x ∈X. Let the fuzzy metric be M(x, y, t) = t/t+│x-y│ . Then

(i)   f and g satisfy the E. A. property for the sequence x = 1 + 1/n, 1, 2, …..

(ii)   f and g are weakly compatible.

(iii)   f and g satisfy for all x ≠ y

M(gx, gy,,qt)   min { M(fx, fy, t), M(fx, gy, t), M(gx, fx, t), M(gx, fy, t), M(gy, fy, t)}

$$\int_0 \varnothing(t)\, dt \quad \geq \quad \int_0 \varnothing(t)\, dt$$

g1 = f1 =1.

Corollary 2.3 Let f and g be two non compatible weakly compatible self mappings of a fuzzy metric space such that

M(gx, gy,,qt)   min { M(fx, fy, t), M(fx, gy, t), M(gx, fx, t), M(gx, fy, t), M(gy, fy, t)}

(i) $$\int_0 \varnothing(t)\, dt \quad > \quad \int_0 \varnothing(t)\, dt$$

(ii)   f(X) ⊆ g(X)

If f(X) or g(X) is a complete subspace of X, then g and f have a unique common fixed point

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MEDICINAL PROPERTIES AND ECONOMIC IMPORTANCE OF AgNP FROM *Ganoderma lucidum*: A REVIEW

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The medicinal importance of fungi should not be ignored as it plays an important role in fields like Ayurvedic dravyaguna and pharmacognosy. *Ganoderma lucidum* was reported with rich medicinal properties due to having good number of medicinal compounds. Ganoderma *lucidum*, an oriental medicinal fungus showing a variety of biological activities like anticancer activity, anti-diabetic activity, hypoglycemic effect, antimicrobial and antioxidant properties. *Candida, Enterococcus,Staphylococcus spp, Streptococcus spp, Escherichia, Pseudomonas* are leading pathogens present on ear, nose and throat region. In the present decades, there is a much gaining attention to scientists in green synthesis of silver nanoparticles. The present paper provides information about the Medicinal properties and Economic importance AgNP from *Ganoderma lucidum*.

Keywords: *Ganoderma lucidum,* AgNP, Medicinal importance,

1. INTRODUCTION

Several fungi like mushrooms are using as medicine as tradition is important in both in India and western countries (Vaidya and Rabba, 1993). Several antimicrobial compounds like lectins, terpenes, polysaccharides have great potential interest on nutritional and medicinal status of different mushrooms. Most of the fungi are saprophytic and non-pathogenic to several living systems like animals, plants, and other microbial species (De Lucca, 2007). The plant-fungi interactions are mediated by primary and secondary metabolites that are available in environment and have several inferences for medicine **(**Scherlach et al., 2013**).**

Fungi are important in both ancient and modern biological processes include brewing, baking, production of organic acids, antibiotics, enzymes, alcohols, and several pharmaceutical products (Bennett, 1998). Symbiotic associations during co-evolution events between plants and fungi results in nutrient exchange and protective mechanisms based on climatic changes based on evolutionary developmental perspective.

Mushrooms that are belongs to fungi are consumed by ancient and **modern** Homo sapiens throughout the world from past to present. Mushrooms like Button mushroom (*Agaricus bisporus)*, Shiitake mushrooms(*Lentinula edodes*),, Oyster mushrooms (*Pleurotus ostreatus)*, Shimeji mushroom (*Hypsizygus tesselatus*), Porcini mushrooms (Boletus edulis) and Paddy straw mushroom (*Volvariella volvacea)* are rich with guanylic acid, glutamic acid, aspartic acid, protein, fibre, iron, vitamin B, vitamin C, vitamin D, beta-glucan, folic acid, potassium and copper. These can control diseases like diabetics, cancer and weak bones. The mushrooms has numerous health benefits such as better immune function, lowers bad

cholesterol, boosts heart health, absorption of calcium, improved metabolic processes and maintain strong bones.

2. FUNGI IN MEDICINAL IMPORTANCE

The medicinal importance of fungi should not be ignored as it plays an important role in fields like Ayurvedic dravyaguna and pharmacognosy (Vaidya and Rabba, 1993). Members of fungal genera Inonotus and Phellinus are well-known as medicinal fungi (medicinal mushrooms) that are used in treatment of bacterial and viral infections, cancer, diabetes, and ulcer (Lee and Yun, 2011). Fungal β-(1$\rightarrow$ 3),(1$\rightarrow$ 6)-glucans are non-cellulosic β-glucans that are used clinically in China and Japan as potent immunological activators treating diseases like microbial infections, hypercholesterolaemia, cancer, and diabetes (Chen and Seviour, (2007).

Table1: Fungi in medicinal importance			
Name of fungi	**Medicinal importance**	**Description**	**References**
Larch quinine fungus *(Laricifomes officinalis)*	Astringent, Diarrhoea, Water motion, Vomiting, Haemorrhoids spasmodic coughing suppressing lactation	The active ingredient is Agricin	Vaidya and Rabba, 1993
Chaga *(Tchaga)*	Used in Ulcers , Tumours (Pulmonary and Gastric), Chronic Gastritis	Sold under the trade name "Befungin" has been approved withinRussian medicinal research	
Snuff Fungus *(Daedaleopsis favida)*	Treatment for jaundice, Treatment of chronic diseases	Traditional medicine Mumbai (Bappa sule)	
Umbarache Ken	Cures Kidney disorders	Grows on fungus on ficus religiosa linn.	
Phansomba *(Fomes fomentarius)*	Diarrhoea and dysentery, healing of wounds	Used mostly by western Indian aqyurvedic doctors introduced into India by the Portuguese in Goa	
Ganoderma lucidum (Curt.: Fr.) P. Karst.	Showing anticancer and antitumor properties, treatment of hepatopathy, chronic hepatitis, nephritis, hypertension, arthritis, neurasthenia, insomnia, bronchitis, asthma, and gastric	Contain numerous bioactive compounds including polysaccharides, triterpenes, and immunomodulatory proteins	Chang and Buswell, 1999; Wasser, 2005

ulcers.[		

Fungi play a major role in Ayurvedic methods like Dravyaguna and pharmacognosy shows good medicinal importance in India and western countries (Vaidya and Rabba, 1993)., Fungi also plays an important role as medicinal and human food from past 30 years leads to finding population structure, climatic factors and distribution that influence the of existence of endophytic fungi grows on host plants (Jia, et al., 2016).

3. Ganoderma lucidum

Ganoderma lucidum is a wood-degrading fungi that belongs to basidiomycetes is very rare in nature that has pharmacological effects (Boh et al., 2007). In Latin, lucidum means shiny or brilliant appearance on fruiting body showing a symbol of good fortune, happy augury, longevity, good health, and even immortality (Wasser, 2005). It has good therapeutic potential in the promotion of health and longevity that is used extensively as "the mushroom of immortality" in Asian countries like China, Japan, Korea and India from past 2000 years (Sanodiya et al., 2009; Sliva, 2003). The dried powder of *Ganoderma lucidum* is mostly used in the treatment of cancer in ancient China. Ganoderma lucidum, an oriental medicinal fungus (Figure 1) showing a variety of biological activities like anticancer activity (Yuen and Gohel, (2005), anti-diabetic activity (Ma, et al., 2015), hypoglycemic effect (Zhang and Lin, 2004). antimicrobial and antioxidant properties (Zhu et al., 1999; Kamra and Bhatt, 2012).

Figure 1: *Ganoderma lucidum*

Herbal medicines are important in health care systems throughout the world from ancient times of mankind that are attracting more attention within the context of health sector reform (Table 2). β-sitosterol and 5α-reductase inhibitor are well-known molecules that were identified in the Ganoderma extracts. Ganoderma is considered to be a natural medicine with clinical benefits like hepatitis, chronic bronchitis, hyperglycemia, hypertension, leucopenia, arteriosclerosis, muscular dystrophy, cancer, and hypercholesterolemia (Nahata, 2013).

Table 2: Treatment and extraction process f compounds from fungi			
Compound present	**Treatment**	**Extraction process**	**Reference/s**
5α-reductase	Prostatic hyperplasia	Petroleum ether extract via high-performance thin-layer chromatography	Nahata and Dixit, .2012
Ganodermin	Inhibited the mycelial growth of Fusarium oxysporum,Botrytis cinerea and Physalospora piricola	Chromatography on DEAE-cellulose, Affi-gel blue gel, CM-Sepharose and Superdex 75.	Wang and Ng. 2006
Laccase	Human immunodeficiency Virus (HIV)-1	Sequential chromatography on DEAE-cellulose and Affi-gel blue gel and adsorption on Con A-Sepharose,.molecular mass of 75 kDa protein	
Triterpenes	Antioxidant, metabolic-regulating, immunomodulatory, and anti-inflammatory activities	Methanol, ethanol, acetone, chloroform, ether, or a mixture of these solvents in normal and reverse-phase HPLC	(Chen et al. 1999; Su et al. 2001).
Ganoderic acids A and B	**Prostate Cancer**	Cellulose-dissolving ionic liquids	Kubota et al., 1982
Ganoderic and lucidenic acids, other triterpenes such as ganoderiols, ganoderals, and ganodermic acids	Antibacterial, antiviral, antitumor, antiosteoclastic differentiation activity, anti-HIV-1, hepatoprotection, antioxidation, antihypertension, cholesterol reduction, and antiaggregation functions.	Based on 7 fractions Column	Nishitoba et al. 1984; Sato et al. 1986; Budavari 1989;

Ethyl acetoacetate ethylene acetal Pyridine-3-ol l,4-Dioxane-2,3-diol Butylated Hydroxy Toluene 9-Cedranone	AgNPs synthesized using G. lucidum with 70% ethanol extract inhibited the growth of E. coli	GC–MS study	Al-Ansari et al., 2020

The family Ganodermataceae is double-walled basidiospore fungi having 219 species. *Ganoderma* species is having different shape and color (red, white, black, yellow, blue/green, and purple) of the fruit body with host specificity, and geographical origin. The artificial cultivation of *G. lucidum* can be achieved using substrates such as grain, sawdust and wood logs in South China (Black type) and Japan (red type). *G. lucidum* contains 26–28% carbohydrate, 1.8% ash, 59% crude fiber, 3–5% crude fat, and 7–8% crude protein where as mushrooms contain 10% consists of 3–28% carbohydrate, 10–40% protein, 8–10% ash, 2–8% fat, 3–32% fiber, and some vitamins and minerals, with calcium, magnesium, potassium, phosphorus, selenium, zinc, iron, copper, terpenoids, steroids**,** phenols, nucleotides and their derivatives, glycoproteins, polysaccharides, peptidoglycans, and triterpenes (Wachtel et al., 2011) . *G. lucidum* in used in the treatment of cancer, diabetes, bacterial and viral infection, and liver injury.

Lanosterol   Ganoderic acid B

Lucidenic acid B   Ganoderiol A
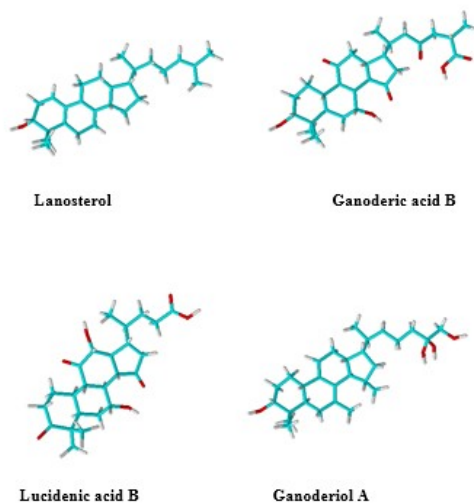
Figure 2: Compounds from *G. lucidum*

Two new lanostane-type triterpenoids, ganoderiol A (1) and ganoderiol B (2) together with known ganodermanontriol (3) and ganodermatriol (4). The compounds were identified as 5α-lanosta-7,9(11)-dien-3β,24,25,26-tetraol (1), 15α,26,27-trihydroxy-5α-lanosta-7,9(11),24-trien-3-one (2), 24,25,26-trihysdroxy-5α-lanosta-7,9(11)-dien-3-one (3) and 5α-lanosta-7,9(ll),24-trien-3β,26,27-triol (4), respectively are isolated from Ganoderma lucidum (Sato et al. 1986).

4. PATHOGENIC MICROBES ON HUMAN

Microbes and hosts play important interacticve mechanisms towards reciprocal relationship. Humans contain dynamic and complex community of microbes known as microbiome that processes a "metaorganism" towards pathogenic or symbiotic relationships to the host (Cho and Blaser, 2012,). Yeast and fungal proteins including (1,3)-β-glucan, high levels of fungal polysaccharides diffuse mycoses in the peripheral blood of patients that chronic fungal infections may increase risk. Composition of the human microbiome and exposure to pathogens changes with age, diet, lifestyle, and biological environment.

4.1 PATHOGENIC MICROBES IN EAR, NOSE, THROAT INFECTIONS

Staphylococcus spp, Streptococcus spp, Escherichia, Pseudomonas. are leading pathogens present on ear, nose and throat region, The common bacteria isolated from ear exudate, are *Staphylococcus aureus (45%), Pseudomonas aeruginosa (34%), Proteus mirabilis (16%)* and Other organisms, were isolated is less frequently. microorganisms can protected by extrinsic pathogenic threats (Agha and Al-Delaimi, 2021). When imbalance occurs, the organism is susceptible to a cause of infections. Synthetic drugs used to help the body fight against from fungal, bacterial, or viral burden (Table 3). They may produce undesirable consequences such as toxicity, adverse effects, and drug resistance. Therefore, research focused on developing novel formulations which is based on natural compounds for safer and more efficient alternatives. The microbiomes of the ear, nose, and throat, and pathogenic microorganisms, and related infections the mode of action of antimicrobial drugs that are used to treat those infections. A haemolytic *Streptococcus* infection. Respiratory tract infection (RTI) with followed by Staphylococcus aureus (14%), *Klebsiella pneumoniae* (11%), *Escherichia coli* (07%) and *Enterobacter cloacae* (07%) patients is considered as major health problem in Throat Infections in Lower Himalayan Region (Singh, 2020).

Table 3: Pathogenic microbes and infection caused from ENTmicrobes			
Human Part	**Pathogenic Microbes**	**Infection**	**References**
Ear	*Pseudomonas aeruginosa* *Aspergillus niger & Candida albicans.* *Streptococcus pneumoniae & Haemophilus influenzae & Moraxella catarrhalis*	Swelling, inflammation, irritation, and drainage of pus and/or blood, Permanently damage the ear canal, leading to hearing loss wimmer's ear.	*Keene et al., 2004.* *Ho et al., 2006*

Nose	*S. pneumoniae, Haemophilus influenzae, and Moraxella catarrhalis,* *S. aureus*	Colonize the nasal passages of healthy children. Colonization of the nasal passages is adults.	Liu et al., 2015.
Throat	*Firmicutes, Fusobacteria, Streptococcus , Neisseria, Gemella*	Pain and sensation of heat in the throat, fever, cough, congestion, flu-like symptoms, swollen lymph nodes	Hong-Li Gong et al.,2013

Staphylococcus aureus, *Pseudomonas aeruginosa*, *Proteus spp*. and *Klebsiella* spp. are leading pathogenic microbes in paediatric patients. Most of the isolates showed high resistance to some antibiotic like cephalosporins. (Abernethy *et al.,*2017). Infections remain the causes of disease, in upper respiratory infections causes hearing loss and disability of learning found in children. In developing countries, name chronic otitis-media causes serious ear infection. Otitis-media, now known to be the most common childhood infection, which leads annually death of over 50,000 children under 5 years, in nasal conditions case of nasal myiasis/maggots in the nose.

Some factors affect the diseases

1- Air pollution directly affect the nose and larynx causing irritation, inflammation and infections, ear is also affected and causing impairment of middle ear, when pollutant enter the mucosa of the tuba.

2- Environmental pollution increasing resistance of microorganisms associated with ENT infections.

3- Emotional stress often with significant impairment of the daily life affected patients. With increase in global population.

5. SYNTHESIS OF ETHANOLIC AgNO3 EXTRACT OF *GANODERMA LUCIDUM*

Ganoderma lucidum was reported with rich medicinal properties due to having good number of medicinal compounds (Al-Ansari et al., 2020). Fungal bioactive compounds show potential biomedical application for alternative therapy for alimentary infections. In the present decades, there is a much gaining attention to scientists in green synthesis of silver nanoparticles (AgNPs) from plant extracts due to abundance, environmental issue and the cost-effective solution. AgNPs can be characterized by techniques like UV-Vis spectrophotometer, X-ray diffraction (XRD), FTIR, energy-dispersive X-ray spectroscopy (EDX), SEM, and transmission electron microscopy (TEM) (Nguyen et al., 2021).

6. BIOCHEMICAL PROPERTIES OF *Ganoderma lucidum*

Biochemical properties of mushroom fruiting bodies are numerous, and higher Basidiomycetes mushrooms have been used in folk medicine throughout the world since ancient times. *Ganoderma lucidum* reportedly has anti-inflammatoryproperties. TLC analysis suggested that the active principles in vivo were triterpenoids. These results indicate that the triterpenoids fraction of *G. lucidum* might be a useful ingredient in the treatment of benign prostatic hyperplasia (Table 4).

Ganodermalucidum species is mostly using in the formulation of functional foods and as nutraceuticals. The fungi are recognized in modern and traditional medicine and pharmacology systems for the presence of biochemicalcompounds. The process ofglycosylation of proteins plays an important role in the occurrence of biochemicals within the fungi.

Table 4: Biochemicals from *G. lucidum*			
Extract	**Part**	**Biochemicals**	**Reference**
Ethanolic extracts	Mycelium	Polysaccharides, phenol, proteins	Saltarelli et al., 2009
Ethanol	Mycelium	Triterpenoids	Liu et al., 2007
Ethanolic extracts	Whole fungi	Flavonoids (quercetin, rutin, myricetin, and morin), protein, Phenols	Saltarelli, et al., 2015
Hexane, dichloromethane, ethyl acetate, and methanol	Fruit body	phenols, flavonoids and ascorbic acid	Kamra and Bhatt,2012
All	Mycelia and spores	400 different bioactive substances, including polysaccharides (Glucose, mannose, galactose, xylose, fucose and arabinose), triterpenoids, nucleotides, sterols, steroids, fatty acids, proteins/peptides and trace elements	Zeng et al., 2018

7. BIOLOGICAL PROPERTIES OF *Ganoderma lucidum*

7.1 Antioxidant activity

Ganoderma lucidum **is a** famous Chinese medicinal mushroom that is mostly cultivated procedurally, harvested seasonally and should be dried for preservation. Oxidative

metabolism in the body is essential that are present in foodstuffs for the survival of cells (Antolovich et al., 2002). Free radical scavenging properties by ascorbic acid have many health benefits in biological systems have many important bioactive compounds showing pivotal role in delaying oxidative rancidity (Table 5).

Table 5: *Antioxidant activity of G. lucidum*		
Extract	**Type**	**Reference**
Hot water extract	Antioxidative effect on lipid peroxidation and superoxide scavenging activity in mouse heart homogenate	Wong et al., 2004
Water- extract	Antioxidant activities by hydroxyl radical, reducing power, 2, 2-diphenyl-1-picryl-hydrazyl (DPPH) free radical and ferric-reducing antioxidant power tests.	Zeng et al., 2019
Ethanol	DPPH scavenging ability ABTS radicals scavenging activity	Lin et al., 2015

7.2 Antimicrobial properties

Most of the plant and mushrooms are showing medicinalproperties for thousands of years for the investigations into its mode of action as antimicrobial agents (Table 6). Antioxidant antibacterial, antifungal, insecticidal and antiviral properties have been investigated in several plants**.**

Table 6:Antimicrobial activity ofG. lucidum			
Extracts	**Microorganisms**	**Description**	**Reference**
Ethyl alcohol, methanol, acetone and distilled water.	*Escherichia coli (MTCC-443), Staphylococcus aureus (MTCC-737), Klebsiella pneumoniae (MTCC-2405), Bacillus subtilis (MTCC-1789). Salmonella typhi (MTCC-531) and Pseudomonas aeruginosa (MTCC-779)*	Good antimicrobial activity with ethanol and acetone extracts against most of the pathogens.	Quereshi, et al., 2010
Hexane, dichloromethane,	*Bacillus subtilis,*	Methanol and	Kamra and

ethyl acetate, and methanol	*Enterococcus faecalis, Listeria monocytogenes, Streptococcus mutans, Klebsiella pneumoniae, Proteus vulgaris, Salmonella typhimurium and Pseudomonas aeruginosa*	aqueous extract exert strong antimicrobial activity.	Bhatt,2012
Methanol (MeOH) and Dichloromethane (DCM)	*Staphylococcus aureus ATCC 29213, Staphylococcus aureus MRSA ATCC 43300, Enterococcus faecalis ATCC 29212, Escherichia coli ATCC 25922, Pseudomonas aeruginosa ATCC 27853, Klebsiella pneumoniae ATCC 700603, Acinetobacter baumannii ATCC 19606, Candida albicans ATCC 10231, Candida krusei ATCC 34135 ATCC 13803, and Candida glabrata ATCC 90030*	Ntural antimicrobial agent against all tested microorganisms.	Celal, 2019

7.3 X-ray film method

Gelatin is a natural polymer that is non toxic, biodegradable, and biocompatible. Bio-Silver nanoparticles synthesized from *Ganoderma lucidum* have lot of properties; Anti-diabetic, Anti-microbial, anti-inflammatory and wound healing properties (Sneha, 2015) . Drug that are in nano size help in easy targeted and transferred to specific site. Gelatine and bio-silver nanoparticles synthesized from *Ganoderma lucidum* are anticipated the combination effect

with nanosized drug (Bio-Silver nanoparticles) compounds results may serve as promising film forming matrix for transdermal delivery of drugs into skin.

8. MOLECULAR MECHANISM FOR TRETMENT OF MICROBS IN EAR, NOSE, THROAT INFECTIONS

Amoxicillin is one of the most commonly used antibiotics that is effective against *Streptococcus* species, *Listeria monocytogenes, Enterococcus spp., Haemophilus influenzae*, some *Escherichia coli, Actinomyces spp., Clostridium species, Salmonella spp., Shigella spp., and Corynebacteria* species. Amoxicillin is in the class of beta-lactam antimicrobials that bind to penicillin-binding proteins that inhibit process of transpeptidation (Akhavan et al., 2021). human microbiome is a complex community with different microbial composition, function and microbial niche Specificity present in different human body sites like gastrointestinal tract, skin, and airways (Ear, Nose, Throat) (Kumpitsch et al., 2019). The oral microbiome is commonly associated with systemic diseases that can extend to surrounding tissues, spread and overgrow in the oral mucosae. Many natural compounds from plants, animals and microbes show antifungal, antibacterial, antiviral, and antibiofilm activities. Studies reveled that combining silver nanoparticles with natural extracts have also shown better promising results (Adelina-Gabriela and Alexandru, 2021).

Microbial infections of the ear, nose, and throat are common problems that are encountered by human beings practicing with treatment with antimicrobial drugs are challenging to scientists due to mechanism of resistance developed by the microorganisms (Muhammad et al., 2021). Mechanisms like disruption of the protective extrapolymer matrix, interruption of quorum sensing, inhibition of related genes, mechanical debridement of the biofilm-bearing tissues and macrolides (clarithromycin and erythromycin) are some effective prevention and management strategies in formation of Biofilms during chronic and common antibiotic-resistant during ear, nose, and throat (ENT) infections (Petros et al., 2007).

9. IN SILICO STUDIES OF EXTRACT OF *Ganoderma lucidum*

Medicinal fungus *Ganoderma lucidum* Karst. (Ganodermataceae) showing screening using 529 pharmacophore models and 279 compounds has been developed by Ulrike et al., 2015. Systematic isolation, and in silico pharmacological prediction has been conducted to discover potential anti-cancer activity from G. lucidum. Compounds like 3β,7β,15β-trihydroxy-11,23-dioxo-lanost-8,16-dien-26-oic acid, 3β,7β,15β-trihydroxy-11,23-dioxo-lanost-8,16-dien-26-oic acid methyl ester, (4E,8E)-N-D-2′-hydroxypalmitoyl-l-O-β-D-glucopyranosyl-9-methyl-4,8-spingodienine, ganotropic acid, 3β,7β,15α,28-tetrahydroxy-11,23-dioxo-lanost-8,16-dien-26-oic acid, (3β,7α)-dihydroxy-lanosta-8,24-dien- 11-one, 26-nor-11,23-dioxo-5α-lanost-8-en-3β,7β,15α,25-tetrol and stigmasta-7,22-dien-3β,5α,6α-triol were first reported from the genus Ganodema. The research on extraction, isolation, pharmacological prediction, and protein interaction network (PIN) analysis might be useful to predict pharmacological activities rapidly and discovery of novel compounds (Shao et al., 2016).

10. CONCLUSION

Most of the plant and mushrooms are showing medicinalproperties for thousands of years for the investigations into its mode of action as antimicrobial agents. Antioxidant antibacterial, antifungal, insecticidal and antiviral properties have been investigated in several plants and microbes. There is a much gaining attention to scientists in green synthesis of silver nanoparticles (AgNPs) from plant extracts due to abundance, environmental issue and the cost-effective solution.

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A FRAMEWORK FOR THE THYROID DISEASE PREDICTION USING MACHINE LEARNING ALGORITHMS

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Thyroid disease is one altogether the foremost common human diseases within the globe and affects somebody's health very badly. Thyroid disease is a disease in which the body does not secrete or supply the required amount of hormones. Our thyroid gland produces hormone, which regulates many functions in your body, including how briskly you burn calories and your heart rate. In thyroid disease, hormones are made in excessive or insufficient amounts. Depending on how high your hormone levels are, you may feel uncomfortable or tired, or else you will twist or gain weight. Women are more likely than men to develop thyroid disease, especially after pregnancy and after menstruation.

In this paper classify healthy people and people with thyroid disease; machine learning is reliable and efficient. In the proposed study, we developed a machine-learning-based system for thyroid disease prediction using the thyroid disease datasets We have easily identified and classified people with thyroid disease out of healthy people using three popular machine learning algorithms, for this we have taken help of feature selection method, evaluation metrics like classification accuracy. This research work has demonstrated a disease prediction system developed using machine learning algorithms based such as Decision Tree Classifier, Logistic Regression Classifier and Naïve Bayes.

Keywords: Prediction, Logistic Regression, Accuracy, Thyroid, Hybrid.

1. INTRODUCTION

Health care refers to the availability of health care services to individuals and communities. By that definition, health care services aren't nearly doctors, nurses, and other advanced physicians who often come to mind when people think about health care services. Managers, therapists, paramedics and technicians all have an area in helping people stay healthy. The healthcare industry has long been a receptive and highly beneficiary of technological advances. Nowadays, machine learning (a subset of artificial intelligence) plays a significant role in many health-related areas, including the event of recent medical procedures, patient data management and records and therefore the treatment of chronic diseases. Machine learning has endless applications within the healthcare industry. Today, machine learning helps to plan hospital management procedures, map and treat infectious diseases and customize treatment.

1.1 Health Care Machine Learning-
Many health care opportunities are created because machine learning models have the flexibility to advanced predictive analysis. There are already existing models in machine learning which will predict chronic illnesses like heart disorders, diseases and intestinal diseases. There are several future styles of learning tools to predict non-communicable

diseases, namely adding more benefits to the health care sector. Researchers are working with machine learning technicians who will provide the foremost accurate prediction of a selected disease to a patient who will develop effective preventive measures.

1.2 Thyroid disease and Types-

The thyroid is a small gland within the neck that produces thyroid hormones. It can release more or less of those hormones. Hypothyroidism could be a condition during which the ductless gland is unable to supply enough thyroid hormones. These hormones regulate the body's metabolism and further affect the body's ability to use energy. Lack of the proper amount of thyroid hormones, normal body functions begin to say no and body image changes day by day (hello, mood swings, happiness, sadness, depression, constipation, cold, weight gain, muscle weakness, dry hair, thinning, weight loss heart rate). Hyperthyroidism could be a condition within which the ductless gland produces too many thyroid hormones. Symptoms of hyperthyroidism are anxiety, restlessness, inability to concentrate, increased appetite, difficulty sleeping, itching, hair loss, nausea and vomiting. A full case history and physical examination (free T4, T3Test, Cholesterol test, TSH test) is required. Blood and this study can help diagnose hyperthyroidism (where the thyroid produces an excessive amount of thyroid hormone) and hypothyroidism. internal secretion (TSH), produced by the pituitary, could be a routine biopsy to test the function of the ductless gland. deficient hormone production causes hypothyroidism, on the opposite hand excess hormone production causes hyperthyroidism.

2. REVIEW OF LITERATURE

In the review, I read many research papers associated with my topic. The following:

Yasir Iqbal Mir et al. (2020), has done research on Thyroid Disease Prediction Using Hybrid Machine Learning Techniques: An Framework Framework the most study focuses on three models of novel-based data collected from 1464 Indian patients. In these models, we compared the highest five ML algorithms within the first model, we achieved a awfully high accuracy of 98.56% by placing the bag on both frames. within the second model supported patient diagnosis we found a awfully high accuracy of 98.08 with SVM. within the third model, the best accuracy of 92.07% was expressed by the J48 separator in serological tests.

Sunila Godara et al. (2018) performed on the prediction of Thyroid Diseases Using Mechanical Learning Methods for logistic retrieval and SVM used for Thyroid prediction. These methods are compared on the idea of Precision, Recall, F measure, ROC, RMS Error and accuracy. This paper has shown that rather than SVM, systemic regression emerges because the best classification for Thyroid diagnosis because the number of classes increases. Comparison between Logistic regression and Support Vector Machine (SVM) on the premise of Precision, Recall, F measure, ROC and RMS. Postponement points give 96.84% accuracy and SVM gives 96.84% accuracy at 93.61%, so retrieval is healthier than Support Vector Machine on the premise of accuracy. Undoubtedly, SVM could be a way more process than the Logistic Regression of binary split. But within the event of a division of multiclass Logistic Regression surpasses SVM. Therefore, it may be concluded that SVM performance is deteriorating because the number of classes increases.

Ammulu K. et al. (2017), conducted a study within the "Thyroid Data Prediction using Data Classification Algorithm", a proposed paper that specialize in the random forest pathway wont to predict hypothyroidism by collecting data within the UCI database. Performance rating is calculated from the confusion matrix for accuracy. The test result's available within the Apply tool. the info mining process is employed within the hypothyroid database to seek out the great and bad conditions from the entire database. Database classification is employed for better treatment, deciding, diagnosis. during this paper, hypothyroid disorder is predicted employing a random forest approach from a knowledge mining process. The result's found within the weka tool itself when the accuracy, which is 70.519% when k = 10, 71.086% when k = 8, 71.160% where k = 6 and 71.162% when k = 3.When k is that the place of division.

U-IoniŃă et al. (2016), conducted a search project on "Predicting Thyroid Diseases Using data processing Methods", an oversized study specializing in differentiation models (Naïve Bayes, Decision Tree, MLP and RBF Network) within the thyroid data set to spot precisely thyroid dysfunction hyperthyroidism and hypothyroidism. the simplest classification model was the choice tree model for all the tests performed. the choice tree model offers 97.35% accuracy, which is beyond in other models.

3. METHODOLOGY

Methodology has a main part of any research. In my research first phase of the proposed work is based on input data. Data set used for experimental purpose. In Second phase we used feature selection and model evaluation for getting a batter result and in the last phase we checked the result by performance measurements by accuracy, Precision and Recall.
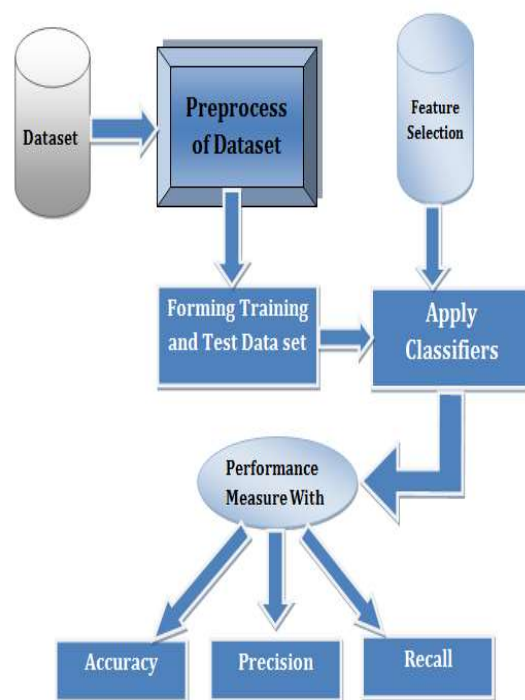
Figure 1: The framework of the proposed model

The proposed system consists of three parts, that are following:-

A. DATA PREPROCESSING: Under data preprocessing we do data cleaning, normalization etc.The raw data eliminates noise ratios, missing values, and inconsistencies that affect the results.

The data set description is as follows: - The data sets that we have used for experimental purpose are downloaded from UCI machine learning repository which was used for implementation with 23 independent attribute and 1 dependent attribute.

Thyroid Disease data set Attribute description

Table 1: Thyroid Disease data set Attribute description

S.NO.	Attribute Name	Value Type	S.NO.	Attribute Name	Value Type
1	Age	continuous,?.	13	goitre	f,t.
2	Sex	M,F,?.	14	TSH_measured	f,t.
3	on_thyroxine	f,t.	15	TSH- Thyroid Stimulating Hormone	continuous,?.
4	query_on_thyroxine	f,t.	16	T3_measured	f,t.
5	on_antithyroid_medication	f,t.	17	T3 - Total Triiodothyroxine	continuous,?.
6	thyroid_surgery	f,t.	18	TT4_measured	f,t.
7	query_hypothyroid	f,t.	19	TT4- Total Thyroxine	continuous,?.
8	query_hyperthyroid	f,t.	20	T4U_measured	f,t.
9	Pregnant	f,t.	21	T4U	continuous,?.
10	Sick	f,t.	22	FTI_measured	f,t.
11	Tumor	f,t.	23	FTI – Free Thyroxine Index	continuous,?.
12	Lithium	f,t.			

B. **FEATURE SELECTION**:

Feature selection is a key concept in machine learning that improves the performance of your model.The data features we use to train our machine learning models have a huge impact on the performance they achieve.

C. MODEL EVALUATION:-

Model evaluation is a process with the help of which we determine the quality of predictions of a system and to do so, we measure the performance of newly trained models on a new and independent dataset.This model compares label data with its own forecasts.

It has basically two types-

1) Cross- validation   2) Hold-out

Machine Learning based Algorithm's-

Naïve Bayes classifiers- The Naive Bayes dividers are a group of development algorithms that support Bayes 'Theorem. not a single algorithm but a family of algorithms in which they all share the same goal, which means that each of the components is independent of each other. The Naive Bayes separator is an example of a machine that normally performs a separating function. The crux of division is based on the Bayes' theoretical theory.

 Bayes Theorem:

$$P(A|B) = \frac{P(B|A)P(A)}{P(B)}$$

By using the Bayes theorem, we will see the possibility that A may have happened, because B did. Here, B is evidence and A is hypothesis. the belief held here is that the predictions / features are independent. The presence of 1 object does not affect the opposite. It is therefore called naïve.

For example, a fruit can be considered an apple if it is red, round, and about three inches in diameter. Whether these features depend on each other or on the existence of other factors, all these structures independently contribute to the possibility that the fruit is an apple and that is why it is known as 'Naive'.

The Naive Bayes model is easy to build and useful especially for very large data sets. In keeping with simplicity, the Naive Bayes are known for surpassing even the most advanced classification methods.

Decision Tree-The decision tree algorithm comes under supervised algorithms under machine learning. It is used for both a classification problem and a regression problem. The feature of this algorithm is that it creates a model that predicts the value of a target variable, and for that the decision tree uses the tree structure to solve the problem. It consists of nodes at several levels from which The leaf node corresponds to a class label and the attributes are represented on the internal node.

Logistic Regression-Logistic regression is mostly used for two-class classification. It identifies the relation between the dependent and independent variables. It mostly to predict data using statistical methods. Here the resultant variable is also a categorical value. The basic functional equation for logistic regression using sigmoid function is

$$a=1/1+e-b \qquad (1)$$

Where b is the dependent variable. logistic regression follows Bernoulli Distribution.

There are three types of logistic regression, that are-
4. Binary Logistic Regression,
5. Multinomial Logistic Regression,
6. Ordinal Logistic Regression.

4. RESULT

The thyroid data set includes health-related characteristics such as age, sex, and test, etc. The results displayed in the following table describe the accuracy of all three classification techniques for thyroid datasets for selected features, after measuring the performance of data obtained from both classifiers. Logistic Regression Classifiers provide best results compared to other two classifiers.

Table 2: Accuracy for Thyroid Dataset

Classifier	Accuracy
Naïve Bayes	76.2%
Decision Tree	93.7%
Logistic Regression	97.5%

5. CONCLUSION

This research presents a demonstration of different classifiers for thyroid disease prediction. I have used the Decision Tree, Nave Bayes and Logistic Regression classifiers. The results were compared and it was seen that the Logistic Regression classifiers is better than Decision Tree and Naive Bayes. Logistic Regression classifiers can be used to better predict thyroid disease. It has been observed that Naïve Bayes and Decision Tree do not provide more

accuracy of training data and test data. We can get even better results using other machine learning based algorithms.

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SYNTHESIS AND CORROSION INHIBITION MECHANISM INVESTIGATION OF A NOVEL NON-TOXIC AMINO ACID SCHIFF BASE ON MILD STEEL IN 1 M HCl

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A newly prepared amino acid Schiff base 2-((*E*)-((*E*)-2-hydrazone-1, 2-diphenylethylidene) amino)acetic acid (HDEAA) obtained from *(E)*-2-hydrazono-1,2-diphenylethannone and 2-Aminoacetic acid was investigated as good corrosion inhibitor on mild steel in 1M HCl. Electrochemical and weight loss methods were used to assess its corrosion inhibition efficiency. The inhibition efficiency of the novel inhibitor directly depends on its concentration and temperature, highest inhibition efficiency was obtained at higher concentration and lower temperature. Electrochemical impedance spectroscopy (EIS) studies revealed that increase in concentration of HDEAA increase the charge transfer resistance. Physicochemical forms of surface assimilations noticed for the inhibitor through N and O hetero atoms and pi-bonding electrons that obey Langmuir adsorption isotherm. SEM images indicated the formation of a protective micro layer on a metallic surface.

Keywords, Schiff's base, Mild steel, Acid Corrosion, EIS, Tafel polarization, SEM

1. INTRODUCTION

Mild steel is one of the widely used steels in industry because of its high mechanical strength, low cost, and ease of manufacture. It is very susceptible to corrosion when exposed to a strong acid solution. To increase the capacity of the industrial processes, mineral acids such as HCl, H_3PO_4, and H_2SO_4 etc. are used for industrial cleaning, acid descaling, oil well acidizing and acid pickling at regular intervals that severely corrode the base steel (Sıgırcık et al., 2017). Among all the mineral acids, hydrochloric acid is widely used due to its low consumption and faster cleaning (Singh et al., 2018).The use of organic inhibitors, which is gaining popularity, is a practical, efficient, and cost-effective way for preventing acid corrosion of industrial equipment. Most organic compounds containing hetero atoms (such as nitrogen, oxygen, and sulphur), conjugated multiple bonds, and aromatic ring work as excellent corrosion inhibitors for metal in acid solution (Kern et al., 2001). These organic inhibitors bind to the metal surface through co-ordinate covalent bond with their free electron pair and create a protective layer through physisorption, chemisorptions, or both mechanisms. Inhibitors block the active sites and increase the adsorption on the metal surface, thus retard the metal dissolution and expanding the life of the steel equipment (Hanza et al., 2016). Schiff base compounds (with the general formula $R_1R_2C=NR$) have hetero atoms and imine functional groups in their structure, thus logically support their use as an excellent corrosion inhibitor (Danaee et al., 2013).

Schiff base compounds, which are the condensation products of amines and carbonyl compounds, have proven to be effective corrosion inhibitors for a variety of metals in a variety of acidic environments due to their simple synthesis from relatively inexpensive raw materials and lack of toxicity to the environment (Akrout et al., 2007). In light of the above facts, the anti-corrosive properties of newly synthesized Schiff base namely 2-((*E*)-((*E*)-2-hydrazone-1, 2-diphenylethylidene) amino)acetic acid (abbreviated as HDEAA) against mild

steel in 1M hydrochloric acid were investigated in the present study by gravimetric, and electrochemical methods.

2. EXPERIMENTAL

2.1. Synthesis of inhibitor (HDEAA)

(E)-2-hydrazono-1,2-diphenylethannone (Benzil monohydrazine), and 2-Aminoacetic acid (Glycine) were procured from sigma-Aldrich and used as supplied.The Schiff base was obtained by the dehydration synthesis of *(E)*-2-hydrazono-1,2-diphenylethannone and 2-Aminoacetic acid in equimolar proportion in alcoholic medium. The reaction mix was refluxed for 3 hours at 60-70°C. The result was the formation of a whitish solid compound (Fig.1). It was washed and filtered with distilled ethanol many times before being dried on moisture less CaCl$_2$.The observed liquefaction point of the Schiff base was 144°C (% of yield = 80).

FTIR (υ)cm^{-1}:υ(–NH$_2$) = 3412, υ(C=N) = 1626, υ(COO$^-$) = 1596, υ_s (C-N) = 1334, υs (C-H)ar = 3058, υs (C=C)ar = 1536 (Fig. S1.).

^{1}H NMR (400 MHz, DMSO-d6) δ/ppm:7.5-7.9 (10H aromatic rings), 10.9 (1H, carboxylic–OH), 7.0 (2H, NH$_2$), 4.5 (2H, CH$_2$) (Fig. S2).

2-aminoacetic acid   (*E*)-2-hydrazono-1,2-diphenylethanone   2-((*E*)-((*E*)-2-hydrazono-1,2-diphenylethylidene)amino)acetic acid
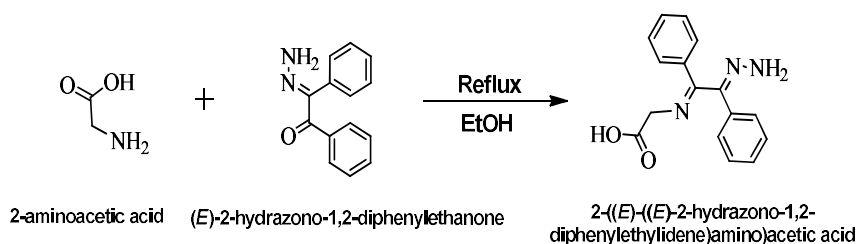
Figure 1: Synthesis of inhibitor (HDEAA)

2.2. Preparation of working electrode and inhibitor solution

Mild steel (0.13% C, 0.06% P, 0.07% S, 0.05% Mn, 0.27% Si, and remainder is Iron) have been utilized as the working electrode in the shape of rectangular rods. One molar hydrochloric acid solution formulated with distilled water. The 0.01M to 0.0001M concentration of HDEAA solution was prepared in the HCl medium. Electrochemical calculations were conducted in standard atmospheric state.

2.3. Weight loss calculation

The mild steel were cut in to a cuboids with dimension 1.5cm×1cm×1cm (L x B x H). It was abraded with different grades of silicon carbide sheets (150,300,400,600, and 1000) to achieve a mirror-like, spot-free surface. After that, the specimens were degreased with acetone and immersed for 8 hours at 300-330K in different concentrations of the researched HDEAA solutions formulated in 1M HCl. The samples were then taken out and cleaned with double purified water. At last, mild steel bits were weighed according to usual method.

2.4. Electrochemical computation

Electrochemical measurements were carried out in a three electrode assembled cell connected with electrochemical workstation by CHI – 600C. The working electrode was made by encapsulating mild steel cuboids with dimensions 1.5cm×1cm×1cm (L× B ×H) in an epoxy

resin (Araldite) with a surface area of 1cm×1cm left uncoated for electrochemical reaction. An insulated copper wire of length approximately15 cm is connected to the other end of the steel block by soldering. To remove pits and fissures from a 1cm^2 surface area of mild steel, emery sheets of grades 150,300, 400, 600, and 1000 are used to polish the surface and degrease it using acetone. The platinum electrode serves as an auxiliary electrode, while the silver/silver chloride serves as the reference electrode.

In a three electrodes assembly electrochemical cell, electrochemical impedance spectroscopy and Tafel polarization experiments were carried out. Before each calculation, the working metal electrode was immersed in an acid solution containing an inhibitor for 4 hours at 300K in order to establish a consistent value for the open-circuit potential (OCP). The impedance spectra were obtained at the stable OCP value between 1×10^5Hz and low frequency of 0.1Hz at amplitude of 0.005V after OCP was stabilized. This was followed by a Tafel polarization analysis, with Tafel curves recorded at a scanning speed of 0.01V/s in the applied potential of -0.2 to -0.8 V.

2.4. Surface morphology study by using SEM technique

The mild steel samples of dimension 1cm×1cm×1cm (L× B ×H) were used for surface morphology study by using SEM technique with HITACHISU 3500 scanning electron microscope. Scanning Electron Microscope image of plain steel samples i.e. the steel samples prior to dipping the acid or inhibitor solution, was recorded. Other images were recorded after dipping in 1M HCl in the absence and presence of inhibitors.

3. RESULT AND DISCUSSION

3.1. Weight loss Measurement

The most basic and simplest technique to explore the efficiency of an inhibitor (newly synthesized Schiff base against corrosion in acid solution can be achieved by the weight loss method (WLM). Corrosion protection efficiency and surface coverage (θ) of the complexes can be calculated by using the following equations (Daoud et al., 2015).

$$\eta_{WLM}(\%) \quad = \frac{C.R._{acid} - C.R._{in.}}{C.R._{acid}} \times 100 \qquad (1)$$

Where,η_{WLM} = Inhibition efficiency (I.E) of the inhibitors in weight loss measurement and
C.R. = Corrosion rate of acid or inhibitor as expressed in the following equation

$$\text{Corrosion Rate} = \frac{W_F - W_I}{A \times t} \qquad (2)$$

Where, W_F= Mass of the mild steel after eight hours (g)
W_I = Mass of the mild steel before immersion (g)
A= Surface area of the steel sample (cm^2)
t = Immersion period (8h)

$$\text{Surface coverage } (\theta) = \frac{C.R._{acid} - C.R._{inh.}}{C.R._{acid}} \qquad (3)$$

The result obtained from gravimetric experiment for blank acid and with inhibitor for three different concentrations at four different temperatures presented in the Table 1.

Effect of concentration of inhibitor
It was observed from the above result that the corrosion inhibition efficiency increased and corrosion rate (C.R.) decreased as the increase in concentration of inhibitor. The inhibitor

shows the maximum inhibition efficiency at $1x10^{-2}$ M concentration. This was due to sufficient adhering of inhibitor molecules on the mild steel surface.

Effect of Temperature

The inhibition efficiency of the complexes has also been found to be decreasing with increasing in temperature. This may be due to desorption of inhibitor molecules from the surface of mild steel occurred at higher temperature.

Table 1: Weight loss results of mild steel in 1M HCl and containing the inhibitor at different concentration at various temperatures

Inhibitor	Temp.	Conc. (M)	C.R. (mg cm^{-2}h^{-1})	Surface Coverage (θ)	I.E ($\eta_{WLM}\%$)
HDEAA	300	$1x10^{-2}$	0.98	0.8787	87.87
		$1x10^{-3}$	1.11	0.8626	86.26
		$1x10^{-4}$	1.72	0.7871	78.71
		Blank	8.08	-	-
	310	$1x10^{-2}$	2.09	0.8293	82.93
		$1x10^{-3}$	2.32	0.8106	81.06
		$1x10^{-4}$	2.82	0.7698	76.98
		Blank	12.25	-	-
	320	$1x10^{-2}$	3.45	0.7724	77.24
		$1x10^{-3}$	3.82	0.7480	74.80
		$1x10^{-4}$	4.14	0.7269	72.69
		Blank	15.16	-	-
	330	$1x10^{-2}$	4.66	0.7557	75.57
		$1x10^{-3}$	5.04	0.7358	73.58
		$1x10^{-4}$	6.32	0.6687	66.87
		Blank	19.08	-	-

3.2. Electrochemical methods

Tafel polarization studies

Anodic and cathodic polarization curves for mild steel in 1M HCl obtained with or without inhibitor. The Tafel curves were shown in the Figure 2. Table 2 lists all of the corrosion variables, including corrosion potential (E_{corr}), corrosion current density (I_{corr}), cathodic and anodic Tafel slopes (β_c and β_a) derived from the Tafel curve, as well as corresponding surface coverage (θ) and inhibition efficiency ($\eta_{TPS}\%$) at various concentrations at 300K. The magnitude of θ and $\eta_{TPS}\%$ was calculated as follows (Khaled, 2008):

$$\theta = \frac{I_{corr} - I'_{corr}}{I_{corr}} \qquad (4)$$

$$\eta_{TPS}\% = \frac{I_{corr} - I'_{corr}}{I_{corr}} \times 100 \qquad (5)$$

Where I_{corr} is the corrosion current density of blank acid and I'_{corr} the corrosion current density with inhibitor.

The decrease in I_{corr} with the increasing in concentration exhibited the efficiency of the additive Schiff base compound as a good corrosion inhibitor and reaching a highest efficiency at 1×10^{-2}M. It was observed from the result of polarization studies that no systematic variation of the E_{corr} obtained with the addition of the inhibitor to the acid solution. The noticed variation in E_{corr} was less than the ±85 mV and hence the newly synthesized Schiff base may not be categorized as cathodic or anodic inhibitors (Singh et al., 2016).Further, reducing in anodic and cathodic current densities at given applied potential indicated that amino acid Schiff base prevented the metal dissolution as well as the hydrogen evolution. Hence, the newly synthesized inhibitor treated as mixed inhibitors.

Table 2: Corrosion variables for 1M HCl and with the inhibitor at different concentrations at 300K							
Inhibitor	Conc. (M)	(-) E_{corr} (mV)	β_{anodic} (mV/dec)	$\beta_{cathodic}$ (mV/dec)	I_{corr} (mA/cm^2)	Surface Coverage(θ)	I.E.(η_{TPS}%)
HDEAA	1×10^{-2}	558	212	184	0.1759	0.8866	88.66
	1×10^{-3}	559	190	199	0.2402	0.8400	84.00
	1×10^{-4}	495	201	204	0.3351	0.7840	78.40
	Blank	506	287	285	1.552	-	-
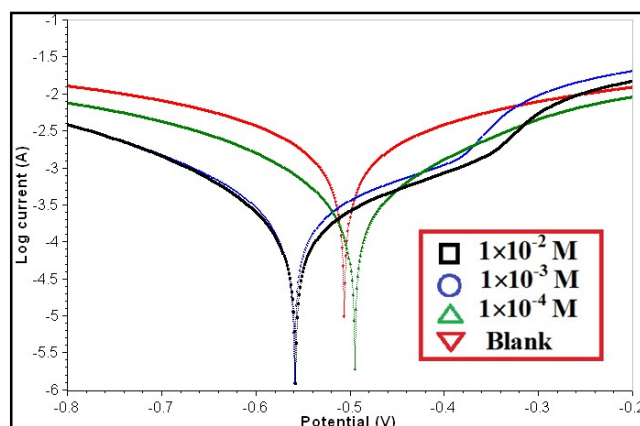
Figure 2: Tafel curves for 1M HCl and containing the inhibitor at different concentration at 300K

Electrochemical impedance spectroscopic studies

To get further insights on corrosion inhibition activity of amino acid Schiff base at mild steel and acid solution interface, EIS experiment was carried out with and without inhibitor at various concentrations at 300K to obtain Nyqust plots (Fig.3). The equivalent circuit (Fig.4.b) and fitting of impedance data (Fig.4.a) with the data of its corresponding circuit can be used to interpret EIS results. The important EIS parameters such as charge transfer resistance R_{ct} and electrochemical double layer capacitance C_{dl} was obtained by the help of the following relation:

$$R_{ct} = Z'_{re}(\text{medium frequency})- Z''_{re}(\text{ increased frequency}) \qquad (6)$$

$$C_{dl} = \frac{1}{2\pi f_{max}} \frac{1}{R_{ct}}$$ (7)

Where, f_{max} is the frequency at which the imaginary component of the impedance has the maximum amplitude.

With the aid of quantities of R_{ct} as per the equation (8), the inhibition efficiency $\eta\%$ was calculated.

$$\eta_{EIS}\% = \frac{R'_{ct} - R_{ct}}{R'_{ct}} \times 100$$ (8)

Where, R'_{ct} and R_{ct} are magnitude of charge transport resistance of inclusion and exclusion of inhibitor respectively.

It was observed that each concentration, the impedance spectra shows a single capacitive loop, which suggests that the charge transfer takes place at electrode\solution interface. When the concentration of the inhibitors decreases, the radius of semicircles of the Nyquist plots decreases. This indicates that the rate of corrosion increases with same trend of concentration. It was observed from the Table 3 that the double layer capacitance value (C_{dl}) decreases and charge transfer resistance value increases as concentration increases. This decrease in double layer capacitance value can be attributed to increase in thickness of electronic double layer (Amin et al., 2010). The increase in charge transfer resistance value (R_{ct}) is due to the formation of protective layer on the metal/solution interface (Lebrin et al.,2007). These findings suggests that the amino acid based Schiff base functioning by adsorption at metal surface thereby causing the decrease in C_{dl} values and increase in R_{ct} values. The highest inhibition efficiency were observed at 1×10^{-2}M concentration.

Table 3: EIS parameters for 1M HCl and different concentrations of the inhibitor in acid at 300K					
Inhibitor	Conc. (M)	R_{ct} (Ω/cm^2)	C_{dl} (μF/cm^2)	Surface Coverage (θ)	I.E ($\eta_{EIS}\%$)
HDEAA	1×10^{-2}	115.20	510	0.8578	85.78
	1×10^{-3}	85.10	1380	0.8075	80.75
	1×10^{-4}	61.13	1420	0.7320	73.20
	Blank	16.38	2142	-	-
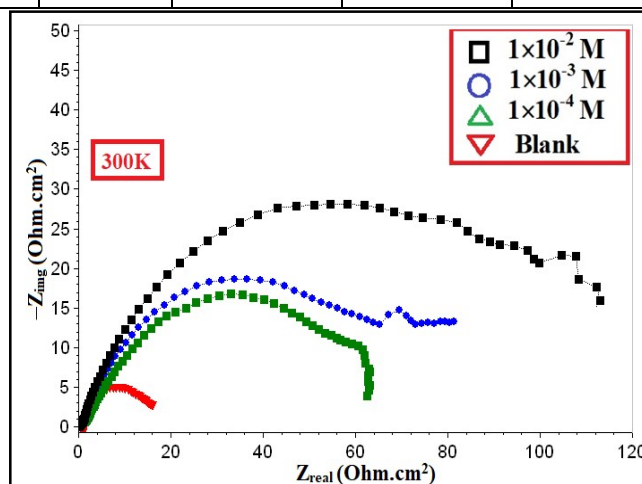
Figure 3: Nyqust plots for 1M HCl and containing the inhibitor at different concentration at 300K
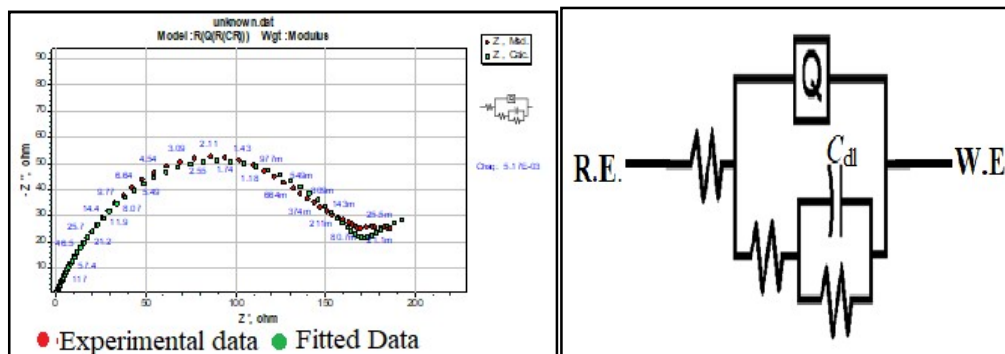
Figure 4: (a).Fittingof Experimental Data (b). Equivalent Circuit Corresponding to Experimental Data

3.3 Adsorption isotherm studies

The efficiency of the inhibitor to protect acid corrosion of metal mainly due to adsorption of the inhibitor molecule on steel surface and the extent of corrosion protection is dependent on the extent of surface coverage. The inhibitor molecule's contact with metal surface might take the form of physical adsorption or chemical adsorption or both. The inhibitor's adsorption is influenced by various parameters, including its chemical structure, charge, and the composition of the mild steel (Abdullach, 2002)

. Various isotherms, including, Frumkin, Freundlich, and Temkin isotherms, were tried to suit these values. The Langmuir adsorption isotherm is well supported by all of the experimental data. The best match was found using the Langmuir adsorption isotherm (Fig. 5). According to the Langmuir isotherm, the degree of surface coverage (θ) is related to the inhibitor's concentration as in equation (9):

$$\frac{C_{In}}{\theta} = \frac{1}{K_{Ad}} + C_{In} \qquad (9)$$

Where C_{In} stands for inhibitor concentration, K_{Ad} stands for constant of adsorption, and θindicates the percentage of the whole surface enveloped by the HDEAA inhibitor. The C_{In}/θ vs. C_{In} plot produced a straight line with a slope of one and a regression coefficient (R^2) of one (Fig. 5). The K_{Ad} was calculated using the intercept of the isotherm, which was determined to be 24.631×10^3in this case. This high K_{Ad} value implies that inhibitor molecules have a substantial adsorption on the metal surface (Mernari et al., 1998).
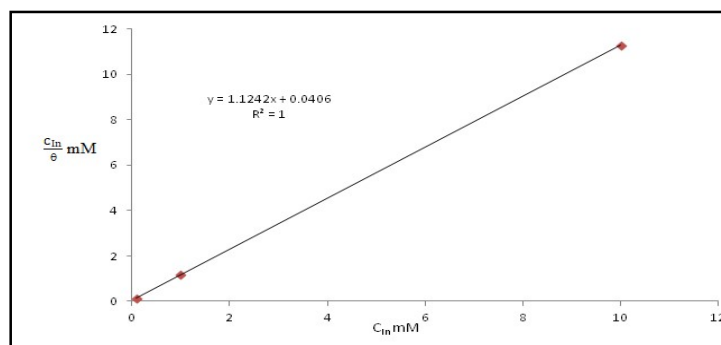
Figure 5: Langmuir plot of HDEAA on mild steel at 300 K in 1 M HCl.

The free energy of adsorption (ΔG_{ad}^o)of HDEAA on a steel surface is computed using the following formula (Verma et al., 2015) :

$$\Delta G_{ad}^o = -RT \ln (55.5K_{ad}) \qquad (10)$$

The calculated value of ΔG_{ad}^o was 35.238 kJ mol^{-1}. The inclusion of Schiff bases raises the free energy values significantly. Inhibitors adsorb strongly on the mild steel surface which causes iron dissolution retards significantly, as seen by these findings. The negative sign denotes that the adsorption phenomenon is spontaneous and that the molecules are adsorbing efficiently. This ΔG_{ad}^o value was found to be in the range of 20-40 kJ mol $^{-1}$ in the present investigations, indicating that the inhibitor is mixed type with a preference for chemical adsorption (Ahamad et al., 2010)

3.4 SEM   investigation

The impact of the inhibitor on the surface morphology of mild steel was investigated using a scanning electron microscope (SEM). The polished mild steel sample prior to immersions in acid or acid containing inhibitor shown in Figure 6(a). Figure 6(b) shows a SEM picture of the mild steel specimens' surface after 8 hours of immersion in 1M HCl solution with no additions of inhibitor. In the absence of inhibitor, the surface was severely damaged, as seen by the micrograph. Images of the surface of mild steel specimens immersed for the same time span in 1.0 M HCl solution containing 1×10^{-2}M of HDEAA shown in Fig. 6(c).
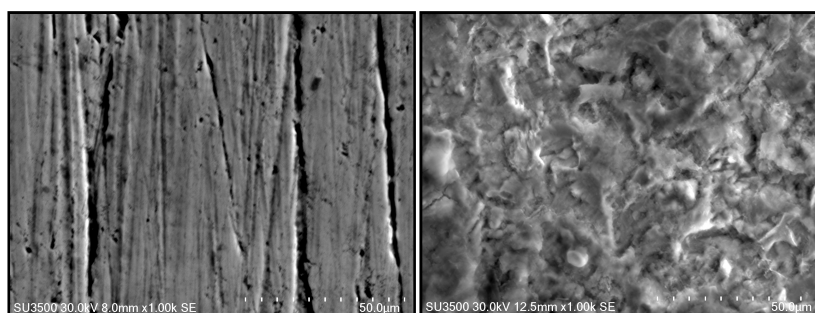
(a)   (b)
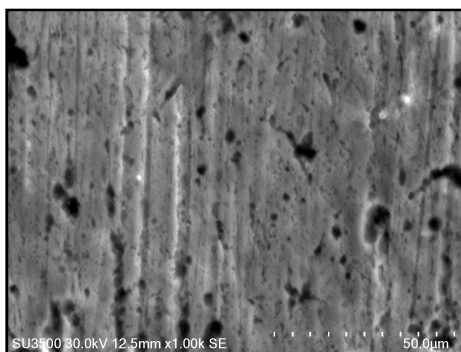
(c)

Figure 6: SEM image after dipping 8 hrs (a) before dipping (b) with no HDEAA and (c) with HDEAA

When compared to the acid solution, the metal exterior seemed to be unwrinkled and with less dent. This result clearly demonstrated that HDEAA had a greater inhibitory effect, which might be due to the formation of a micro layer on the steel metal exterior. The layer on the steel metal's surface might be owing to efficient organic molecule adsorption via hetero atoms.

3.5 Inhibition mechanism investigation

Organic inhibitors use an adsorption method to demonstrate their ability to block corrosive media. The adsorption process is affected by various factors, including the molecular configuration of the inhibitor, the type of the steel, and the charge sharing at the steel/electrolyte boundary. Based on the findings, a simple and effective inhibitory mechanism for the newly synthesized HDEAA molecule may be proposed. In 1M acid solution, the HDEAA be able to survive in protonating structure with equilibrium to its molecular structure, which can be described as:

$$HDEAA + HCl \rightleftharpoons [HDEAA\ H]^+ + Cl^-$$

On the positively charged carbon steel surface, the chloride ions were trapped which provide an opposing charge to the solution boundary. The adsorption of $[HDEAA\ H]^+$ ions on the mild steel surface are promoted by this. The donor–accepter relations among the pi-electron clouds of the HDEAA and the empty d-orbital of the metal atom during chemisorptions may also be responsible for inhibitor molecule adsorption (Panda et al., 2021). There is another possibility for generating stable complexes between protonated molecule, $[HDEAA\ H]^+$, and the metallic cation generated over the steel surface due to chelation and the contribution of lone pair electrons of oxygen and nitrogen atoms. (Tang et al. 2010). According to the theoretical and experimental findings, HDEAA adsorption behavior may be due to both physisorption and chemisorptions.

4. CONCLUSION

In 1M HCl solution, the newly synthesized Schiff base was shown to be an effective mixed type corrosion inhibitor for the investigated metal. This corrosion-inhibiting ability was

entirely dependent on the concentration and chemical composition of the molecule. The effectiveness of inhibition increased significantly as the concentration increased, but decreased as the temperature increased. The adsorption characteristics of hetero oxygen atoms, nitrogen atoms, imines (>C=N-), and the pi-electron cloud of aromatic chains are responsible for HDEAA molecules' corrosion prevention on metal surfaces. Through a firmly combined physiochemical contact with the steel surface, the HDEAA obeyed the Langmuir adsorption isotherm in the current investigation. The SEM scans revealed an excellent surface exposure of HDEAA molecules over the steel surface.

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AUTOMATIC ALERT SYSTEM FOR OVER HEAD WATER TANK MANAGEMENT USING INTERNET OF THINGS

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Loss of water by means of overflow from overhead tank is a common scenario in day to day life. But this loss of fresh water is very valuable for this living world as ground water level is going on decreasing. The main cause of water overflow from overhead tanks is due to ignorance by the user or no awareness of overflow. By use of sensor technology and Internet of Thing (IoT) this problem of water loss can be solved by providing a speech alert, light blink alert and SMS alert to the user before overflow occur so that the pump can be switched off. Also when water level reduced below minimum level alert will be generated to switch on the pump. This technique will become efficient in domestic/institutional and commercial buildings for overhead water tank management.

Keywords: Overflow, Water saving, IoT, Arduino, Sensor, Alert system.

1. INTRODUCTION

One of the most important components is water because of which life exist on this earth. Water present in the form of liquid, solid and in food products. We use water for our day today activity like cooking, washing, drinking and cultivationetc. All these life activity required fresh water (Ground water, river water etc.). In recent age the availability of fresh water and their resources reduced in significant manner due to wastage of water by human being sin different formin everyday life **(Ramappa et al., 2014)**. The most common way of water loss is tankover flow and tap leakage in city areas. This makes a hugequantity of water loss due to ignorance and can be protected if develop an alert for this at individual level **(Worldbank.org, 2017) (Wescoat et al., 2014)**.

We are living in the age of Internet of Things (IoT), where it is possible to connect everything to internet and can controlremotely. In this paper we have developed an IoT based alertsystem which sends alert to the user regarding water level inoverhead water tank so that the user can switch on/off pump based on the need.On this context there exist technologies:

1. Sensor based electrical systems exist which automatically controls pump as per water level in water tank, but this system will be a bottle neck ifthere is leakage in pipe line or any tap left open sun knowingly for long time.
2. Android based application which control pump to lift water to the over head tank based on water level measurement in the tank by using sensors and mobile application. But the problem is that, user have to beat tentive regarding tankfull/empty condition by observing mobile application **(Shah et al., 2017)(Abou-Allaban et al., 2007)**.
3. Hence, this motivates to develop an automatic alert system which gives alert in the form of sound, light and SMS to usermobile to turn off/on the pump before water lost due to overflow.

4. The rest of the paper is organized as following. Section 3.1describes about the hardware components and 3.2 describes system prototype with circuit diagram.Section3.3 represents the operation of the prototype with flow chart. Section 3.4 shows the result in the form of graphs. Finally, conclusion and future works are discussed inSection4.

2. LITERATURE REVIEW

Arduino is an open source electronic platform having easy to use hardware and software combinations. It is easy to use for beginners as well as robust enough for advanced users to take the advantages as well. There are several digital and analogue pins in Arduino by using which it can read inputs like light on a sensor and turn it into an output like turning off a motor or automatically controlling the temperature of the Air conditioner. Due to its portable size, pocket friendly cost and flexibility it is most suitable for IOT based projects. In The previous research **(Rao et al., 2013)** Arduino mega was used to make a low cost, continuous water quality monitoring system. As water pollution is the primary key factor to declining ecological health in aqua system worldwide, the model was capable of measuring biologically relevant physiochemical parameters in freshwater like temperature, light intensity, electrical conductivity, pH, dissolved particles, dissolved oxygen , turbidity etc. . These parameters are kept in constant measurement and sudden change in any of them indicates water quality issues and if such happens then the model provides Alarm so that appropriate action can be taken on time.

This is the era of smart computing and is totally based on internet of things (IOT). These days IOT is playing a crucial role in transforming "traditional technology" from home to offices to "next generation computing". In smart farming IOT is used for monitoring the crop field with the help of several sensors such as humidity, temperature, light, soil moisture etc. In The previous research **(Nayyar et al., 2016)**AnandNayyar and Er. VikramPuri made a model by using Arduino Mega 2560, soil moisture sensor, esp8266 Wi-Fi module, DSI8B20 temperature sensor and bread board for the smart management of freshwater for precession irrigation which results in increasing crop yields as well as decreasing costs.
Temperature sensor is used to monitor plants that are harvested. If the temperature falls below the threshold value or rises above the threshold value then immediately it sends an alarm to the user.
The moisture sensor is used to maintain the current soil moisture. It helps in arranging the water supply efficiently and also helps in enhancing irrigation to achieve optimal plant growth. The ideal soil moisture level for farming in India varies between 62-100 depending upon the plant as well as location also. The result proven that the IOT based smart farming is highly efficient when compared with the conventional approach.

Bats are wonderful creatures, blind from the eyes but having vision sharper than humans. Ultrasonic sensing is the technique used by bats. They produce sound waves that hit object and get reflected back. Then the bat measure the distance of the object based on the time that elapses between the moment the sound wave is produced and the moment it is returned to the bat, in the same manner ultrasonic sensor works. In The previous research **(Latha et al., 2016)** N. Anju Latha, B. Rama Murthy, k. Bharat Kumar used ultrasonic sensor to measure the distance of the targeted object through the air using "non-contact" Technology. Ultrasonic sensor measures the distance without damage and easy to use. The signals received from the outer world is in analogue form, then it is digitally formatted and processed by the

microcontroller. The experimental results show that it provides continuous accurate data without any damage.

3. EXPERIENTIAL WORK

3.1 Hardware components

1) Arduino UNO: Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller and connect to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

2)Ultrasonic Sensor: ultrasonic sensor measures distance by using ultrasonic waves. The sensor head emits an ultrasonic wave and receives the wave reflected back from the target. Ultrasonic Sensor measures the distance to the target by measuring the time between the emission and reception.

3)GSM Module: SIM900A Modem is built with Dual Band GSM based SIM900A modem from SIMCOM. It works on frequencies 900MHz. SIM900A can search these two bands automatically. SIM900A is an ultra-compact and wireless module. The Modem is coming interface, which allows you connect PC as well as microcontroller with RS232 Chip (MAX232). It is suitable for SMS, Voice as well as DATA transfer application in M2M interface.

4)Speaker, LED: Speaker compatible for 5V for sound generation, Red and green LED for indication.

5)Water Tank: Water tub to store water.

6)Jumper wires.

3.2 System prototype
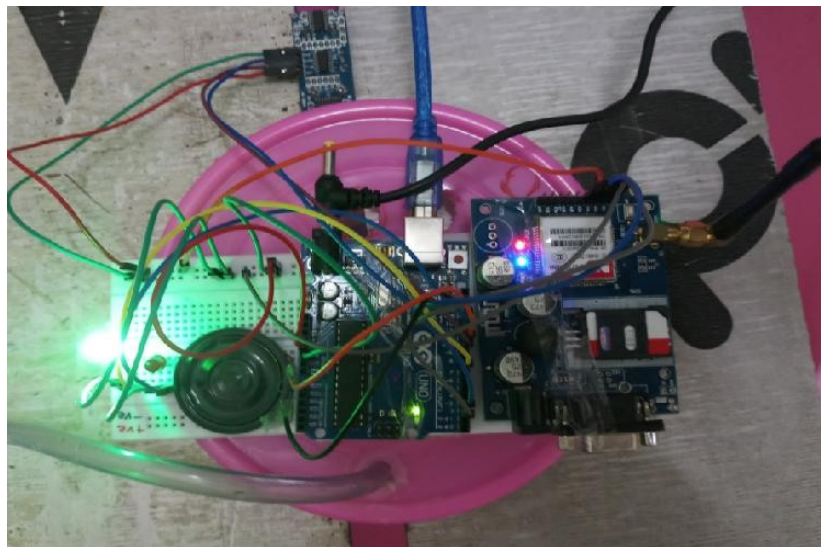
Figure 1: Prototype for automatic alert system for overhead tank overflow.

	Table 1: Alert type and Stage	
Sl No.	Condition of water level in tank	Alert generated
1	Water level at minimum level(12—14 cm) as per prototype	Sound: "Tank is empty, switch on the motor" LED Light: Green After10 second SMS: To user mobile number
2	Water level at tank top level(3—6 cm) as per prototype	Sound: "Tank is full, switch off the motor" LED Light: Red After10 second SMS: To user mobile number
3	Water level in between minimum and maximum levels	No Alert

The Arduino Uno provides its IDE for writing code to control devices connected as shown in fig.1. The hardware component listed in sub section-3.1 are connected to Arduino Uno via bread board as shown in circuit diagram in fig 2. The device operates as follows:

1)Ultrasonic sensor is used to measure the distance/level of water from its position by sending waves to water surface and measures the time it takes to return back. This calculates the distance of water as output from ultrasonic sensor passed to Arduino Uno.

2)The water tub is leveled with a scale so that water position can be measured. Minimum water level, maximum water level and overflow level is set and applied in the code block in Arduino IDE.

3)GSM module is set with Arduino to send SMS when it is triggered. It has a SIM card which allows the SMS to communicate in GSM network.

4)When water level is at minimum distance i.e. tank is going to empty an alert is generated in the form of voice sound (Recorded) "Tank is empty, switch on the motor", Green light on and SMS is send to users mobile.

5)If motor is on and water level is at maximum level, an alert is generated in the form of voice sound (Recorded) "Tank is full, switch off the motor", red light on and SMS is send to user mobile. This alert continues till user switch off the motor.

6) User gts time to switch off the motor, as gap between maximum water level and water overflow level permits some time. This is useful if alert generated in the form of sound when user is at home and SMS if at outside and nearby. The alert type and stage is shown in table1.
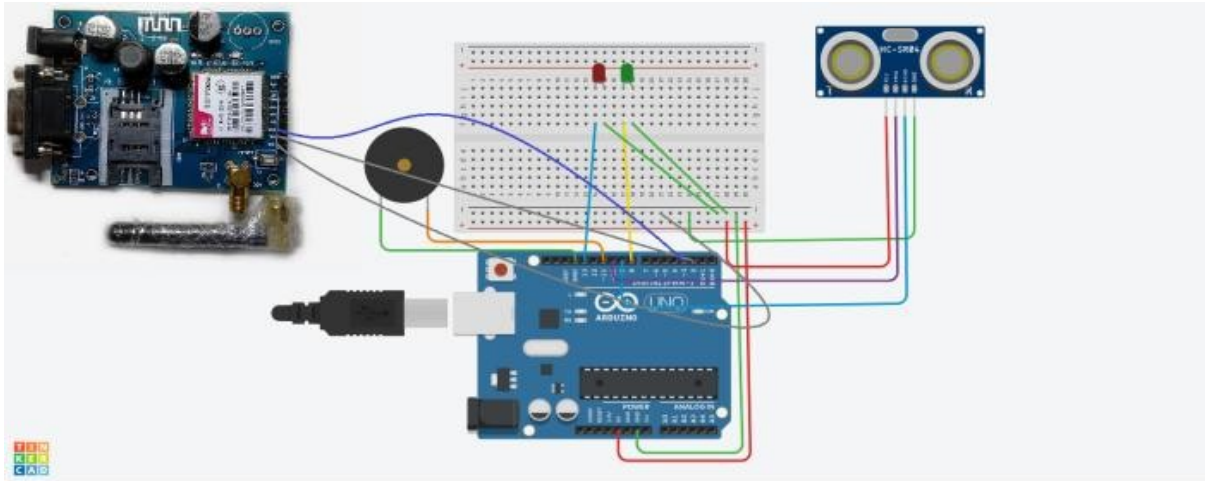
Figure 2: Circuit diagram for automatic alert system for overhead tank overflow.

3.3 Operation of the proposed model

The operation principle of the proposed model is presented in the form of flow chart in fig 3.
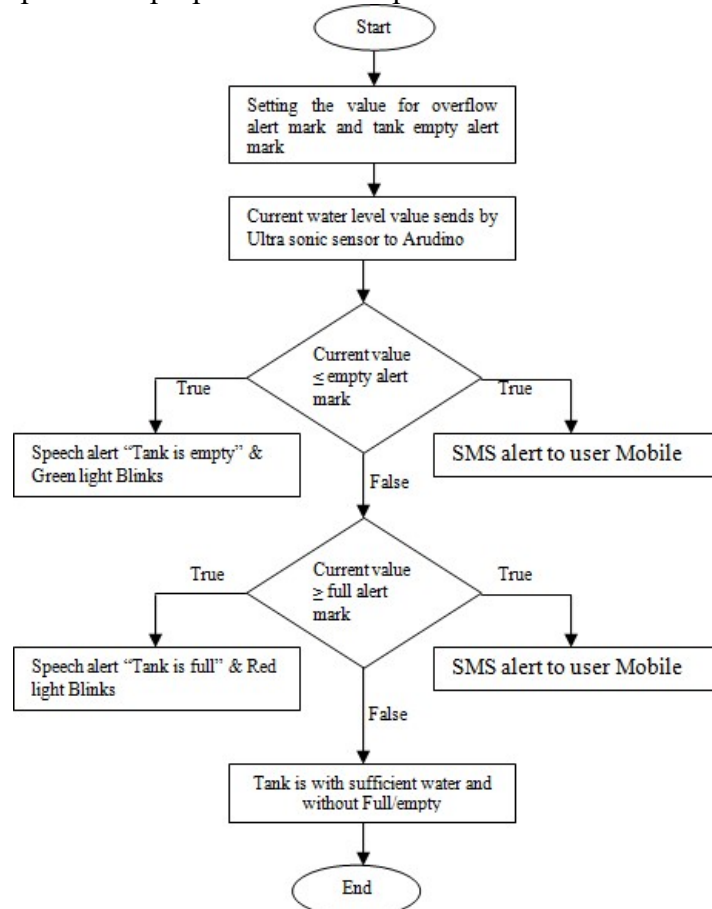
Figure 3: Flowchart showing the operation for overhead tank overflows.

The proposed model is tested with an empty tank and water is filled from outer source. When water level reached the empty alert mark alert generated in all forms for the defined range. Similarly when water level reaches full alert mark range alert generated in all forms.

3.4 Results

In this section the result is presented in the form of graph for the experiment conducted.
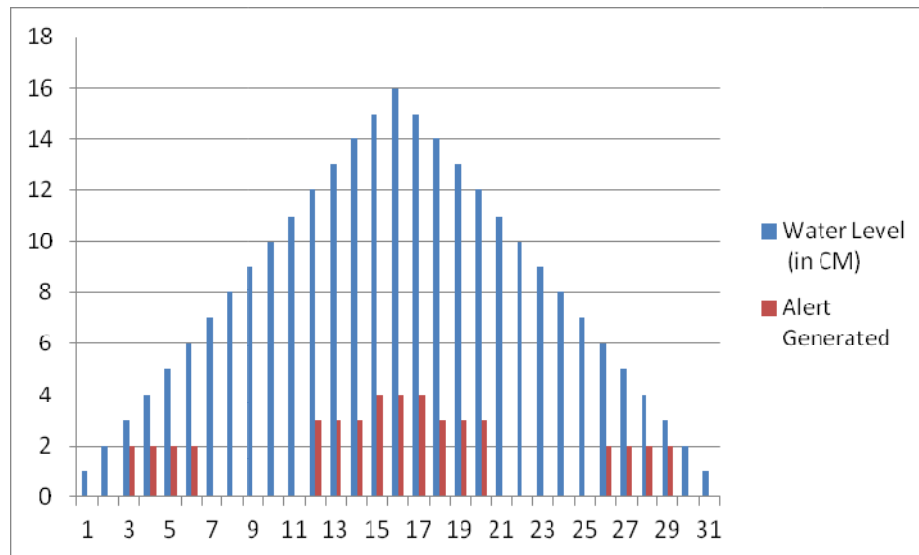
Figure 4: Water level Vs Alert generated.

The water level is measured by the ultra-sonic sensor is recorded in the unit of centimeter and the alert is denoted as: 4-for tank over flow, 3-for alert mark tank full, 2- for alert mark tank empty. The graph for water level Vs alert generated is presented in fig.4. Here, water level and alert generated is presented with respect to time at x axis.

4. CONCLUSION

Water is the most important basic need in every body's life but unfortunately due to human negligence huge quantity of water is getting west every day. We are living in the era of technology where we can apply technology to alert users before water is wasted due to overflow from tanks. In this paper we usedan IoT based technology to produce alert in the form of speech, light and SMS to make the user aware before the water get overflow from overhead tanks so that the user can switch off the pump and also produce an alert when water level reduces below minimum. In future we are going to embed machine learning into it so that the module can observe the behavior and daily water uses amount of the user according to the changes in season and the motor system will be fully automated and will provide water based on the users behavior and previous dataset.

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REGIONAL DISTRIBUTION OF RADIO-DIAGNOSTIC FACILITIES IN STATES & UTs OF INDIA-AN EMPIRICAL ANALYSIS (2021)

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The Purpose of this study was toanalyze the available Radiological Diagnostic facilities in all states and UTs of India and to explore whether these facilities were sufficient for their dependent populations in different regions of India.The secondary data based study concluded that besides the population size various other factors such as illiteracy, unemploymentetc. are responsible for inequity in services distribution and delivery leading to poor utilization.Use of PPP (Public Private Partnership) model,incentivize healthcare workers in remote areas and Tele Radiology, Social Health insurance found to improve the scenario &address this issue.

Keywords: RDC(Radio-Diagnostic Centre), Picture archiving and communication system(PACS), PPP, Tele-Radiology, AERB

1. INTRODUCTION

Diagnostic Radiology is a group of various modalities of medical imaging by using X-rays.Medical use of x-rays for diagnosis and treatment has proven to be immensely beneficial to the society at large. However, unsafe use of x-ray radiation has health risks associated with it and hence it is required that proper care is exercised throughout the life cycle of the equipment i.e., from manufacture, supply, installation, use, maintenance, servicing and ultimately decommissioning.

With so many horrific diseases plaguing the world, it is important to have a good disease management plan. Radiology plays a huge role in disease management by giving physicians more options, tools, and techniques for detection and treatment. Diagnostic imaging allows for detailed information about structural or disease-related changes. With the ability to diagnose during the early stages, patients may be saved. Without radiology, this may not be possible.

As per the current scenario, radiology has emerged as one of the key elements among the diagnostic tools in the medical industry. It not only aids in observing the effect of the treatments but also in anticipating the results.The role of radiology is paramount in the healthcare sector, coupled with a wide range of tools and techniques that are used for diagnosing and recommending the best treatment to the patients. It enables the doctors to get a comprehensive overview of the disease that the patient is suffering.

2. REVIEW OF LITERATURE

Margulis AR, Sunshine JH. (2000)in his paper "Radiology at the turn of the millennium" discussed the various areas where progress has occurred like Picture archiving and

communication system(PACS) and problem might arise costliness of radiology services, requirement of radiologist etc.

Krestin Gabriel P.(2009)mentioned in his paper "Maintaining Identity in a Changing Environment: The Professional and Organizational Future of Radiology" that limited no. of Radiologist and easy job options for them ,radiologists are resistant to adopt technology ,while as because of advanced technology features it is very much convenient for clinicians to interprets the pictures & films. Selfreferral is also in imaging procedures is often economically motivated, leads to overuse of services, and creates unjustified health care expenses.

BarikDebasis and ThoratAmit,(2015)discussed the disparity in access to Healthcare services in his paper "Issues of Unequal Access to Public Health in India". He has also emphasized that increased coverage of health insurance can add an extra protection from the health risks and early detection of disease conditions may help in achieving good health and lower the treatment cost.

Shri ashwini kumar choubeythe minister of state in the ministry of health and family welfare in 2018 explained the availability of clinicians in India and also told if we add Allopathic and as well as other streams doctor ,doctor population ratio 1: 902 , is better than recommended WHO patient doctor's ratio 1:1000.

3. RESEARCH METHODOLOGY

This research was secondary data based descriptive research and available data was analyzed to find inequity in distribution of diagnostic radiology services.

3.1 Sources of data- Data was taken from secondary sources likeAERB (Atomic Energy Regulatory Board India) website accessed in 2021 and demographic data taken from census of India, Wikipedia etc. Data was related to 28 states and 08 Union territories of India.

Hypothesis was formulated to know the interrelationship between variables.

Null hypothesis (Ho) --There is no relationship between population of the States &UTs and available Radiological Diagnostic facilities.

Alternate Hypothesis: There is relationship between population of the States & UTs and available Radiological Diagnostic facilities.

3.2 Tabulation and Analysis of Data

Table 1.No. of Radiological Diagnostic stakeholder in States & UTs on 28 Oct 2021

S.No.	STATE/UT	REGION	STATEHOOD	POPULATION	AREA	DIAGNISTIC RADIOLOGY STAKEHOLDER
1	Andhra Pradesh	Southern	01-Nov-56	4,95,06,799	1,60,205	3310
2	Arunachal Pradesh	North-Eastern	20-Feb-87	13,83,727	83,743	28
3	Assam	North-Eastern	26-Jan-50	3,12,05,576	78,550	978
4	Bihar	Eastern	26-Jan-50	10,40,99,452	94,163	1763
5	Chhattisgarh	Central	01-Nov-00	2,55,45,198	1,35,194	2118
6	Goa	Western	30-May-87	14,58,545	3,702	310
7	Gujarat	Western	01-May-60	6,04,39,692	1,96,024	7173
8	Haryana	Northern	01-Nov-66	2,53,51,462	44,212	3774
9	Himachal Pradesh	Northern	25-Jan-71	68,64,602	55,673	690
10	Jharkhand	Eastern	15-Nov-00	3,29,88,134	74,677	904
11	Karnataka	Southern	01-Nov-56	6,10,95,297	1,91,791	7265
12	Kerala	Southern	01-Nov-56	3,34,06,061	38,863	5416
13	Madhya Pradesh	Central	26-Jan-50	7,26,26,809	3,08,252	3545
14	Maharashtra	Western	01-May-60	11,23,74,333	3,07,713	14436
15	Manipur	North-Eastern	21-Jan-72	28,55,794	22,347	111
16	Meghalaya	North-Eastern	21-Jan-72	29,66,889	22,720	106
17	Mizoram	North-Eastern	20-Feb-87	10,97,206	21,081	158
18	Nagaland	North-Eastern	01-Dec-63	19,78,502	16,579	56
19	Odisha	Eastern	26-Jan-50	4,19,74,218	1,55,820	1277
20	Punjab	Northern	01-Nov-66	2,77,43,338	50,362	3581
21	Rajasthan	Northern	26-Jan-50	6,85,48,437	3,42,269	5234
22	Sikkim	North-Eastern	16-May-75	6,10,577	7,096	57
23	Tamil Nadu	Southern	01-Nov-56	7,21,47,030	1,30,058	11070
24	Telangana	Southern	02-Jun-14	3,51,93,978	1,14,840	2949
25	Tripura	North-Eastern	21-Jan-72	36,73,917	10,492	91
26	Uttar	Central	26-Jan-50	19,98,12,341	2,43,28	6782

	Pradesh				6	
27	Uttarakhand	Central	09-Nov-00	1,00,86,292	53,483	1111
28	West Bengal	Eastern	26-Jan-50	9,12,76,115	88,752	5197
29	Dadra and Nagar Haveli and Daman and Diu	Western	26-Jan-20	5,86,956	603	37
30	Jammu and Kashmir	Northern	31-Oct-19	1,22,58,433	55,538	542
31	Ladakh	Northern	31-Oct-19	2,90,492	1,74,852	27
32	Chandigarh	Northern	01-Nov-66	10,55,450	114	277
33	Puducherry	Southern	16-Aug-62	12,47,953	492	390
34	Andaman and Nicobar Islands	Southern	01-Nov-56	3,80,581	8,249	14
35	Delhi	Northern	01-Nov-56	1,67,87,941	1,490	4404
36	Lakshadweep	Southern	01-Nov-56	64,473	32	1
	TOTAL			1,21,09,82,600		95182

3.3 Result

1. Kind of relationship that exists between the population and Radiological Diagnostic stakeholders by using scatter diagram
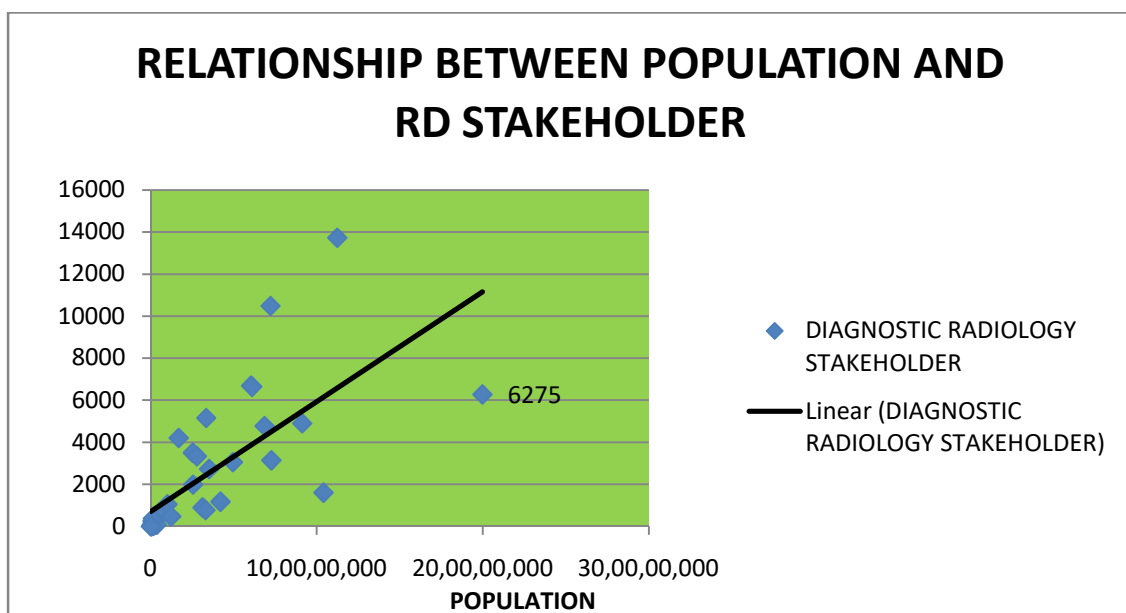

Figure1. Relationship Graph

Interpretation--Figure shows that there is a *positive relationship between population and no. of Radio-diagnostic stakeholders* as scatter along the line is small except few of them.The Pearson's Coefficient Correlation was found to be**0.7092 .As this value lies between** +0.25 to +0.75,we can interpret that there exists a **moderate correlation** between the two variables.

A correlation indicates that both the variables are related, but causal relationship can't be established by this method .The probability error can be used to check the reliability of Karl Pearson's coefficient

PE=**0.6745 X 1-r^2/√N(**Where r is Correlation coefficient=**0.7092**
N is no. of pairs of observations which is here **36)**

PE= 0.0558 (Degree of freedom (df)=36-2(As we have taken 2 variables for this study) and with significance level 0.05 value from PPMC is) 0.325(in two tailed test)

As PE<0.325 we can reject the null hypothesis(There is no relationship between population of the States &UTs and available Radiological Diagnostic facilities)

Now we use this method to comment on the reliability of the Karl Pearson's coefficient

If r/ PE =>6 then r is significant and relationship exists between two variables

Again putting the value in the above equation we get the value 0f 12.69 which is higher than 6, hence we can say value of correlation coefficient is significant for this study.

Now we calculate the variation in dependent variable 'y'(RD centres) due to independent variable 'x'(Population) for that r^2(coefficient of determination) which is

r^2= 0.70x 0.70=0.4900 or 49% means, population is responsible for 49 % variation is distribution of Radio-Diagnostic Centres inthe States & UTs of the India.

Inference--It means population is most dominant factors regarding the availability of RD stakeholders in the states and UTs but other factors also responsible as literacy, legal formalities, scarcity of professionals etc,

3.4 Discussion

Study shows grossly availability of Radiological diagnostic facility in various states is satisfactory but inequality can also not be denied. As we see from table no.2

Table2. Distribution of RDC region wise

REGIONS	RD CENTRES	POPULATION	% Of TOTAL RDC	% TOTAL POPULATION	LIT RATE%
NE(8)	1585	45772188	1.67	3.78	79.63
CENTRAL(4)	13556	308070640	14.24	25.44	72.75
EASTERN(4)	9141	270337919	9.60	22.32	70.49
NORTHERN(8)	18529	158900155	19.47	13.12	76.08
SOUTHERN(8)	30415	253042172	**31.95**	20.90	**81.91**
WESTERN(4)	21956	174859526	23.07	14.44	81.72
TOTAL	**95182**	**1,21,09,82,600**			
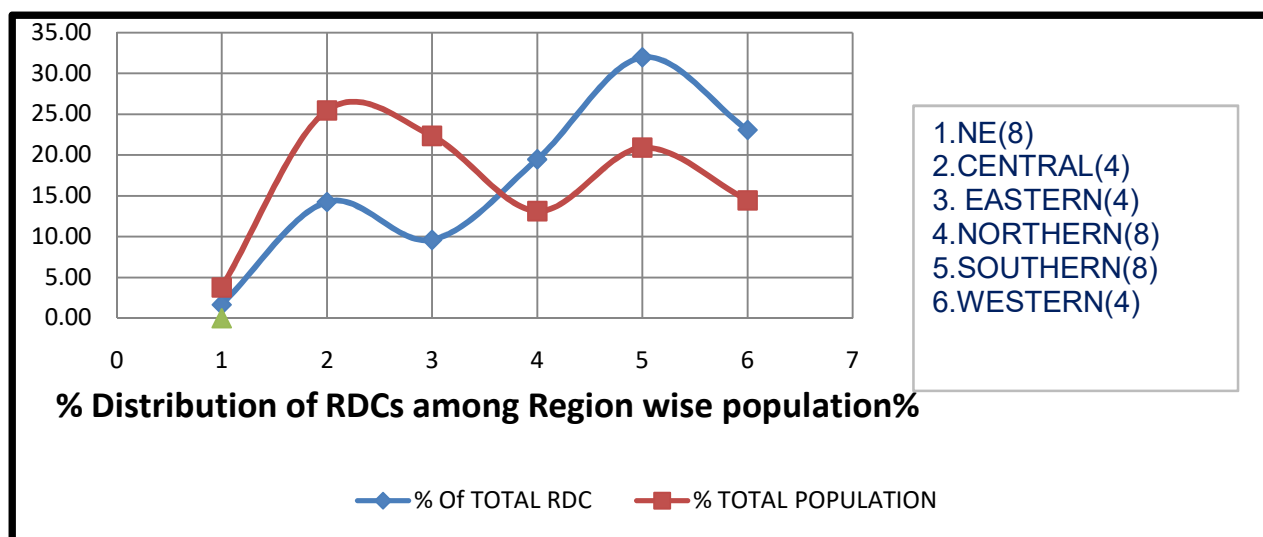
Figure2. Regional Availability of RDCs

Maximum 32 % of RDC s are located in Southern region while as population wise it is number 3 in the India. While as Central region is most populated but of RDCs it is on number 4.We come to this fact literacy plays a very vital role in establishment of RDCs .There may be various regions for this kind of inequality also as mentioned below

1. Literate people are more compliant with the rules and regulations as AERB guidelines are very stringent regarding establishment of such centres for safety of work force& patients**.(Figure 3)**
2. Population of Union Territories are only 2.7 % of total population while as 6% of RDCs are located in UTs in comparison with states 97.3% of total population with 94% of RDCs**.(Figure4).**There may be reason as Delhi is still under UT and is the capital of India with various premier medical establishments including AIIMS located in this region and also two UTs are recently created.
3. Primary Health Centres are not working effectively in terms of diagnosis and further referral to higher centres for availing such kind of facilities.
4. Still these facilities are not very prominent in Public sector, and average income is less in eastern region due to unemployment,citizens are not capable to bear these expanses out of their pocket.
5. Robust infrastructure is mandatory by AERB to start these facilities which is definitely lacking in Eastern region in comparison to other regions.
6. Most of the population in Western & Southern region is urban in nature where accessibility to thesefacility is easier than other places.
7. Doctor /Patient ratio is very low in Eastern region, due to scarcity of qualified medical personnel, establishment of RDCs is not a easier job.
8. Public sector health infrastructure does not support this facility effectively.
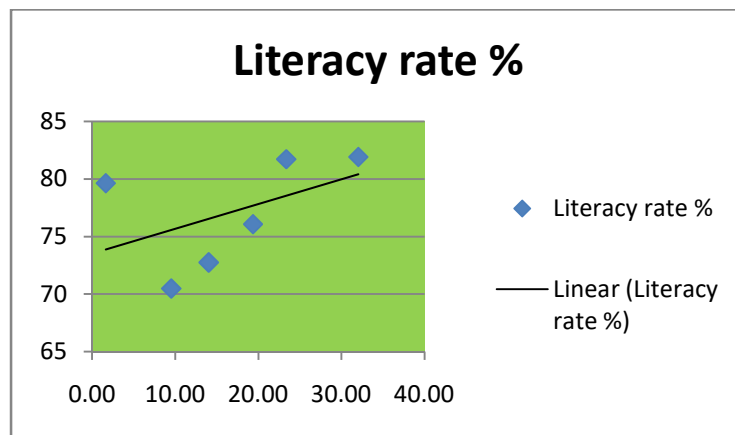
Figure3. Relationship Graph between Literacy Rate & % of RDCs
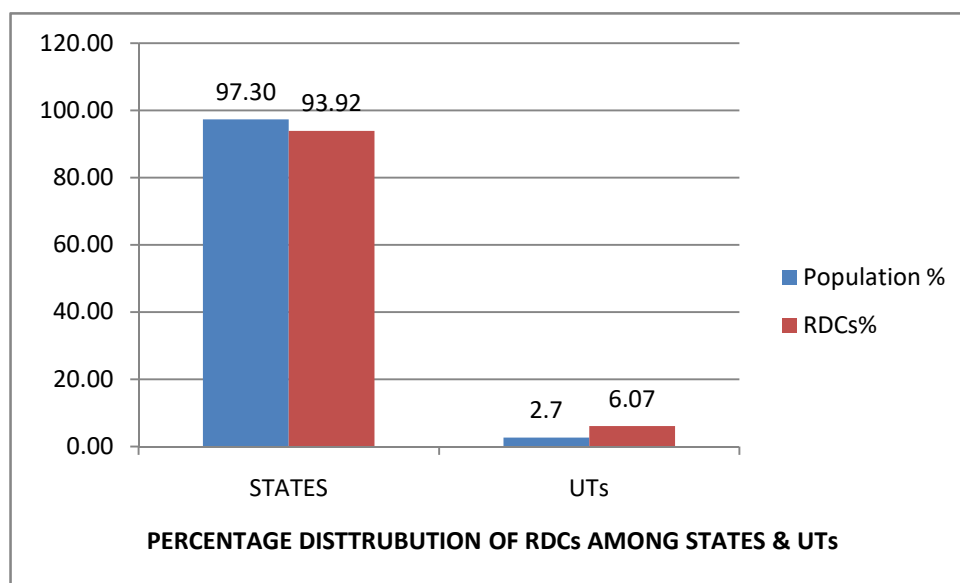
Figure4.Distribution of RDCs Among States & UTs

4. RECOMMENDATIONS

1. Inequity in distribution of Radio Diagnostic services in Public Sector among various States & Union Territoriescan be reduced by Public private partnership (PPP) as one of the options.
2. Need to strengthen the Primary Healthcare infrastructure by providing necessary working force. One of the options is to incentivize the healthcare workers with revised salaries and other additional facilities in remote areas.
3. By providing Social Health Insurance to economically weaker and illiterate sections of the societies, this distributional inequity can be reduced.
4. AERB Licensing procedure is to be made simpler& user friendly.
5. Government should promote the Tele Radiology to reduce the inequity in distribution by increasing the accessibility of scarce resources of Public Health Care System,especially in hilly and rural areas.

5. CONCLUSION

There is inequity in distribution of RDCs across different states and UTs of India and this inequity can be reduced with the help of recommendations given above. Optimal use of RDCs can be further assessed by the estimation of workload for the existing facilities.

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A SURVEY ON EEG AND NON-EEG BIOMETRICSYSTEM

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Security is the primary concern these days. The recent progress in technology leads to the essential need for security in our society. Biometrics is one of the ways to provide security by using human traits. A Biometric system is built using Traits that can be physical and behavioral or can be unimodal or multimodal systems depending on the requirements. Previous approaches in the area of security and authentication were focused on strategies like token, pin, card, passwords. Which can be damaged or stolen easily and is not appropriate for today's world. To overcome these challenges human traits are used for biometrics, which is more reliable than previous methods of authentication. This paper summarizes the works to address EEG-based and traditional biometric systems. The Combination of EEG signals with human traits creates a more robust biometric approach. That can be used for continuous authentication. This paper gives a critical analysis of the traditional biometric systems and EEG-based biometric systems and can be used as a roadmap for researchers interested in EEG biometrics.

Keywords-Biometrics,Traits,Electroencephalography,Stimuli

1. Introduction

Biometric recognition is an automatic recognition of individuals based on their features derived from human traits called physiological and behavioral characteristics. The term called biometric comes from the Greek words which mean is bios (life) and metrics (measure). A lot of applications in today's world require confirming the identity of an individual. Traditionally knowledge-based, token-based biometric systems were used to verify the identity of an individual. But these systems are no longer preferred because they are not reliable enough to trust a person's identity. So a reliable scheme to confirm the identity of a person is recognizing a person based on their traits is more interesting in emerging technological applications(I & Grgic, 2004). Biometric system using sensors is emerging as a novel way of authentication to offer better privacy in the real world. Data collection using sensors for biometric is an easy approach. There are lots of sensors present around us. Some of them we daily use like smartwatches (Balli & Sag, 2019), smart phones(Karakaya et al., 2019). These sensor tries to gather some information like Accelerometer(measure acceleration), Gyroscope (measures angular speed), and a Magnetometer (measures ambient magnetic

field). Using motion sensors to classify human motion is also a current topic for study. In today's world where IOT presence could lead to serious privacy breaches if some more secure system has not come for security. Considering the sensitivity of data a new approach for authentication is required that should incorporate BCI rather than traditional authentication methods. BCI recognizes a specific frequency pattern in a person's brain that is unique for every individual.BCI authentication methods uses eeg,meg signals over mobiles and computers(Qaseem & Stanislav, 2018).This is an emerging technology soon it will surround all other technologies in the future. Being emerging technology researchers have more interest in this.

In section 2, describe the biometrics with human traits, traditional and EEG based biometrics using ways of stimuli as protocol with various machine learning steps and available device and dataset in section 3. Section 4 looks at the unimodal and multimodal biometrics.Traditional biometric using Physiological Traits, behavioral traits, and a combination of both are discussed and represented in tabular form in section 5, section 6, and section 7 respectively.EEG-based biometric using Traits or various stimuli are discussed in section 8 Finally, the paper ends with the application of biometrics and the conclusion accordingly in sections 9 and 10.

2. Human Traits
Biometrics that involves human characteristics or traits are of two types.
1. Biometrics with physiological Trait
2. Biometrics with behavioral Trait
3. combination of both(Multimodal)
Both the traits are used to build a biometric system shown in figure 1. As an input physical and behavioral characteristics feed into the biometric system and based on that analyze whether a person is authentic or not.
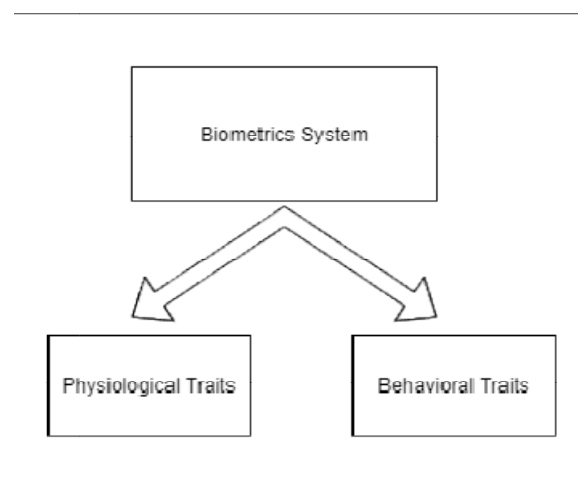

Figure 1: Biometric system with Human traits

To access a resource there is a need to identify an entity by using a biometric system. In the case of physical access, the resources are rooms, buildings, etc. In the case of logical access,

it can be an application on the desktop(Giot et al., 2011). A biometric system generally consists of two modules (a)enrollment and (b) verification. In the enrollment phase template is created using several biometric samples for the user and in the verification phase, a user is verified if the provided sample match with the already stored template in the first phase, this a decision is taken to be taken either give the grant to access of a system or deny based on the comparison result of both modules
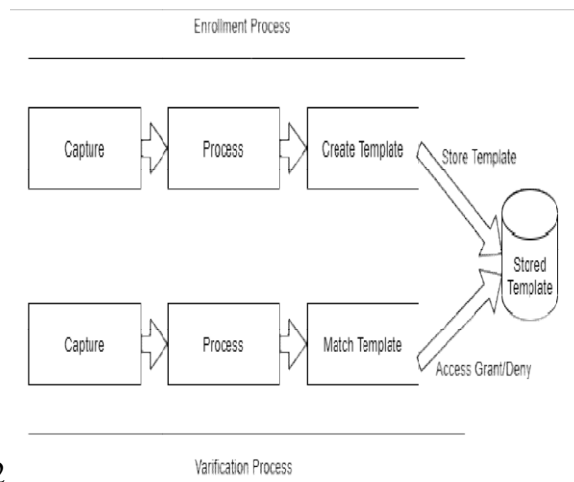
shown in figure 2

Figure 2: Biometric system process

The physiological traits of a human are Eyes, Fingerprint, Face, DNA, Hand. On the other hand, Behavioral traits are voice, signature Human physiological and behavioral traits can be treated as a biometric characteristic (False, n.d.) as long as it satisfies the requirements that are:

1.Universality:-This characteristic must be contained by all the measured populations.

2.Collectibility:-It should be easy to take a feature set that can be measured easily to employ a biometric system.

3. Acceptability:- It depends on the people's acceptability. People should not object while giving characteristics to authenticate themselves with the system.

4. Uniqueness: -Each person has some different characteristics like everybody has a fingerprint and at least one finger they can use for identification.

5. Permanence: This characteristic should not change in continuity like the ridge structure of the palm.

3. Traditional Vs EEG based Biometrics System
3.1 Traditional Biometric System

A biometric system is used in several applications. According to these applications, there are several biometric systems are designed based upon the requirement of several organizations. Some system is designed using physiological traits like fingerprint(Barman et al., 2015), iris(Mira et al., 2013), retina(Sadikoglu & Uzelaltinbulat, 2016), DNA(Cuijk, 2009) palm(Ajij et al., 2019), face(Ding & Tao, 2018). Some biometric systems are designed using behavior traits of a human-like signature(Hafemann et al., 2017), voice(Singh et al., 2018),

keystroke(Giot et al., 2011), gate(Khamsemanan et al., 2018), movement(Neverova et al., 2016), touchless(Ravi & Sivanath, 2013), gesture(Gesture et al., 2015).

3.2 Electroencephalography(EEG) Based Biometric System

Convention Biometric system which involves knowledge such as username and password can be easily penetrated by coercion and credentials can be easily stolen or forgotten. With the advancement in the art of machine learning and signal processing technique, researchers try to look out new ways of authentication using EEG(Jayarathne et al., 2017). EEG is used basically for recording the electrical activity of the brain. Electrode sensors are used for this recording this electrical activity from the brain. This electrical activity is a result of several neurons present in the human brain(Abdulrahman et al., 2019). EEG-based biometric is also employed in the pervasive environment in which EEG data is sent over the network to a server. Then scheduling server dispatch data for several applications to different data analysis servers. Then analysis server tries to search the corresponding database to identify a person and provide feedback to an application(B. Hu et al., 2011).EEG biometric is also explored in the area of cryptography(Damaševičius et al., 2018) and watermarking(Trung et al., 2019). Sensors are used for the collection of EEG data. Three ways through which data can be collected first way is the embedding method in which a microelectrode array is inserted into the cerebral cortex and collect electrical activity from nerve cells called local field potentials(LFP). The advantage of this method is high precision but its disadvantage is it can damage the nerve cells. Another method is semi-embedding in which electrodes are placed on the human brain's cerebral cortex part. It does not damage the nerve cells. Both the above method is intrusive for the human body. The last method is the non-embedding method electrode placed on the skull so no need of intrusion is required in the subject's body. It is a convenient and affordable way. That's why it is so common in the brain-computer interface research area(Liang et al., 2016).

Several authentication systems have been proposed by the researcher in the literature. These systems are implemented by using mainly these six protocols. Protocols are used for recoding the signal from the human brain and for building robust authentication systems shown in figure 3. The detail of each is given below.

Visual Evoked Potentials(VEP)
Visual evoked potentials are caused by a visual stimulus like alternating checkerboard pattern on the monitor and accordingly response of a user with the help of an EEG electrode is recorded.

Mind Task(MT)
Signals are recorded while a person performs some mind task. For example, calculate the number of objects displayed over a screen in mind.

Resting-State(RS)
In resting-state scenarios, users are advised to sit calmly without overthinking state In either eye open or eyes closed state while taking EEG readings.

Imagine Task(IT)

Recording signals using imagined tasks require asking the user to do certain tasks such as imagined speak, mental Writing an imaginary finger/hand movements, etc.

Eye Blinking/MUSIC listening
These signals are recorded while a user does blinking of their eyes or listens to music.
P300 Wave
It measures event-related potentials. Related
Potential(ERP)component that's elicited within the process of decision making. It is generated when something unexpected happened. Every time a surprising stimulus happens, the brain will generate a tiny response after 300 milliseconds and that's called p300.
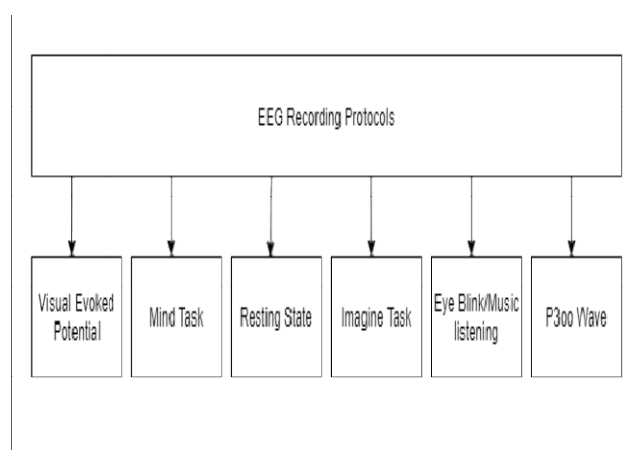
Figure3: Representation of recording protocols

The EEG-based biometric system follows the most basic model with various machine learning steps for the identification of a claimed person. These steps are data acquisition, preprocessing, feature extraction, and classification with the result at the end. Then the model is designed by asking the user to perform a certain activity, by using various stimuli as protocol. Various Stimuli are visual evoked potential(VEP), resting-state(RS), imagination(IM), motor, motions, reading,video,images.

Data Acquisition:-During this step by using several electrodes, raw EEG data are collected. It is collected by following electrode placement according to 10-20 international system and asking the user to perform some activities according to various stimuli like watching the video, listening to music or perform some imagination and by giving task such as calculation in mind, sit calmly with eyes close and open or perform motor imagery. Electrode range can vary from 1 to 256. These obtained signal from this phase is used for further processing by the system.

Preprocessing:-EEG signal has five types of wave patterns delta wave(0.5-4Hz),theta wave(4-8Hz),alpha wave(8-12Hz),beta wave(12-30Hz) and gamma wave(30-45Hz)(Shedeed, 2011).These waves are present in various regions of the brain. While collecting data from a different region of the brain various types of artifacts are also stored with that data like muscular movement, environmental noise, hair rubbing so to obtain better frequency characteristics from this data it becomes necessary to remove artifacts from this data. To achieve this there are various filtering techniques are used such as smoothing, Gabor filter,

moving average. Also, some signal enhancement techniques are used few of them are binarization, normalization, interpolation, summing.

Feature Extraction:-This is the next step in this model. Various features are extracted and selected based on the type of problems or expected solutions. Features can be of time domain, frequency domain, transform, or spatial domain.

Classification:-In this process, it is required to physically assign the objects into a predefined set of classes. In this step basically division is occurring according to homogeneous categories. There are several classification approaches, including various algorithms depending on various traits used in the biometric system(B. Kaur et al., 2020).

Result:-Finally results are obtained at the end of the experiment.

However few approaches also use deep learning for EEG-based Person identification(PI) with various neural networks techniques such as convolution neural network(CNN), recurrent neural networks(RNN).(Wilaiprasitporn et al., 2020) That makes the system more robust and accurate for person identification.

EEG Devices And Databases

Different Types of EEG devices are present in the market has been used by researcher during their experiment shown in figure 4.

Figure:4 Signals capturing device

These devices are used for the user to capture signals from various regions of the brain. Table 1 shows the number of devices available for the researcher to perform user authentication with the help of these devices(Soufineyestani et al., 2020).

Table 1: EEG device with some channels and sampling rate		
Device	No of Channels	Sampling rate
Openbci	16	125-250Hz
BIOPAC	32	100Hz
MindWave	1	3-100Hz
EMOTIVE Epoc	14	128Hz
ENOBIO 32	32	125
Emotive Insight	5	128Hz
mBrainTrain	24	250-500Hz

Biosemi	256	2-16Hz
g. tech	64	500Hz
BCI2000	64	160Hz
BrainAmp	64	200Hz

There are lots of EEG data are available for public use. These database sources were created for medical purposes but have been used for several other purposes such as for security. Some datasets are paid and some are free to use publically.

(i) A world-leading research center called Donders repository is indulging in research work related to the brain, cognition, and behavior in health and diseases. This repository is used by 2068 researchers to manage their data related to research. Lots of EEG data is available here and can be requested for access to the published data.

(ii) UCI machine learning repository contains an EEG dataset of alcoholic subjects. Which is measured by 64 electrodes placed over the scalp with 256 Hz frequency. It consists of three versions of the small dataset (2 subjects), large data(20 subjects) set, and full dataset(122 subjects).

(iii) Physionet is a Research resource for complex physiologic signals established in 1999. It is offering free access to a huge amount of physiological and clinical data.EEG signals, data can be easily found for experiments like motor movement, mental tasks, etc.

(iv) Kaggle is a data science community. it consists of around 50,000 public databases. It contains not only EEG datasets but other datasets also present for various purposes. For EEG signals there are around 75 datasets available.

(v) OpenNeuro is an openly available Neuroinformatics database storing datasets for brain imaging research. It is a free platform for sharing EEG, MRI, MEG, ECoG, PET data. There are nearly 540 datasets are available over this platform.

4.Unimodal Vs Multimodal Biometrics
Biometric systems are categorized in unimodal and multimodal systems using individual features, that can be behavioral and physiological.
4.1 Unimodal
The unimodal biometric system is those system that use a single trait of a human being for identification. Unimodel biometric has less accuracy because it gathers information by using only a single source or single trait. So it becomes necessary to satisfy all the biometric characteristics such as uniqueness, universality, permanence, acceptability, collectability for

this single trait. Furthermore, it achieves less desired performance in this real-world application. To solve the performance issues of this unimodal biometric system, the role of the multimodal biometric system comes into existence. Some of the issues that are associated with the unimodal system are:

1. Lack of individuality
2. Noisy data
3. Non-Universality
4. Susceptibility of circumvention

4.2 Multimodal

Unlike the unimodal system that has performance issues and has less accurate results, the multimodal system uses more than one modality and traits to build more robust systems and give more accurate results. This multimodal system combines the output from the different biometric systems for person identification (Oloyede et al., 2016). One of the major advantages of this system is that the failure to enrollment rate is reduced. some of the advantages of a multimodal biometric system are:

1. Better recognition
2. Accuracy Assured
3. More Secure

Multimodel systems are further classified based on multi-sensor, multi-sample, multi-algorithm, multi-modal, multi-instance, and hybrid systems (Balraj & Abirami, 2020).

5 Traditional biometric using Physiological Traits

Physiological traits of a human being include Iris, Fingerprint, Face, DNA, Retina Hand. These traits are used for the building of a biometric system. These traits are generally related to body shape.

5.1 Iris- The analysis of colored area near the pupil of an individual's eye.

5.2 Hand Geometry-The analysis of an individual's hand with variation in the length of the finger.

5.3 Fingerprint- The analysis of unique patterns of ridges and minutia points of an individual.

5.4 Face-The analysis of different facial features like the position of eyes, nose, lips, and distance between them.

5.6 DNA-The analysis of different genomic mutations, these do not change during the lifetime of a person.

5.7 Retina-The analysis of the pattern contains blood vessels on the thin nerve at the backside of the eyeball that process light entering through the pupil.

As it varies from person to person so there are a lot of biometric works that have been done in this area, some of the work is shown in table2.

S.no	Author & year	Traits	Database/ subject	Features/ Algorithm	Accuracy
Table 2 : Traditional biometric using physiological traits					
1	Waheed et	Retina	RIDB /20	luminance,	92.50

				contrast, and structure	
2	De Mira et al.(Mira et al., 2013)	Iris	i)University of Bath Iris Image Database, ii)CASIA Iris Image Database/25	morphological operators	i)99.35 ii)98.88
3	Sadikoglu et al.(Sadikoglu & Uzelaltinbulat, 2016)	Retina	DRIVE Database	Neural Network	97.50
4	Ding et al.(Ding & Tao, 2018)	face	i)PaSC ii)COX Face, iii) YouTube Faces	Trunk-Branch Ensemble CNN model	-
5	Cuijk et al.(Cuijk, 2009)	DNA	13 subjects	Short Tandem Repeats and Single-Nucleotide Polymorphisms	-
6	Ajij et al.(Ajij et al., 2019)	palm	i)VERA(left hand) ii)VERA(right hand) iii)COEPdataset	Random forest, Multi-layer perceptron, Support vector machine, simple logistic regression, KNN, multiclass classifier	i)96.5 ii)97.5 iii)95.3
7	Ravi et al. (Ravi & Sivanath, 2013)	fingerprint	20 subjects	retinex algorithm	93.63

6.Traditional biometric using Behavioral Traits

Biometric traits of a human being include voice, signature, keystroke, gait, gesture, movement, etc. are used for building a biometric system. It is associated with any pattern or activity done by an individual.

6.1 Voice- The analysis of an individual voice pattern like pitch, tone, frequency, and cadence.

6.2 Signature-The analysis of the way a person writes his/her name.

6.3 Gait-The analysis of a person walking style.

6.4 Gesture-The analysis of body gestures of humans.

6.5 Keystroke-The analysis of a unique rhythm pattern in a way a person types on the keyboard.

6.6 Movement/motion-The analysis of a pattern of humans moving or using an object.

Biometric is an attractive technology, sometime it is also integrated with sensors to achieve security and access control in several applications. sometimes the behavior of a person is analyzed using sensors. some of the research work in the field of behavioral biometric is shown in the table3.

S.no	Author & year	Traits/sensor	Database/ Subject	Algorithm	Accuracy
	Table 3 Traditional biometric using behavioral traits				
1	Duster et al.(Dustor & Kłosowski, 2013)	voice	ROBOT/30	Fuzzy Kernel Ho-Kashyap classifier FKHK	-
2	Jayamaha(Jayamaha et al., 2008)	voice	150 test cases	Hidden markov model(HMM)	86.25
3	Hafemann(Hafemann et al., 2017)	signature	i)Brazilian (PUC-PR) ii)GPDS-160 iii)GPDS-300	Feature-CNN_GPDSnorm classifier-SVM (RBF)	-
4	Eskander et al.(Eskander et al., 2014)	signature	Brazilian Signature Database	Fuzzy Vault (FV)	97
5	Iranmanesh *et al*(Iranmanesh et al., 2014)	signature	SIGMA database 200 subjects	multilayer perceptron (MLP)	93.1
6	Pushpalatha et al.(Offline Signature	signature	GPDS-960 database	(HMM)	93.4

	Verification Based on Contourlet Transform and Textural Features Using HMM, 2014)				
7	Khamsemanan et al.(Khamsemanan et al., 2018)	gait	i)Dataset A-160 subjects ii)Dataset B-90 subjects	Knn Extremely randomized tree, MLP	i)97.0 ii)96.8
8	Hong et al.(Gesture et al., 2015)	gesture	8 subjects	Support Vector Machine(SVM)	92.83
9	Hayashi et al.(Hayashi et al., 2014)	gesture	75 subject	SVM	-
10	Neverova *et al*(Neverova et al., 2016)	Motion- mobile inertial sensors.	1500 subjects	Dense Clockwork RNN	-
11	Peng et al.(Peng et al., 2021)	accelerometer, gyroscope, magnetometer, force-sensitive resistors (FSRs).	26subjects	DNN–HMM	68
12	Balli et al.(Balli & Sag, 2019)	Sensor- accelerometer, gyroscope, step counter and heart rate	5 subject	RF	98.5
13	Karakaya et al.(Karakaya et	Sensors- Accelerometer,	Hand movement orientation and	decision forest, boosted decision	-

	al., 2019)	Gyroscope, and Magnetometer	grasp (HMOG)data-100 subject	tree, SVM, and logistic regression	
14	Pleva et al.(Republic, 2016)	keystroke	50 subjects	HMM with MFCC (Mel-frequency cepstral coefficients) features	99.33

7. Traditional biometric using the multimodal system

Multimodal biometric systems fuse different unimodal biometric systems to improve the performance of the whole system shown in table 4. This type of biometric system combine several unimodal biometric systems serially, parallelly, hierarchically. Multimodal biometric removes all the disadvantages of a unimodal system like the noise effect present in data that cause problem while deciding authentication of a person(Iwasokun G. B. et al., 2015).In this case source of data is single but in a multimodal system, multiple sources are present to decrease this noise effect. There are multilevel fusion is possible while designing a multimodal biometric system.

7.1 Feature level-This type of fusion is required to combine various feature set from various biometric into a single one. The first step is preprocessing the features and then deducing the features independently. Feature vectors are joined to form a composite feature vector by using any specific fusion algorithm. These composite vectors can be used for further classification. This feature level fusion is more efficient compare to matching score level and decision level fusion.

7.2 Matching Score level-This is also called measurement level fusion. This combines the score to make a single score to form the final decision. Produced score output by biometric matcher gives information about the input pattern and also representation of feature vector. Two approaches are classifying and combining to drive matching scores based on the processing of match scores (Kabir et al., 2019).

7.3 Decision level-In this type of fusion individual decisions of different modalities are combined. This gives a common decision as a result. The final classification depends upon the fusion of various individual modalities.

7.4 Sensor level –This type of fusion is possible when multiple traits from multiple sensors are required or multiple values of the same biometric are required from a single sensor. Raw information is extracted from types of multiple sensors and then combined to produce raw fused information to build a multimodal system using sensors (Mishra, 2010).

S.no	Author and year	Traits/Sensor/Fusion	Database /subject	Features / Algorithm	Accuracy
	Table 4: Traditional biometric using the multimodal system				
1	Aizi et	Iris+fingerprint/score	i)iris database	i)decision tree	i)95.00

		level	CASIA-IrisV4 ii)CASIA-FingerprintV5	combined to the weighted sum (BCC) ii) fuzzy logic (BFL)	ii)94.44
2	Bharathi et al.(Bharathi & Sudhakar, 2019)	Finger vein+palm vein/score level	i)100 subject (finger) 100 subject(palm)	fuzzy logic technique	99.5
3	Bailey et al.(Bailey et al., 2014)	Keyboard+mouse+gui/ (a) Feature Level Fusion (b) Ensemble Based, Decision Level Fusion	31 subjects	BayesNet J48 LibSVM	-
4	Vildjiounaite et al.(Vildjiounaite et al., 2006)	Gate+voice/accelerator/ scorelevel fusion	32 subjects	Voice(GMM+MFCC)	-
5	Zhang et al.(Xinman Zhang et al., 2020)	Face+voice/score level fusion	XJTU multimodal database 102 subjects	Face feature(LBP) Voicefeature(MFCC)	-
6	Kumar et al.(Kumar et al., 2019)	Light camera+motion sensors	23 subjects	LSTM 3D-CNN	91.3
7	Kaur et al.(D. Kaur et al., 2013)	Speech+signature/feature level fusion	14 subjects	SIFT MFCC	98.2
8	Su et	Finger vein+ecg	VeinECG (70	LBP-based features of	-

al.(Su et al., 2019)		subject)+ECG-ID dataset	finger vein and1DMRLBP-based features of ECG	

8. EEG-based biometric using Traits or various stimuli.

To complement or to address the existing biometric system another biometric system comes into a role that used brain activity as a biological trait. Brain activity is considered a new and unique way to recognize a person. Brain activity is influenced by several things such as mood, stress, mental state of a person.it is not possible to control these activities by threatening.No one can imitate these activities (Vinod, 2017). EEG-based person authentication(EBPA) system(Tran et al., 2019) can be built when a person is in a variety of brain states. The system has more accuracy when a person is familiar with stimuli. Using electrodes/sensors are used to record the activity from the brain. Some of the physiological traits that are used with EEG signals are given in table 5. There are various stimuli/EEG protocols are used to record signals from different areas of the brain at different frequency bands.

8.1 Delta-These includes a wave of low frequency that is 0-4Hz but high amplitude. These are very common in childhood waking time but in adults, it appears in the sleep state. Other than sleep state if it appears in adults, it shows tumors or depression in adults. These are not affected by the opening of eyes.

8.2 Theta-These are mostly found in children has aged less than five years. These waves are fewer frequency waves that are 4-8Hz.

8.3 Alpha-Alpha waves are synchronized waves, which means they are regular and invariant. These can be obtained from an inattentive brain or in the state of mind drowsiness or at light sleep. These appear at a frequency of 8-15Hz. These can be abolished by visual stimuli or mental effort. It is diminished when the eyes are open. They are mostly present in the occipital area and sometimes in other areas also.

8.4 Beta-These are high-frequency waves that are 16-30Hz. These are desynchronized waves means irregular and variant. These are recorded during mental activity or mental tension and the arousal state. These are not affected by the opening of eyes.

8.5 Gamma- These waves are generated in the state of conscious activity or the state of fear. when beta waves reach 30 to 100Hz. Then these waves are called Gamma waves.

S.no	Author & year	Trait/sensor/stimuli	Database /subjects	Device/Channel	Features/ Algorithm	Accuracy
Table 5 EEG-based biometric using Traits or various stimuli.						
1	Abo-Zahhad et al.(Abbas & Abo-Zahhad, 2017)	Eye(EOG)+EEG	40 subjects	Neurosky Mindwave	LDA or Mahalanobis DA	93.72
2	Merrill et al.(Merrill et al., 2019)	Tasks +EEG	7 subjects	OpenBCI-8channel	XGBoost tool	99.82
3	Wu et al.(Wu et al., 2018)	i)self- or ii)non-self-face rapid serial visual presentation+EEG	45 subjects (15 users and 30 imposters)	16 channels	hierarchical discriminant component analysis (HDCA)	i)91.31 ii)91.61
4	Rahman et al.(Rahman et al., 2017)	EEG+ KINECT face	Eeg-14 subject EUROCOM Kinect face dataset-52 subjects	15 channels	KNN	100
5	Campisi et al.(Campisi et al.,	EEG+RS(resting state)	48subjects neurophysiology laboratory of the IRCCS	64	ARmodel+polynomial regression	96.08

	2011)				
6	Choi et al.(Choi et al., n.d.)	EEG+RS(resting state)	17 subjects	31 channels	-	88.4
7	Puengdang et al.(Puengdang, 2019)	EEG+VEP	20 subjects	6 channels	LSTM of SSVEP and ERP features+deep learning	91.44%
8	Hu et al.(J. F. Hu, 2009)	EEG+motor imagery[MI]	BCI competition 2003	64 channel	Mlbpn Traindx algorithm	-
9	Zhang et al.(Xiang Zhang et al., 2018)	EEG+GAIT	7 subjects	EPOC+ Emotiv headset-14	RNN	99.57
10	Smithaet al.(Smitha et al., 2017)	EEG+VOICE	8 subjects	Emotiv Epoc neuroheadset	LDA	72.2
11	Kumaret al(Kumar et al., 2018)	Envisioned speech+EEG	23 subjects	Emotiv EPOC+-14	RF	85.20
12	Kauret al.(B. Kaur et al., 2017)	Music+EEG	60 subjects	Emotiv Epoc+ 14 sensors +2 references	HMM and SVM classifiers	97.50 % and 93.83 %
13	Sainiet	Signature+EEG	70subjects	Emotiv Epoc+	Feature-	98.24%.

				14 sensors +2 references	PHOG HMM	
14	Zahhad et al.(Abo-Zahhad et al., 2016)	EEG+EOG+Eyeblinking	31 subjects	Neurosky Mindwave headset	LDA	-
15	Barra et al.(Barra et al., 2017)	EEG+ECG	EEG Motor Movement/Imagery Dataset (EEGMI)(109 subjects)& PTB Diagnostic ECG Database (PTB)(290 subjects)	ECG(12LEADS) &EEG(64 CHANNEL)	ECG(peak detection method)EEG(power spectral density)	-
16	Krishna et al.(Krishna et al., 2019)	AR/VR+eye tracking+EEG	i)EEG-MI from physionet ii) EMVIC 2012 competition	64 channels	i)svm+rbf ii)RF	-
17	T. Salturk et al. (Salturk & Kahraman, 2021)	EEG+VEP	DEAP 32 subjects	32 channels	CNN	89.06

9. Applications of Biometrics

Biometric technology is employed in several areas. As security demands keep on growing so biometric technology is also growing.

9.1 Access Control- Sometimes there could be any place such as any building, private firm, or school, or any place where only a limited and authorized person can visit. where the need for biometric becomes so necessary. Biometrics has many advantages when it comes to access control.it could also be beneficial where it becomes necessary to record the attendance, checking library details. The fingerprint system is the most widely used system in this type of scenario and face recognition is also performs better compared to the key, access card that can be stolen.

9.5 Legal and government application-Government have used several multimodal biometric applications to detect or identify real people like aadhar database is also an initiative taken by the government to store the detail of civilians. Biometrics in the legal application has old history. Fingerprint, voice, face, details are stored by the government to enhance public safety and keep track of the people we are looking for.

9.2 Healthcare-Biometric in the field of health is very important for timely diagnosis. Medical records are very valuable. blood is given by any person, the identity of that person like iris, the fingerprint should be recorded, it eliminates the risk of duplication. By this process becomes more secure.

9.3 Commercials-with the advancement in networking old security methods are no longer capable of providing security. So biometric technology can be good support can provide security and convenience for everything that needs to be protected. The banking sector is one of the areas where security is required in money matters, so person identification becomes an area of prime concern. Several banking solutions, now a day uses a wide range of biometric which uses human traits like a fingerprint, face, voice, etc alone or in combination to serve against several frauds(Guennouni et al., 2020).

9.4 Wearable applications-Biometrics with smart wearable devices is a new technology that replaces traditional password, pin, chip authentication ways of biometrics. Smart devices like bands, smartwatches, etc bring out a new form of biometrics in this real world(Hill, 2015).

10. Conclusion

This paper provides an overview of traditional and EEG-based biometric technology using various human traits and various stimuli for recording brain signals. This paper first reviews the human traits used in biometric can be physiological or behavioral. In continuation of that combined with neuroimaging methods such as EEG. Also, the available dataset and devices are describe used for biometric system development are studied. The next topic reviewed is unimodal and multimodal biometric in continuation of Traditional biometric using Physiological Traits, behavioral traits, and combination of both the traits with their respective tabular review. The appropriate fusion method of multimodal systems is also explained. Moreover, in this paper EEG based biometric using Traits or various stimuli to record signals from different areas of the brain at different frequency bands are also reviewed**.** Furthermore, the paper discussed the application of biometrics after intensive study in this area.

From this survey several uses of biometric in different areas are explored such as EEG used in the pervasive environment, wearable biometric such as bands, the smartwatch can become

the future for biometric in upcoming years. In the era of advancement of technology biometric have become so necessary for the identification and verification of an individual. Its demands will keep on increasing in upcoming years where there can be a requirement for the most robust and continuous authentication mechanism.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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A REVIEW ON COVID-19 DATASET OF CHEST X-RAY IMAGES

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The viral COVID-19 infection has become a public health emergency all over the globe. The identification of positive cases with high accuracy plays an important role in the management of cases such as allocation of limited resources for example, ICU beds, ventilators, oxygen cylinders etc. This viral is still spreading since none of the treatment could control it completely. Therefore, for its better management, researchers across the world are trying to discover the different characteristics of this virus by analyzing the different datasets of confirmed cases. Among different kinds of databases available of this virus, we are presenting a review on the chest X-rays imaging dataset of the infected patients in this study.

Key words:CHEST X-RAY, COVID-19, DATASET.

1. INTRODUCTION

As per the latest report released by WHO on 12th September, 2021 [1], over 220 million verified COVID-19 cases and deaths have been reported worldwide, including 4.5 million deaths. The epidemic picture of this severity varies across the regions and countries.Cases and deaths are continuing to rise in some regions of the globe, while they are reducing in others.'Anti-lockdown tactics' include getting vaccinated, keeping physical distance, cleansing hands, avoiding crowded and closed locations, and wearing a mask to prevent the spread of disease without shutting down huge parts of society [1].

Therefore, viral COVID-19 infection has become a public health emergency all over the globe. The identification of positive cases with high accuracy plays an important role in the coordination of cases such as distribution of scarce resources for example, ICU beds, ventilators, oxygen cylinders etc. This viral is still spreading since none of the treatment could control it completely. So, healthcare professionals are looking for urgent remedies to overcome the spread of this virus. Rapid and reliable diagnosis of the affected cases is one of the primary needs. For diagnosis, a SARS-CoV-2 virus- specific "reverse transcriptase polymerase chain reaction (RT-PCR), Real-time RT-PCR (rRT-PCR) and Reverse transcription loop-mediated isothermal amplification (RT-LAMP)" laboratory tests are generally used [2]. However, these tests can take up-to two days to confirm the result, producing more delayed serial testing, if required in some cases to avoid the false negatives [3]. Hence, for its better management, researchers across the world are trying to discover the different characteristics of this virus by analysing different kind of datasets of confirmed cases. Among those, rapid methods such as artificial intelligence enabled medical imaging technologies of computed tomography (CT) and chest X-rays are also explored worldwide for accurate detection of patients with suspected SARS-CoV-2 infection [4]. In comparison to CT, the X-ray facility is more cost effective and accessed even in the remote corners of the country and thus, X-ray scans can be easily obtained for patients [5]. In this study, we are presenting a review on the chest X-rays imaging dataset of the infected patients among different kinds of databases available for this virus.

2. LITERATURE REVIEW

Both the clinical and AI groups are interested in the idea of using common and simple chest X-ray (CXR) imaging for early detection of COVID-19 patients.Since the emergence of covid-19, a number of studies have been carried out worldwide using deep learning based automated detection of Covid-19 with chest x-rays [5–9]. All these studies are using chest x-ray images obtained from different sources[10, 11]. In this study we provide brief descriptionof these datasets.

3. CHEST X-RAY IMAGING DATASET

The chest X-ray imaging dataset are used in different kind of diagnostic research studies, for example diagnosis of pneumonia, respiratory diseases, diseases related to or affecting lungs, detection of Covid-19 etc. Therefore, this type of dataset has been categorised in three classes namely, Chest X-ray imaging dataset of Covid-19 patients, Chest X-ray imaging dataset of pneumonia cases and chest X-ray dataset of normal people and children.Table 1 provides a description about Chest X-ray imaging dataset of Covid-19 patients. Similarly, we have listed Chest X-ray dataset of non-covid-19 cases in Table 2. The online link to these datasets is also provided in the tables. A detailed description about the subject age, gender and other information may be found with the provided link to each dataset.

Table 1: Chest X-ray imaging datasets of Covid-19 patients.		
Dataset Name	**Number of Chest X-ray images**	**Link**
Cohen/IEEE 8032 dataset[12]	COVID-19- 468 Others- 178	"GitHub - ieee8023/covid-chestxray-dataset"
Brixia-score-COVID-19[12]	COVID-19- 4703	"GitHub - BrixIA/Brixia-score-COVID-19"
GeneralBlockchain covid-19	COVID-19- 100 segmented images	"GitHub - GeneralBlockchain/covid-19-chest-xray-segmentations-dataset"
agchung/Figure1	48 images each with label COVID-19, pneumonia or no finding	"GitHub - agchung/Figure1-COVID-chestxray-dataset:"
ML Hannover	240 images consisting of COVID-19 as well as other cases	"https://github.com/agchung/Figure1-COVID-chestxray-dataset"
agchung/Actualmed	215 images each with label COVID19, inconclusive or No finding	"https://github.com/agchung/Actualmed-COVID-chestxray-dataset"
Cancer Imagine Archive	$COVID-19 > 200$ images	"https://wiki.cancerimagingarchive.net/pages/viewpage.action?pageId=70226443"

HM Hospitals	COVID − 19 >5000 images	"https://www.hmhospitales.com/coronavirus/covid-data-save-lives/english-version"
BIMCV-COVID19+	1311 images each with PCR test report for COVID19/ COVID19-uncertain	"https://github.com/BIMCV-CSUSP/BIMCV-COVID-19"
Kaggle COVID-19 radiography[13]	Compiled from the Cohen/IEEE 8032, the website sirm.org and from forty three number of publications for COVID-19 cases including the chest X-ray images of the UCSD-Guangzhou pediatric dataset (for control samples) and images of viral pneumonia except COVID19 each with one of the three labels COVID19, normal and viral pneumonia.	"https://www.kaggle.com/tawsifurrahman/covid19-radiography-database"
V7 Darwin covid-19-chest-x-ray	Compiled from the "Cohen/IEEE 8032 for COVID-19 samples and UCSD-Guangzhou pediatric dataset for non-COVID-19 samples".	"https://github.com/v7labs/covid-19-xray-dataset"
COVIDx[14]	Compiled from "the Cohen/IEEE 8032, angchung/Actualmed and angchung/Figure1 dataset for the chest X-ray images of COVID-19 including the Pneunomia and Normal samples from the RSNA Kaggle Pneumonia dataset" with each image labeled with COVID-19, Pneunomia or Normal.	"https://github.com/ieee8023/covid-chestxray-dataset"

Table 2: Chest X-ray imaging datasets of Non-Covid-19 people.		
Dataset Name	Number of Chest X-ray images	Link
BIMCV-PADCHEST[15]	Chest X-ray images acquired	"https://www.hmhospitales.com/coronavirus/covid-data-save-lives/english-version"

	from 67000 patients	
CheXpert[16]	224,316 number of chest x-ray images	"https://stanfordmlgroup.github.io/competitions/chexpert/"
ChestXray-NIH[17]	120k images 30k patients	"https://nihcc.app.box.com/v/ChestXray-NIHCC"
RSNA Pneumonia Kaggle[18]	30k images from the ChestXray-NIH dataset	"https://www.kaggle.com/nih-chest-xrays/data"
ChestXray-NIH Google[19]	18k images from the ChestXray-NIH dataset	"https://www.kaggle.com/c/rsna-pneumonia-detection-challenge/overview/description"
Montgomery[20]	138 frontal chest images	"http://openi.nlm.nih.gov/imgs/collections/NLM-MontgomeryCXRSet.zip"
Shenzhen[20]	662 frontal chest images	"http://openi.nlm.nih.gov/imgs/collections/ChinaSet_AllFiles.zip"
UCSD – Guangzhou pediatric[21]	5000 chest X-ray images from children	"https://www.kaggle.com/paultimothymooney/chest-xray-pneumonia"
MIMIC-CXR-JPG v2.0.0[22]	377,110 chest x-rays	"https://www.kaggle.com/paultimothymooney/chest-xray-pneumonia"
Indiana University /OpenI[23]	7500 chest x-rays	"https://openi.nlm.nih.gov/imgs/collections/NLMCXR_png.tgz"

4. CONCLUSION

We have reviewed a number of datasets of chest X-ray images of COVID-19 as well as non COVID-19 cases. We observed substantial flaws in the majority, if not all, of the publicly available datasets. The documents containing entire dataset construction process is found missing in many of these datasets. Since there are different kinds of control cases, therefore, the dataset intended use, as well as explicit warnings of common misuse cases should be defined properly. Also labelsreported in different datasets varies from each other, thereby, making it difficult to validate a model on different dataset. Finally, in order to assess the possibility of sampling error, datasets should include demographic characteristics and participant qualifying criteria information.

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ANALYSIS OF ENERGY EFFICIENT WIRELESS SENSOR NETWORKS USING MACHINE LEARNING TECHNIQUES

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Wireless sensor networks (WSNs) are the most effective technology for a wide range of real-time applications because of its small size, cost-effectiveness, and ease of deployment. WSN may vary dynamically as a result of external or internal circumstances, necessitating a costly and unnecessary network overhaul. In wireless sensor networks, when energy sources and battery capacity are both restricted, energy efficiency is a critical consideration. Researcher can use intelligent energy management models to maximize lifetime of WSNs. Traditional WSN techniques are clearly planned, making dynamic network response difficult. Machine learning (ML) approaches can be used to overcome such problems and respond appropriately. In this paper, we conducted a comparison of many ML-based WSN approaches. We also looked at machine learning algorithms for localization, data aggregation, clustering, routing mobile nodes and energy harvesting along with some unresolved challenges.

Keywords: WSNs, machine learning, data aggregation, clustering, routing, energy efficiency, network life time

1. Introduction

Wireless sensor networks (WSNs) are the most effective technology for a wide range of real-time applications due to its small size, low cost, and ease of deployment. WSN's job is to monitor a field of interest, collect data, and transfer it to the base station for post-processing analysis. A significant number of sensor nodes are used in some WSN applications. As a result, a scalable and efficient algorithm is required to manage such a vast number of nodes (Akyildiz I. et. al., 2002, Yick J. et al., 2008 Rawat P. et al., 2014). Furthermore, the WSNs may change dynamically owing to external reasons or as planned by the system designers. As a result, network routing techniques, localization, latency, cross-layer design, coverage, QoS, and link quality may all be affected. Because of the network's very dynamic nature, it may necessitate a depreciating non-essential reconfiguration, but traditional WSN systems are coded. As a result, the network does not function correctly in a dynamic context.

Machine learning (ML) is a technology which helps to train a machine by sample data. As a result, the machine can solve different types of problems easily. ML is part of Artificial Intelligence (AI). Machine learning algorithms helps to design a mathematical model which returns predicted value. By the help of predicted value, we can predict the future like whether forecasting, stock market analysis etc. WSN issues like localization, data aggregation, clustering, routing, energy harvesting etc and also uses in IoT applications. ML solves different applications and saves money and time. WSNs' performance is improved via machine learning, and the need for human intervention or reprogramming is reduced. The following are some of the ML applications in WSNs:

- Machine learning algorithms are used to deploy the number of sensor nodes in the target area.
- Localization problems can be solved by machine learning algorithms.
- The network faults in WSNs can be identified by using machine learning.
- Sending all of the data to the base station will result in network transmission overhead. Machine learning can also help reduce the dimensionality of data at the sensor or cluster head level.
- Because WSNs are self-powered and have a long lifespan, they benefit from energy harvesting. Machine learning techniques resolves energy harvesting issues.
- When it comes to extending the life of a network, data routing is crucial. The dynamic behaviour of sensor networks needs dynamic routing strategies to increase system performance.
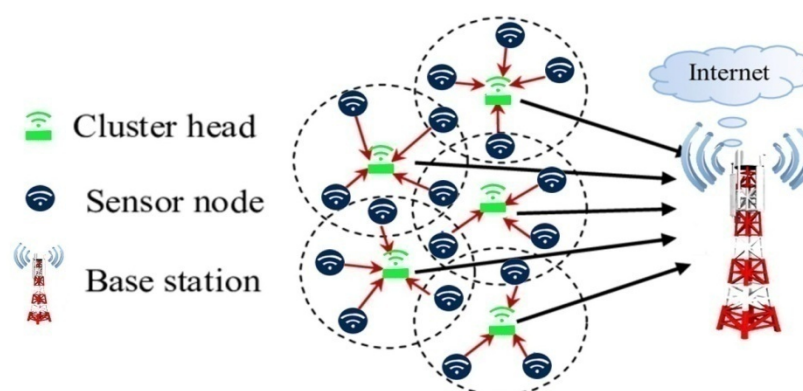

Fig. 1 WSNs Model

The paper is structured as follows:

Section II Machine Learning approaches
Section III Machine Learning Techniques
Section IV Machine Learning Algorithms
Section V Statistical Analysis
Section VI Open issues
Section VII Conclusion

2. Machine Learning Approaches

Based on learning patterns, ML approaches have been categorised into four categories: supervised learning, unsupervised learning, semi-supervised learning, and reinforcement learning (Ayodele 2010).

2.1 Supervised Learning

Supervised learning is one of the most important data processing strategies in machine learning. We provide a set of inputs and outputs (datasets with labels) in supervised learning, and the machine learns how to associate them while training. At the end of the training phase, we can identify a function from an input x with the best approximation of output y. Two types of supervised learning are regression and classification. Classification approaches include logic-based (decision tree and random forest), perceptron-based (ANN and deep learning), statistical learning (Bayesian and SVM), and instance-based (k-NN). By using these algorithms different applications such as localization, target tracking, medium access control, security QoS services etc. can be resolved.

2.2 Unsupervised Learning

In unsupervised learning, there is no output (unlabeled) associated to the inputs; even the model attempts to extract relationships from the data. To classify a group of similar patterns into clusters, reduce dimensionality, and find anomalies in the data, researchers used unsupervised learning approaches. Connection, anomaly detection, routing, and data aggregation are just a few of the problems that unsupervised learning solves for WSNs. Unsupervised learning includes clustering (k-means, hierarchical, and fuzzy-c-means) and dimensionality reduction (PCA, ICA and SVD).

2.3 Semi-Supervised Learning

Semi-supervised learning was first used on data that was both labelled and unlabeled. It contains semi-supervised classification for partially labelled data, constrained clustering for both labelled and unlabeled data, regression for unlabeled data, and dimensionality reduction for labelled data.

The two goals of semi-supervised learning are to predict labels on unlabeled data in the training set and to predict labels on future test data sets. Based on these goals, semi-supervised learning is divided into two types: transductive learning and inductive semi-supervised learning.

Semi-supervised learning applications include natural language processing, web content categorization, speech recognition, spam filtering, video surveillance, and protein sequence classification. This learning mechanism is used by WSNs to solve problems like fault detection and localisation (Hady M..F.A. et. al., 2013, Feldman D. et al., 2013).

2.4 Reinforcement Learning

The Reinforcement Learning (RL) algorithm learns by interacting with the environment and accumulating data in order to perform specific behaviours. RL boosts performance by figuring out how to get the optimum result from a given situation (Forster et al., 2007).

2.5 Evolutionary Computation

In evolutionary computation, computational models inspired by nature and biological evolution are utilised to solve issues. Evolutionary computing is a subcategory of artificial intelligence that uses a number of combinatorial optimization methods. Evolutionary computation has been used to successfully develop a variety of applications, including WSNs. In their study, the authors provided an overview of various evolutionary approaches for WSNs. Localization, coverage, routing, target tracking, and mobile sink are just a few of the WSN difficulties that have recently been handled utilising evolutionary or nature-inspired algorithms..

3. Machine Learning techniques

Machine learning helps analysis data, trains the machine by data sets and solves different types WSNs issues, IoT applications and other applications using different techniques which are explained below (Mitchell, 1997, Ayodele, 2010).

3.1 Regression

Regression is a technique which finds out relationship between dependent variables and independent variables. It also helps to design a model to predict the future vale of dependent variables. There are different types of regression. They are linear regression, nonlinear regression, logistic regression, ride regression, lasso regression, polynomial regression.

3.2. Decision Trees (DT)

DT technique contains if – then rules to improve readability. In DT, there are two types of nodes which are leaf node and decision node. DT solves various problems in WSNs like data aggregation, connectivity, anomaly detection and mobile path selection.

3.3. Random Forest (RT)

RT is generated by taking number of DTs to solve regression and classification problems with the help of large data set and returns high accuracy. It requires less training time than

other ML algorithms. It solves MAC and coverage problems of WSNs. It also applied in banking, health, marketing sectors to resolves issues.

3.4 Artificial Neural Network (ANN)

ANN is based on the model of human brain which is connected with a large of neurons that process information and return exact result. Ann is operated on layers and layers are connected with nodes. Every node associated with an activation function. ANN solves various WSN applications like data aggregation, routing, localization, detect faulty nodes and congestion control.

3.5 Naive Bayes Classifier

A form of classification algorithm is the Naive Bayes Classifier. Naive Bayes, a well-known type of classifier, is based on Bayes' theorem and strong independence assumptions. It's a simple probabilistic classifier that computes conditional class probabilities before predicting the most likely classification. To put it another way, the descriptive attribute probability models values will be used to give a class to an object.

3.6 Deep learning

Deep learning is subset of ANN. It is also layer based which is inspired by human nerve system. It is applied in various WSN application like routing, energy harvesting, medical image processing, speech recognition etc.

3.7 Support Vector Machine (SVM)

SVM divides the dataset into two groups, separated by a linear border that maximises the margin between the normal and attack classes. The hyperplane with the greatest distance between it and the closest positive and negative samples is the one that SVM seeks out. The kernel activating function is utilised instead of the exponential activating function in the fundamental design of an SVM network, which is similar to that of a standard RBF network (which is commonly Gaussian). To activate the kernel, you can use a polynomial kernel, a Gaussian radial basis kernel, or a two layer feed-forward neural network kernel.

3.8 K-Nearest Neighbour (K-NN)

KNN is instance base learning system which is used in regression and classification. This technique is based on various distance functions like Euclidean distance, Hamming distance. K-NN technique solves various problems like data aggregation, fault detection and anomaly detection of WSNs.

3.9 K-means clustering

In this technique, K number of positions are selected as centroids form given data set randomly to form clusters. It halts crating and optimizing clusters when either:

- The centroids have stabilized.
- The defined number of iterations has been achieved.

It is very simple clustering technique and applied in WSNs to determine optimal cluster heads for routing data to the sink and also applied for mobile sink.

3.10. Hierarchical clustering (HC)

HC is another important technique of machine learning to solve the problems of K-means clustering. It uses two techniques i.e agglomerative and divise. Agglomerative uses bottom – up approach whereas divise uses top-down method to design clusters. The HC resolves various issues of WSNs like data aggregation, energy harvesting and mobile sink

3.11 Fuzzy –c-means clustering (FCM)

FCM is developed by Bezdek in 1981 which is based on fuzzy set theory. Clusters are determined by equal measurement like intensity, distance and connectivity which is based on number of clusters, dimension, data points and iterations and solves various WSNs problems like localization, connectivity and mobile sink.

3.12 Reinforcement Learning (RL)

RL algorithm helps to learn by interacting with environment and collect information to do certain actions and determine optimal result from the environment. Q-learning is one of the RL learning system which is agent based.

4. Machine Learning Algorithms

4.1 Localization

Localization is the process of estimating the location of sensor nodes in target area to design WSNs. To design large sensor WSNs, the sensor nodes can't be deployed manually. There are different methods applied to deploy the sensor nodes. Machine learning algorithms are applied to deploy sensor nodes to design energy efficient WSNs. Classification and regression model are used to deploy the sensor nodes in target area. The following table defines different techniques to design energy efficient WSNs. (Wang Z. Et el., 2018) have designed a novel algorithm LSVM-PCS which is based on support vector machine and polar coordinate system to solve localization issues of WSNs. It provides better result over traditional localization algorithms. According to (Wang Z. Et. El., 2017) RSS based DSL is right method to localize the person without attaching any electronic device. They have purposed a method by which less amount of data can be sent to sink collected by sensors. They have also two localization methods which are based on GML and PF to global optimum and track the targeted objects.

Table 1: Localization for WSN				
Techniques Applied	Environment	Mobility of Nodes	Complexity	Benefits
SVM	Centralized	Static	High	Energy efficient
Bayesian	Centralized	Static or Mobile	High	Energy efficient

4.2 Data Aggregation

Data aggregation is the process of collecting and combining data from sensor nodes. In WSNs, data aggregation has an impact on a variety of characteristics, including power, memory, communication overhead, and computational units. In WSNs, data aggregation plays an important role in reducing the number of transmissions and communication overhead. An efficient data aggregation method balances sensor node energy consumption and extends network lifetime. Cluster-based data aggregation, tree-based data aggregation, in-network data aggregation, and centralised data aggregation are all examples of data aggregation methods that are dependent on the network topology. In (Song X. et al., 2013, Atoui et al., 2016, Gispan L. et al., 2017), the authors have designed energy efficient WSNs by applying different regression techniques. In (Yang H. et al., 2013), the authors have proposed energy efficient WSNs by applying decision tree. In (Morell A. et al., 2016) the authors have proposed to control imbalanced class problem in WSNs. In (Morell A. et al., 2016, Anagnostopoulos C. et al., 2014, Chidean M. I. et al., 2015), the author have designed energy efficient WSNs by using PCA method. In (Pinto A. et al., 2014), the authors have proposed an approach to implement data fusion techniques in WSNs using genetic algorithm.

Table 2: Data aggregation for WSNs				
Technique Applied	Environment	Topology	Mobility of nodes	Benefits
Regression	Distributed	Tree	Static	Improved network lifetime
Decision tree	Distributed	Tree	Static	Enhanced network lifetime
ANN	Distributed	Tree	Static	Enhanced network lifetime

| Bayesian | Distributed | Hybrid | Static | Enhanced network lifetime |
| Genetic classifier | Distributed | Star | Static or mobile | Extended network lifetime |

4.3 Clustering in WSN

In the case of battery-powered sensors, a fundamental challenge in WSNs is that they have limited or no energy sources available. WSN protocols must perform by lowering CPU load in the situation of mobile sensor nodes with limited battery power. WSNs face a significant power management challenge because they are battery-powered devices. The group of sensor nodes is known as cluster which consumes less power and improves network lifetime of WSNs.

In (Abbasi A. et al., 2007), clustering technique is applied to minimize the power consumption of sensor nodes and extends the lifetime of WSNs. In (Mohammed N. et al., 2011), leader election mechanism is used for intrusion detection in MANET. In (Hajami A. et al., 2010), an enhanced algorithm is designed for MANET clustering using multi-hop and network density. In (Pani N. K. et al., 2014), the authors have designed hybrid routing protocol for protection of MANET. In (Sethi S. et al., 2010), the authors have designed optimized routing protocol for MANET. In (Safa H. et al., 2010), the authors have designed a cluster based trust aware routing protocol for mobile ad hoc network. In (Zhang Y. et al., 2009) the authors have solved routing problems using clustering and detected intrusion of clusters. In (Younis O. et al., 2004), the authors have proposed energy efficient distributed protocol using residual energy and node degree for WSNs. In (Heinzelman W. B. et al., 2002), the popular protocol LEACH is designed which is better than HEED. In (Rajan M. A. et al., 2008), the authors have designed cluster based protocol using graph theory for MANET. In (Reese J. et al., 2006), the authors have solved p-median problem.

Table 3: Clustering in WSNs			
Techniques Applied	Data Noise	Speed of Clustering	Accuracy
K-Means	High	Fast	Low
Fuzzy – c- means	Low	Slow	High
Hierarchical clustering	Low	Low	High

4.4 Routing in WSN

Because sensor nodes have limited memory, bandwidth, and processing capabilities, design concerns like as energy consumption, data coverage, scalability, and fault tolerance must be considered while creating a routing protocol (AI-Karaki J. et al., 2004).

In (Mehmood A. et al., 2017), the authors have designed energy efficient routing protocol based on ANN. ANN training the protocol with various parameters like residual energy, distance between nodes, boarder nodes, cluster heads and sink. In (Gharajeh, M. et al., 2016), the authors have designed DFRTP protocol which is based on fuzzy system. This protocol reduces data delivery ratio and reduces power consumption of sensor nodes. In (Srivastava J. et al., 2015), the authors have designed ZEEP protocol for mobile sensor networks which is fuzzy based. The cluster heads are selected by using GA. Hence, ZEEP is energy efficient protocol. In (Lee, Y. et al., 2017), deep learning based routing algorithm is designed for mobile sensor network which controls packet loss, power management and congestion. In (Khan F. et al., 2016), SVM based routing protocol is designed to control power consumption and improve the network lifetime which is better than LEACH protocol. In (Jafarizadeh V. et al., 2017), Naive Bayes based cluster head selection algorithm

designed for energy efficient routing protocol which extends network lifetime. In (Li uZ. et al., 2014), a new routing frame is designed for data collection using Bayesian method. In (Kazemeyni F. et al., 2014), a new routing model is designed using Bayesian method for decentralized system as compare to centralized system. In (Hammoudeh M. et al., 2015), K-means classification algorithm is used for optimality of clusters. This algorithm is energy efficient and improves throughput. In (Liu X. et al., 2017   ), the authors have designed energy efficient clustering using k-means algorithm and used multi-hop path from cluster heads to sink. In (Jain B. et al., 2018), the author has designed EKMT protocol using k-means which minimizes delay and improves the throughput.

Table 4: Routing Algorithms for WSNs				
Technique Applied	Topology	Environment	Mobility of Nodes	Complexity
ANN	Tree	Centralized	Static	High
	Tree	Distributed	Static	Moderate
	Tree	Distributed	Static	Moderate
Deep Learning	Hybrid	Centralized	Mobile	High
SVM	Hybrid	Distributed	Static	Moderate
Bayesian	Tree	Distributed	Static	Moderate
	Hybrid	Centralized	Static	Low
	Hybrid	Centralized	mobile	Moderate
K-Means	Hybrid	Distributed	Static	Low
	Tree	Distributed	Static	Moderate
	Hybrid	Centralized	Static	Moderate

4.5 Energy Harvesting
Battery power is a major current source of energy for sensor nodes in WSNs, and the energy spent by the sensor nodes determines the network's lifetime. The majority of WSN applications necessitate network lifetimes of many months to years. We use energy-efficient protocols or provide energy harvesting technologies for sensor nodes to extend the lifetime of WSNs.

For energy efficiency, a variety of routing, sleep-scheduling, mobile sink, mobile charger, and other protocols have been developed. Due to high computational resources, unavailable sensor nodes, and additional maintenance, however, the energy need is not met. Maintenance-free, long-lasting, and self-powered energy harvesting is a feature of WSNs. Energy harvesting provides continuous power to sensor nodes from sources such as radio frequency, wind, solar, thermal, mechanical, and vibration energy.

There are two types of energy harvesting: without energy storage (sensor nodes directly use the electricity without any backup) and with energy storage (rechargeable battery). Several machine learning-based models have been used to track effective energy harvesting approaches for wireless sensor networks (WSNs). Many algorithms are used for energy harvesting . In(Sharma A.et al., 2018), the authors have designed solar irradiance prediction system by using ML technique which provides better result than conventional method by taking data set of national renewable energy laboratory (NREL). In (Tan, W. et al., 2017), the authors have designed an indoor test methodology for solar powered wireless sensor networks using linear regression technique which will work both centralized and distributed environment. But it provides better result in distributed than centralized environment. In (Kosunalp, S. et al., 2016), the author has designed Q-SEP algorithm using reinforcement technique for energy harvesting in wireless sensor networks which returns better harvested

energy in particular time period. In (Hsu, R. C et al., 2014), the authors designed energy harvesting algorithm using reinforcement learning technique for controlling duty cycles of WSNs. In (Aoudia, F. A., et al., 2018), the authors have designed a model using deep learning technique for wind power generation for IOT which produces better result than other conventional model. In (Chen, F., et al., 2019), the authors have designed energy harvesting algorithm using hierarchical clustering algorithm for heterogeneous wireless sensor networks. In this network, renewable energy provides energy to cluster heads and non-renewable energy provides rest of nodes. The less number of cluster heads are deployed to minimize the power consumption of WSNs.

Table 5: Energy harvesting for WSNs			
Technique Applied	Environment	Complexity	Source of Energy
Regression	Centralized/Distributed	High	Solar
Reinforcement Learning	Centralized	Low/Moderate	Solar
Deep Learning	Centralized	High	Wind
Hierarchical clustering	Distributed	Low	Solar/Wind

4.6 Mobile Sink:

Mobile sink is used to solve energy-hole problem in WSNs. In large WSNs, mobile sink movement from node to node is tedious task. So scheduling mobile sink or use rendezvous point to design energy efficient WSNs. In (Kim S. et al., 2017), the authors have designed naive Bayesian based data collection model using mobile sink from sensor nodes which is better than tradition model and energy efficient. This model also used IoT application. In (Tashtarian F. et a., 2015), the authors are purposed ODT algorithm for selection of RV points for mobile sink which improves lifetime of WSNs. In (Almiani K.et al., 2010), the authors designed energy efficient cluster based algorithm for data collection of mobile nodes in WSNs. In (Zhang R. et al., 2016), the authors have purposed hybrid algorithms for data collection in large scale WSNs using mobile sink which improves network life time. In (Zhang R et al., 2015), the authors are developed hierarchical clustering algorithms for data collection using mobile sink in large WSNs which is energy efficient. In (Nayak P. et al., 2016), the authors have purposed fuzzy logic based clustering algorithm for WSNs which energy efficient and improves network life time and produces better result than LEACH. In (Wang J. et al., 2017) , the authors purposed PSO base clustering algorithm with mobile sink to extend network life time of WSNs which is better than TTDD and LEACH. In (Praveen D. K. et al., 2018), the authors have purposed ACO based algorithm for tour of the mobile sink of WSNs which is energy efficient and extends network life time. In (Ha I. et al., 2017), the authors have proposed an algorithm which is based on k – means algorithm and minimum spanning tree to improve network lifetime of WSNs.

Table 6: Mobile Sink for WSNs	
Techniques Applied	**Benefits**
Decision Tree	Mobile path selection for mobile sink
Bayesian	Mobile path selection for mobile sink
K-mean clustering	RV points, optima RV points for mobile sink
Hierarchical clustering	Data collection for mobile sink
Fuzzy c-means clustering	Data collection for mobile sink
Evolutionary computing	Minimize tour length for mobile sink

6.   Statistical Analysis

We believe that supervised learning techniques will solve the majority of WSN concerns. In recent years, supervised learning algorithms have overcome 67% of WSN difficulties. Unsupervised learning approaches answered 18% of WSN issues, whereas reinforcement learning approaches solved 15%.

7. Open Issues

There are several challenges in wireless sensor networks. So, further research desirable in area of WSNs using intelligent techniques like machine learning and soft computing. The WSNs issues are localization, coverage and connectivity, data aggregation, routing, target tracking, energy harvesting etc.

8. Conclusion

We presented latest work in WSNs based on machine learning. We have discussed numerous challenges in WSNs that have arisen as a result of the use of ML approaches, such as location, data aggregation, clustering, routing, and energy harvesting. It has been discovered that genetic algorithms are successful in clusters of sensor nodes and can improve the energy efficiency of WSNs when clustering methodologies for WSNs using ML algorithms are used. In future, we will focus on data analysis using different machine learning algorithms using different data sets in different applications.

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APPROXIMATION OF FUNCTION IN THE WEIGHTED ZYGMUND CLASS BY MATRIX – EULER SUMMABILITY MEAN OF FOURIER SERIES

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The degree of approximation of function in Lipschitz and Zygmund class using different means of Fourier series and conjugate Fourier series have been great interest among the researcher.In this paper, a theorem on degree of approximation of function in the weighted Zygmund class by Matrix - Euler summability means of Fourier series has been established.

Keywords : Degree of approximation , Zygmund class, Weighted Zygmund class , Matrix – Euler mean, Euler mean, Fourier series.

1. INTRODUCTION
The theory of summability is concern about the generalization of the concept of the limit of a sequence or a series which is affected by an auxiliary sequence of linear means of the sequence or series. The original sequence or series may be divergent but the sequence of linear means is to be convergent.The error estimation of function in different function spaces such that Lipschitz, Holder, Zygmund spaces using different summability means of Fourier series have been obtained by several researchers. The summability method of infinite series have played vital role in the development of pure and applied mathematics.

2. LITERATURE REVIEW

The degree of approximation of function belonging to different classes like Lip α, (Lip α, p), Lip (ξ(t),p) , Lip (Lp , ξ(t)) have been studied by many mathematician using different summability means. The generalized Zygmund class was introduced by Leindler (1981) Moricz (2010), moricz e t al. (2007) etc. Recently Singh et al. (2017) Mishra et al. (2020), Kim (2021) ,Shyamlal et al. (2013) , Das et al. (2019) find the results in Zygmund class by using different summability means . In this paper we find the degree of approximation of function in the weighted Zygmund class by Matrix – Euler mean of Fourier series.

Let f be a periodic function of period 2π integrable in the sense of Lebesgue over $[\pi, -\pi]$. Then the Fourier series of f given by

$$f(t) \approx \frac{a_o}{2} + \sum_{n=1}^{\infty}(a_n cosnx + b_n sinnx) \qquad \text{.......(2.1)}$$

Zygmund class z is defined as

$$Z = \{f \in C[-\pi,\pi] | f(x + t) + f(x - t) - 2f(x)| = O(|t|)\}.$$

In this paper , we introduce a generalized Zygmund $Z^w(\alpha,\gamma)$ defined as

$$Z^w(\alpha,\gamma) = \left\{f \in C[-\pi,\pi] \left(\int_{-\pi}^{\pi}|f(x+t)+f(x-t)-2f(x)|^\gamma dx\right)^{\frac{1}{\gamma}} = O(|t|^\alpha\omega(t))\right\}$$

...........(2.2)

Where $\alpha \geq 0$, $\gamma \geq 1$ and ω is a continuous non negative and non decreasing

function. If we take $\alpha = 1, \omega = constant$ and $\gamma \to \infty$, then $Z^w(\alpha,\gamma)$ class reduces to

the z class. Now we define the weighted class as

$$W(Z_r^{(w)}) = \left\{f \in W(Z_r^{(w)}) : 1 \leq r \leq \infty \underset{t \neq 0}{\sup} \frac{\|f(.+t)+f(.-t)-2f(.)\sin^\beta(.)\|_r}{\omega(t)} \leq \infty\right\}$$

where $\|f\|_r^{(w)} = \|f\|_r + \underset{t \neq 0}{\sup} \frac{\|f(.+t)+f(.-t)-2f(.)\sin^\beta(.)\|_r}{\omega(t)}$

.......(2.3)

We write $through the paper$

$$\emptyset_x(t) = f(x+t) - 2f(x) + f(x-t)$$

.......(2.4)

$$K_n^{\Delta E}(t) = \frac{1}{2\pi}\sum_{k=o}^{n}\frac{sin\left\{(n-k+1)(\frac{t}{2})\right\}cos^{n-k}(\frac{t}{2})}{sin(\frac{t}{2})} =$$

.......(2.5)

In 2013 Shyam Lal and Shreen established the following theorem:

Let the lower triangular matrix $A = (a_{n,k})$ satisfying the following condition
$a_{n,k} \geq 0$ $(n = 0,1,2,3,\ldots\ldots; \; k = 0,1,2,\ldots\ldots.n)$

$$\sum_{k=0}^{n} a_{n,k} = 1 \sum_{k=0}^{n}|\Delta a_{n,k}| = o\left(\frac{1}{n+1}\right) and (n+1)a_{n,n} = o(1)$$

.........(2.6)

Let f be a 2π periodic function ,Lebesgue integrable in $[0,2\pi]$ and belonging to
generalizeded Zygmund class $(Z_r^{(w)})$ $(r \geq 1)$. Then the degree of approximation of
function f by matrix – Euler mean of Fourier series is given by

$$E_n(f) = inf\|t_n^{\Delta E} - f\|_r^v = o\left(\frac{1}{(n+1)}\int_{\frac{1}{n+1}}^{\pi}\frac{w(t)}{t^2v(t)}dt\right)$$

...........(2.7)

Where $\omega(t) and v(t)$ are the Zygmund modulai of continuity and $\frac{w(t)}{v(t)}$ is positive
and non - decreasing .

3.MAIN RESULT

In this paper we prove the following theorem:

Let the lower triangular matrix $A = (a_{n,k})$ satisfying the following condition $a_{n,k} \geq 0$ $(n = 0,1,2,3,\ldots\ldots;\ k = 0,1,2,\ldots\ldots n)$

$$\sum_{k=0}^{n} a_{n,k} = 1 \sum_{k=0}^{n} |\Delta a_{n,k}| = o\left(\frac{1}{n+1}\right) and (n+1)a_{n,n} = o(1)$$ ....(3.1)

Let f be a 2π periodic function ,Lebesgue integrable in $[0,2\pi]$ and belonging to weighted Zygmund class $W(Z_r^{(w)})$ $(r \geq 1)$. Then the degree of approximation of function f by matrix – Euler mean of Fourier series is given by

$$E_n(f) = \inf \|t_n^{\Delta E} - f\|_r^v = o\left(\frac{1}{(n+1)} \int_{\frac{1}{n+1}}^{\pi} \frac{t^{\beta-2} w(t)}{v(t)} dt\right)$$

Where $\omega(t) and v(t)$ are the Zygmund modulai of continuity and $\frac{w(t)}{v(t)}$ is positive and non - decreasing .

To prove the theorem we need the following lemma.

3.1 Lemma - For $0 \leq t \leq \frac{1}{n+1}$ we have

$$|K_n^{\Delta E}(t)| = o(n+1)$$ ....(3.1.1)

Proof - For $0 \leq t \leq \frac{1}{n+1}$ and $\sin\frac{t}{2} \geq \frac{t}{\pi}$, $\sin nt \leq nt$, $|\cos t| \leq 1$ we have

$$|K_n^{\Delta E}(t)| = \left|\frac{1}{2\pi} \sum_{k=o}^{n} a_{n,k} \frac{\sin\left\{(n-k+1)\left(\frac{t}{2}\right)\right\} \cos^{n-k}\left(\frac{t}{2}\right)}{\sin\left(\frac{t}{2}\right)}\right|$$

$$\leq \frac{1}{2\pi} \sum_{k=0}^{n} a_{n,k} \frac{(n-k+1)\left(\frac{t}{2}\right)\left|\cos^{n-k}\left(\frac{t}{2}\right)\right|}{\frac{t}{\pi}}$$

$$\leq \frac{1}{4}(n+1) \sum_{k=0}^{n} a_{n,k}$$

$$= o(n+1)$$

3.2 Lemma - For $\frac{1}{n+1} < t < \pi$, we have

$$|K_n^{\Delta E}(t)| = o\left(\frac{1}{(n+1)t^2}\right)$$ ....(3.2.1)

Proof - For $\frac{1}{n+1} < t < \pi$, $\sin\frac{t}{2} \geq \frac{t}{\pi}$ using Abel's lemma we get

$$|K_n^{\Delta E}(t)| = \left|\frac{1}{2\pi} \sum_{k=o}^{n} a_{n,k} \frac{\sin\left\{(n-k+1)\left(\frac{t}{2}\right)\right\} \cos^{n-k}\left(\frac{t}{2}\right)}{\sin\left(\frac{t}{2}\right)}\right|$$

$$\leq \frac{1}{2t}\left|\sum_{k=o}^{n}(a_{n,k}-a_{n,k+1})\sum_{v=0}^{k}sin\left\{(n-v+1)(\tfrac{t}{2})\right\}cos^{n-v}\left(\tfrac{t}{2}\right)+a_{n,n}\sum_{k=0}^{n}sin\left\{(n-k+1)(\tfrac{t}{2})\right\}cos^{n-k}(\tfrac{t}{2})\right|$$

$$\leq \frac{1}{2t}\left[\sum_{k=o}^{n-1}|\Delta a_{n,k}|\,\frac{sin(2n-k+2)(\tfrac{t}{4})sin(n+1)\tfrac{t}{4}}{sin\,(\tfrac{t}{4})}+a_{n,n}\frac{\left|sin\left\{(n+2)(\tfrac{t}{4})\right\}sin(n+1)(\tfrac{t}{4})\right|}{sin(\tfrac{t}{4})}\right]$$

$$\leq \frac{\pi}{t^2}\left[\sum_{k=o}^{n-1}|\Delta a_{n,k}|+a_{n,n}\right]\max_{0\leq k\leq n}\left|sin(2n-k+2)\left(\tfrac{t}{4}\right)sin(n+1)\tfrac{t}{4}\right|$$

$$= \frac{\pi}{t^2}\left[\sum_{k=o}^{n-1}|\Delta a_{n,k}|+a_{n,n}\right]$$

$$= \frac{\pi}{t^2}\left[o\left(\tfrac{1}{n+1}\right)+o\left(\tfrac{1}{n+1}\right)\right]$$

$$=o\left(\frac{1}{(n+1)t^2}\right)$$

3.3 Lemma – Let $f \in Z_r^{(w)}$ then for $0 < t \leq \pi$

    (i) $\|\phi(.,t)\|_p = o(w(t))$

    (ii) $\|\phi(.+y,t)+\phi(.-y,t)-2\phi(.,t)\|_r = \begin{cases}o(w(t)\\o(w(y)\end{cases}$

    (iii)   If $\omega(t)$ and $v(t)$ are defined as in theorem then

$$\|\phi(.+y,t)+\phi(.-y,t)-2\phi(.,t)\|_r = \left\{v(y)\frac{\omega(t)}{v(t)}\right.$$

Where $\phi(x,t) = f(x+t)+f(x-t)-2f(x)$.

3.4 Lemma - $\left\|\phi(.+y,t)+\phi(.-y,t)-2\phi(.,t)sin^\beta(.)\right\|_r = o\left(t^\beta v(y)\frac{\omega(t)}{v(t)}\right)$

Proof - Following lemma 3(c) $\left|sin^\beta t\right| \leq t^\beta$ and for v is positive non-decreasing

$t \leq y$ we obtain

$$\left\|\phi(.+y,t)+\phi(.-y,t)-2\phi(.,t)sin^\beta(.)\right\|_r = o\left(t^\beta \omega(t)\right)$$

$$=o\left(t^\beta v(t)\frac{\omega(t)}{v(t)}\right)$$

$$\leq o\left(t^\beta v(t)\frac{\omega(t)}{v(t)}\right)$$

since $\frac{\omega(t)}{v(t)}$ is positive, non-decreasing if $t \geq y$ then $\frac{\omega(t)}{v(t)} \geq \frac{\omega(y)}{v(y)}$ so that

$$\left\|\phi(.+y,t)+\phi(.-y,t)-2\phi(.,t)sin^\beta(.)\right\|_r = o\left(t^\beta \omega(y)\right)$$

$$= o\left(t^\beta v(y)\frac{\omega(t)}{v(t)}\right)$$

3.5 Proof of Theorem :

Let $S_k(f:x)$ denotes the partial sum of Fourier series given in (2.1) then we have

$$S_k(f:x) - f(x) = \frac{1}{2\pi}\int_0^\pi \emptyset(x,t)\frac{\sin(k+\frac{1}{2})t}{\sin\frac{t}{2}}dt \qquad\qquad\text{........(3.5.1)}$$

Then

$$\frac{1}{2^n}\sum_{k=0}^n \binom{n}{k}(s_k(f;x)-f(x)) = \frac{1}{2\pi}\int_0^\pi \emptyset(x,t)\frac{1}{2^n}\sum_{k=0}^n \binom{n}{k}\frac{\sin(k+\frac{1}{2})t}{\sin\frac{t}{2}}dt$$

$$E_n^1(x) - f(x) = \frac{1}{2\pi}\int_0^\pi \emptyset(x,t)\frac{1}{2^n \sin\frac{t}{2}}\left\{I_m\sum_{k=0}^n \binom{n}{k}e^{i(k+\frac{1}{2})t}\right\}dt$$

$$=\frac{1}{2\pi}\int_0^\pi \emptyset(x,t)\frac{1}{2^n \sin\frac{t}{2}}\left\{I_m\sum_{k=0}^n \binom{n}{k}e^{ikt}\cdot e^{it/2}\right\}dt$$

$$=\frac{1}{2\pi}\int_0^\pi \emptyset(x,t)\frac{1}{2^n \sin\frac{t}{2}}\left\{I_m(1+e^{it})^n e^{it/2}\right\}dt$$

$$=\frac{1}{2\pi}\int_0^\pi \emptyset(x,t)\frac{\sin\left\{(n+1)(\frac{t}{2})\right\}\cos^n(\frac{t}{2})}{\sin(\frac{t}{2})}dt. \qquad\qquad\text{......(3.5.2)}$$

Now $t_n^{\Delta E}(x) - f(x) = \frac{1}{P_n}\sum_{k=0}^n a_{n,k}\{E_{n-k}^1(x) - f(x)\}$

$$=\frac{1}{2\pi}\int_0^\pi \emptyset(x,t)\sum_{k=0}^n a_{n,k}\frac{\sin\left\{(n-k+1)(\frac{t}{2})\right\}\cos^{n-k}(\frac{t}{2})}{\sin(\frac{t}{2})}dt.$$

$$= \int_0^\pi \emptyset(x,t)K_n^{\Delta E}(t) \qquad\qquad\text{.........(3.5.3)}$$

Let $\quad l_n(x) = t_n^{\Delta E}(x) - f(x) = \int_0^\pi \emptyset(x,t)K_n^{\Delta E}(t)dt \quad$ then

$$l_n(x+y) + l_n(x-y) - 2l_n(x) = \int_0^\pi [\phi(x+y,t)+\phi(x-y,t)-2\phi(x,t)]\,K_n^{\Delta E}(t)dt$$

Now $\left(l_n(.+y)+l_n(.-y)-2l_n(.)\sin^\beta(.)\right)$

$$= \int_0^\pi \left[\phi(.+y,t)+\phi(.-y,t)-2\phi(.,t)\sin^\beta(.)\right]K_n^{\Delta E}(t)dt$$

$$\left\|l_n(.+y)+l_n(.-y)-2l_n(.)\sin^\beta(.)\right\|_r = \int_0^\pi \left\|\phi(.+y,t)+\phi(.-y,t)-2\phi(.,t)\sin^\beta(.)\right\|_r K_n^{\Delta E}(t)dt$$

$$= \int\limits_0^{\frac{1}{n+1}} \left\| \phi(.+y,t) + \phi(.-y,t) - 2\phi(.,t)\sin^\beta(.) \right\|_r K_n^{\Delta E}(t)dt$$

$$+ \int\limits_{\frac{1}{n+1}}^{\pi} \left\| \phi(.+y,t) + \phi(.-y,t) - 2\phi(.,t)\sin^\beta(.) \right\|_r K_n^{\Delta E}(t)dt$$

$$= I_1 + I_2 (say) \qquad\qquad\qquad ....(3.5.4)$$

The function Let $f \in W(Z_r^{(w)})$ implies $\emptyset \in W(Z_r^{(w)})$.

Using lemma(3.1) and (3.4) and the monotonically of $\frac{\omega(t)}{v(t)}$ with respect to t we have

$$I_1 = \int\limits_0^{\frac{1}{n+1}} \left\| \phi(.+y,t) + \phi(.-y,t) - 2\phi(.,t)\sin^\beta \right\|_r K_n^{\Delta E}(t)dt$$

$$= o\left(\int\limits_0^{\frac{1}{n+1}} \left(v(y)\frac{t^\beta \omega(t)}{v(t)} \right)(n+1)\, dt \right)$$

$$= o\left((n+1)v(y) \int\limits_0^{\frac{1}{n+1}} \frac{t^\beta \omega(t)}{v(t)}\, dt \right)$$

$$= o\left((n+1)v(y) \frac{\omega\left(\frac{1}{n+1}\right)}{v\left(\frac{1}{n+1}\right)} \int_0^{\frac{1}{n+1}} t^\beta dt \right)$$

$$= o\left((n+1)^{-\beta} v(y) \frac{\omega\left(\frac{1}{n+1}\right)}{v\left(\frac{1}{n+1}\right)} \right) \qquad\qquad ....(3.5.5)$$

Using lemma (3.2) and (3.4) we have

$$I_2 = \int\limits_{\frac{1}{n+1}}^{\pi} \left\| \phi(.+y,t) + \phi(.-y,t) - 2\phi(.,t)\sin^\beta(.) \right\|_p K_n^{\Delta E}(t)dt$$

$$= o\left(\int\limits_{\frac{1}{n+1}}^{\pi} \left(v(y)\frac{t^\beta \omega(t)}{v(t)} \right)(n+1)^{-1}t^{-2}dt \right)$$

$$= o\left((n+1)^{-1}v(y)\int_{\frac{1}{n+1}}^{\pi}\left(\frac{t^{\beta-2}\omega(t)}{v(t)}\right)dt\right)$$

.............(3.5.6)

From (3.5.4) (3.5.5) and (3.5.6) we get

$$\left\|l_n(.+y)+l_n(.-y)-2l_n(.)sin^\beta(.)\right\|_r$$

$$= o\left((n+1)^{-\beta}v(y)\frac{\omega\left(\frac{1}{n+1}\right)}{v\left(\frac{1}{n+1}\right)})\right)+o\left((n+\quad 1)^{-1}v(y)\int_{\frac{1}{n+1}}^{\pi}\left(\frac{t^{\beta-2}\omega(t)}{v(t)}\right)dt\right)$$

$$\underset{y\neq 0}{sup}\frac{\|l_n(.+y)+l_n(.-y)-2l_n(.)\|_r}{v(y)}=\quad o\left((n+1)^{-\beta}\frac{\omega\left(\frac{1}{n+1}\right)}{v\left(\frac{1}{n+1}\right)}\right)+o\left((n+1)^{-1}\int_{\frac{1}{n+1}}^{\pi}\left(\frac{t^{\beta-2}\omega(t)}{v(t)}\right)\right)$$

..........(3.5.7)

Clearly $\quad \emptyset(x,t)=|f(x+t)+f(x-t)-2f(x)|$

Now applying Minkowski's inequality we have

$$\|\emptyset(x;t)\|_r=\|f(x+t)+f(x-t)-2f(x)\|_r$$

Again using lemma we have

$$\left\|l_n(.)sin^\beta(.)\right\|_r\leq\left(\int_0^{\frac{1}{n+1}}+\int_{\frac{1}{n+1}}^{\pi}.\right)\left\|\phi(.,t)sin^\beta(.)\right\|\left|K_n^{\Delta E}(t)\right|dt$$

$$= o\left((n+1)\int_0^{\frac{1}{n+1}}t^\beta\omega(t)dt\right)+o\left((n+1)^{-1}\int_{\frac{1}{n+1}}^{\pi}t^{\beta-2}\omega(t)\,dt\right)$$

$$= o\left((n+1)\omega\left(\frac{1}{n+1}\right)\int_0^{\frac{1}{n+1}}t^\beta dt+\left((n+1)^{-1}\int_{\frac{1}{n+1}}^{\pi}\frac{\omega(t)}{t^{2-\beta}}\,dt\right)\right)$$

$$= o\left((n+1)^{-\beta}\omega\left(\frac{1}{n+1}\right)\right)+o\left((n+1)^{-1}\int_{\frac{1}{n+1}}^{\pi}\frac{\omega(t)}{t^{2-\beta}}\,dt\right)\qquad\text{... (3.5.8)}$$

From (3.5.7) and (3.5.8) we have

$$\left\|l_n(.)sin^\beta(.)\right\|_r^v=\left\|l_n(.)sin^\beta(.)\right\|_r+\underset{y\neq 0}{sup}\frac{\left\|l_n(.+y)+l_n(.-y)-2l_n(.)sin^\beta(.)\right\|_r}{v(y)}$$

$$= o\left((n+1)^{-\beta}\, \omega\left(\frac{1}{n+1}\right)\right) + o\left((n+1)^{-1} \int_{\frac{1}{n+1}}^{\pi} \frac{\omega(t)}{t^{2-\beta}}\, dt\right) + \quad o\left((n+1)^{-\beta} \frac{\omega\left(\frac{1}{n+1}\right)}{v\left(\frac{1}{n+1}\right)}\right)$$

$$+ o\left((n+1)^{-1} \int_{\frac{1}{n+1}}^{\pi} \left(\frac{t^{\beta-2}\omega(t)}{v(t)}\right)\right)$$

$$= \sum_{i=1}^{4} J_i \qquad\qquad\qquad ... (3.5.9)$$

Now we write J_1 in terms of J_3 and J_2 , J_3 in term of J_4.

In view of the monotonicity of v(t) we have

$$\omega(t) = \left(\frac{\omega(t)}{v(t)}\right)\, v(t) \le\, v(\pi)\left(\frac{\omega(t)}{v(t)}\right)\, v(t) = o\left(\frac{\omega(t)}{v(t)}\right) \quad for\ 0 < t \le \pi$$

Therefore we can write

$$J_1 = o(J_3)$$

Again using monotonicity of v(t)

$$J_2 = (n+1)^{-1} \int_{\frac{1}{n+1}}^{\pi} t^{\beta-2}\frac{\omega(t)}{v(t)} v(t)\, dt \le (n+1)^{-1} v(\pi) \int_{\frac{1}{n+1}}^{\pi} \left(t^{\beta-2}\frac{\omega(t)}{v(t)}\right) dt \, \le (n+1)^{-1} \int_{\frac{1}{n+1}}^{\pi} \left(\frac{t^{\beta-2}\omega(t)}{v(t)}\right) dt$$

$$= o(J_4)$$

$$............ (3.5.10)$$

Using $\frac{\omega(t)}{v(t)}$ is positive and non- decreasing , we have

$$J_4 = (n+1)^{-1} \int_{\frac{1}{n+1}}^{\pi} \left(t^{\beta-2}\frac{\omega(t)}{v(t)}\right) dt \ge (n+1)^{-1} \frac{\omega\left(\frac{1}{n+1}\right)}{v\left(\frac{1}{n+1}\right)} \int_{\frac{1}{n+1}}^{\pi} t^{\beta-2}\, dt \ge (n+1)^{-1} \frac{\omega\left(\frac{1}{n+1}\right)}{v\left(\frac{1}{n+1}\right)} \frac{1}{(n+1)^{\beta-1}}$$

$$\ge (n+1)^{-\beta} \frac{\omega\left(\frac{1}{n+1}\right)}{v\left(\frac{1}{n+1}\right)}$$

Therefore we can write

$$J_3 = o(J_4) \qquad\qquad\qquad .... (3.5.11)$$

so we have

$$\left\|l_n(.)sin^{\beta}(.)\right\|_r^v = o(J_4) = o\left((n+1)^{-1} \int_{\frac{1}{n+1}}^{\pi} t^{\beta-2}\frac{\omega(t)}{v(t)}\, dt\right)$$

Hence

$$E_n(f) = \inf \left\| l_n(.)\sin^\beta(.) \right\|_r^v = o\left((n+1)^{-1} \int\limits_{\frac{1}{n+1}}^{\pi} t^{\beta-2} \left(\frac{\omega(t)}{v(t)} \right) dt \right)$$

This complete the proof.

4. CONCLUSION

This work is generalization of the result of Shyam Lal et al, (2013) "Best Approximation of Function of Generalised Zygmund Class by Matrix - Euler Summability Means of Fourier Series". In future, this result can be generalised under certain conditions.

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METHODS TO IMPROVISE MACHINE TRANSLATION(ANALYSIS OF SANSKRIT TO ENGLISH)

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Communication plays an important rolein expressing our ideas and feelings to others but there are many languages which are spoken in whole world so the language should not become a barrier for the communication. Machine translation was developed to access the other languages documents which may contain very useful and critical information.Government agencies and research institutes are providing initiatives to develop tools for machine-controlled text translation, which might be effective for international business communications into information professionals to improve their information services.

Machine translation uses various algorithms to translate the text like neural machine translation, statisticalmachine translation, hybrid, hierarchical. This paper presents different Machine Translation system where Sanskrit is involved as source, target or key support language. Researchers employ various techniques like Rule Based Machine Translation (RBMT) systems, Corpus Based systems and Hybrid Machine Translation systems, Neural Machine Translation (NMT) were developedto obtain anaccurate measure to obtain the desired output fromthe source language as no method can completely produce the exact meaning sentence**.**

Keywords: Statistical, machine translation, hybrid, hierarchical, neural , corpus.

1. INTRODUCTION

More than 6,500 languages are spoken all over the world and in India itself, there are around 121languages which are in existence. In this diverse world, sharing of information, knowledge and ideas play a vital role. Not everyone is capable of convey their message to all the people around them.

To minimize communication gap between the peoplewe need a tool which provide us an easyway to communicate and understand each other's thoughts without having prior knowledge of that language and this tool is known as translator and the process is known as translation.

1) Hierarchical phrase based models and syntax based models.

2) Rule-based Machine Translation (RBMT): RBMT follow a set of grammatical rules to make the sentence more correct and accurate.

3) Hybrid Machine Translation (HMT): HMT is ablend of RBMT and SMT. It is more precise regarding quality.

4) Neural Machine Translation (NMT): NMT is acategory of machine translation that depends upon the neural network model to construct statistical models with the objective of translation.

As we know that many languages are directly or indirectly derived from Sanskrit. Sanskrit is mother of all languages so its existence is necessary. That's why we need a translator which can convert large text of Sanskrit into English so a person who doesn't haveany prior knowledge of Sanskrit can easily understand the message that the text conveyed.

2. LITERATURE REVIEW

Authors describe a statistical method to machine translation in this study(Peter F. Brown,1990). It divides the source text into segments and compares them to an aligned bilingual corpus(C. Dove,2012) to determine the most likely translation using statistical possibility and data(Abadi,2016).

$$p(English|Sanskrit) = \frac{p(English) \times p(Sanskrit\ |English)}{p(Sanskriti)} ---------- (1)$$

Author explain a stack decoding technique in paper(Ye-Yi Wang,1998). They proposed heuristics and a hypothesis rating method.

The writers of study Brown (1993)analyse the differences in language between English and Sanskrit. This research examines English-Sanskrit translation patterns in order to identify probable areas of translation divergence.

The purpose of this study is to explore the design and development of a cross-language system from English to Sanskrit(D. Dinh,2014) in order to make it more suited.

The authors of paperRathod S.G(2014) argue that using a fixed-length vector is a bottleneck in improving the performance of this basic encoder-decoder architecture, and that this can be enhanced by allowing a model to automatically (soft-)search for parts of a source text that are relevant to predicting a target word without having to form these parts as a hard segment clearly.

The author of this paper discusses various machine translation technologies (Dzmitry Bahdanau,2014). This method, also known as Memory-Based Machine Translation, takes a series of sentences from the source language and generates corresponding translations in the target language via point-to-point mapping. When comparable sorts of sentences are translated using examples, and a previously translated sentence is repeated, the same translation is likely to be correct again(Rathod S.G,2014).
As seen in(E. Sumita,2014), the example-based method is mostly used to translate two completely different languages, such as Japanese and English. Deep language analysis can't

be used because it's too time-consuming. A good example of an EBMT tool is PanEBMT(Mishra,2009). When modification is done on a regular basis, RBMT performs better and produces better results. However, it is less efficient when compared to Corpus-based and Hybrid methods. When the target language does not have a lot of morphology, Corpus Based MT, especially Statistical MT, is a useful option. Hybrid MT is preferable when the source and target languages are more complicated.

The authors of this work(Melvin Johnson,2009) proposed two simple and effective kinds of attentional mechanisms: global and local approaches. Global approach focus on whole source word at a time and Local approach focus at subset of whole source word at a time. They demonstrate both approaches on WMT translation between English and German

The authors of this studyprovide GNMT, which attempts to address the shortcomings that NMT had, such as accuracy and speed. (Melvin Johnson,2009)

This research paper(F.J.Och ,July2003) presents different Machine Translation system where Sanskrit is involved as source, target or key support language .This paper focuses on Sanskrit in machine translation to discover the language suitability(Jawaid B,2014).

Sébastien Jean, Kyunghyun Cho, Roland Memisevic, and Yoshua Bengio suggested an approach based on the importance of sampling, in which a limited fraction of target vocabulary is decoded because utilizing a large target vocabulary increases training complexity.

The author discusses various machine translation technologies. This method, also known as Memory-Based Machine Translation, takes a series of sentences from thesource language and generates corresponding translations in the target language using point-to-point mapping. When comparable sorts of sentences are converted using examples, and a previously translated sentence is repeated, the same translation is likely to be correct again(Jawaid B,2014).As seen inKumar A(2010), the example-based method is primarily used to translate two completely different languages, such as Japanese and English. One of the key disadvantages of the Example-based engine is that thorough language analysis cannot be used. A good example of an EBMT tool is Pan EBMT.

When customization is done on a regular basis, RBMT performs better and produces better results. However, it is less efficient when compared to Corpus-based and Hybrid methods. When the target language does not have a lot of morphology, Corpus Based MT, especially Statistical MT, is a useful option. Hybrid MT is preferable when the source and target languages are more complicated.

In paper(Promila Bahadur ,2012).they are working oncombining translation memories with NMT. Their works include a better support of reduced precision on GPU and integration of optimized back end for non-Intel CPUs

The tool kit contains multiple projects and features to cover the complete model production workflow. The main implementations, Open NMT-py and Open NMT-tf, support many configurable models and efficient training procedures to produce high-quality models. During the WMT19 campaign (Barrault et al., 2019), thebest BLEU score for English to German was 44.9 but the best human evaluated system scored only 42.7 with an ensemble of Big Transformers. It isalso important to stress that we found many WMT19 references in the test sets (whether for English to German or some other pairs) were obviously being posted its of commercial systems. A very simple way to outline this phenomenon was to score each document with these commercial systems and show the huge difference in BLEU points for some of them. On the otherhand, these systems were not over-performing in the same way for previous years test sets. This has been reported by several papers within the WMT19 campaign.

Traditional methods, such as Statistical Machine Translation, are outperformed by the translation quality.

However, the research demonstrates that there are still significant issues with the Machine Translation model for document-level machine translation jobs, such as the loss of the original document theme and a lack of fluency.

The goal of this paper is to increase translation quality, and we focus on developing an NMT network that can capture contextual information from other sentences. His method allows the model to gain context information throughout the training phase(Rathod S.GSeptember, (2014))

Due to the lack of a parallel corpus at the document level, a two-step training technique is used.

Our context-aware model improves BLEU scores by 3.77 percent and 3.29 percent when compared(to the sentence-based model, according to the evaluation findings of Chinese to English translation.

We reuse past translation that is encoded into a set of cases in Machine Translation (MT), where case is the input sentence and its matching translation.

A case will be found that is similar to the input sentence, and a solution will be generated by changing the target language.

In the realm of English to Sanskrit language MT, the CBR approach is utilized as a learning mechanism.

Syntactical features of the English language are included in the cases in our case database (SiddiquiT.,2008)

Using the ANN approach, the new input English sentence is matched with old cases from the stored case bases.

Rules are used to adjust the retrieved case(Kumar A,2010).

The integration of the CBR approach of MT with ANN and a rule-based model of English to Sanskrit MT is shown in this research, where the CBR approach of MT is utilized to pick the Sanskrit translation rule of the input English sentence(Upadhyay P, 2014).

The effectiveness of neural machine translation (NMT) has attracted the attention of researchers in recent years.

 The most common inputs to NMT systems in practical applications are sentences in which words are represented as separate vectors in a word embedding space. This word embedding space does not display any dependency or semantic role links between words within a sentence.Recent research has discovered that semantic information is critical for machine translation to provide succinct and appropriate translations(Warhade S. R,2012). Despite tremendous development, the design and functions of these models are limited to statistical machine translation systems.

In order to generate excellent translations, this research compares phrase-based statistical approaches to Rule-based statistical approaches in English-Indian language and Indian-Indian language MT systems.   To construct the rules and linguistic resources(Sreelekha S,2017), such as morphological analyzers, part-of-speech taggers and syntactic parsers, bilingual dictionaries, transfer rules, morphological generator, and reordering rules, the RBMT system necessitates a significant amount of human effort. There have been successful attempts with all four RBMT techniques in the instance of English to Indian languages and Indian to Indian languages(Ye-Yi Wang,2019). These methods generate statistical models from multilingual parallel corpora using a supervised or unsupervised statistical machine learning technique. Word-based translation, phrase-based translation, and

hierarchical phrase-based model are the three statistical techniques used in machine translation.

3. EXPERIENTIAL WORK

After discussing various approaches of machine translation used by several researchers and their outcomes we need dataset to train our machine as machine learn from the sample only. So this section illustrates the sample sentences of Sanskrit language and their translation in English language which shows how one word means in English language differently in different contexts and thus helpful in providing more accurate results of machine translation as shown in Table 1.

3.1 Data Set

To begin, we create a Sanskrit-English dataset comprised of bilingual sentence pairings in Sanskrit and English. A tab-delimited pair of a Sanskrit text sequence and the translated English text sequence appears on each line in the dataset. It's worth noting that each text sequence can be as simple as a single sentence or as complex as a paragraph of many sentences. Sanskrit is the source language and English is the target language in this machine translation challenge where Sanskrit is translated into English.

Following that, we perform a number of preprocessing steps on the raw text data. For example, we insert space between words and punctuation marks, replace non-breaking space with space, and convert capital letters to lowercase characters.

Because the machine translation dataset is made up of pairs of languages, we can create distinct vocabulary for the source and target languages. The vocabulary size will be much greater with word-level tokenization than with character-level tokenization.

Sample sentences for training machine from Sanskrit to English Language is given below as shown in table 1.

Table 1:SANSKRIT TO ENGLISH TRANSLATION	
SANSKRIT SENTENCE	ENGLISH SENTENCES
1. भवत्याःनर्तनंकदाअस्ति?	**When is your dance?**
2. गतदिनेसःबहुउग्र :जातः।	**Yesterday he was very angry.**
3. ममकार्यालियम्आगत्यमाम्अवदत्	**Came to my office and told...**
4.स :भोजनेआसक्त :अस्ति।	**He is busy eating food.**
5.नेतारूप्यकाणिगणनेव्यापृत :अस्ति।	**The leader is busy counting the notes.**
6.सःबहुआग्रहंकरोति।	**He is very insistent.**
7.अद्यनूतनालेखनीप्राप्ता		**Got a new pen today.**
8.ह्याःधावनस्पर्धाआसीत्।	**Yesterday was the race event.**
9.गिर्योःमध्येसूर्योदयःशोभते।	**The sun looks beautiful (nice) between the two hills.**
10.तत्रद्वयोःपङ्क्त्योःमध्येस्थानंनास्ति।	**There is no place between the two lines.**
11.महाभारतंपठित्वाअहंअनेकाःकथाःजानामि।	**Having read Mahabharata, I know many tales.**
12.संस्कृतंसुलभम्।अतःअहंसंस्कृतंपठामि।	**Sanskrit is easy. So, I am studying Sanskrit.**
13.भवान्दशाधिकषड्वादनेउत्तिष्ठति|	**You get up at 6:10.**
14.सःसायङ्कालेलिखति	**He writes in the evening.**
15.अलेक्षःसप्तवादनेगच्छति	**Alex goes at 7 o'clock.**

16.श्वःशनिवासरः	Tomorrow is Saturday.
17.परश्वःभानुवासरः	Day after tomorrow is Sunday.
18. एषःकः?	Who is he (this one)?
19.हरेःपत्नीलक्ष्मीः।	Lakshmi is the wife of Hari.
20.साध्वोःशीघ्रंमैत्रीभवति।	Good people become friends quickly.
21.तत्रधेनूनांसमूहःतिष्ठति।	A group of cows sits there.
22.साधूनांदर्शनंपुण्यम्।	Seeing the saints is meritorious.
23.आपत्कालेबुद्धेःपरीक्षाभवति।	The test of intellect is during an emergency/trouble.
24.शिशुःक्रीडाङ्गणेपतितिरोदनंकरोति।	The child falls in the playground; weeps.
25. अहंपठामि।	I read.
26.सीताक्रीडति।	Seeta plays.
27.जीवेषुकरुणाचापिमैत्रीतेषुविधीयताम्।	Be compassionate and friendly to all living beings.
28.अहिंसाप्रतिष्ठायांतत्संनिधौवैरत्यागः।	As a Yogi becomes firmly grounded in non-violence (Ahimsa), other people who come near will naturally lose any feelings of hostility.
29.रमेशःसंकटातुमांत्रायते।	Ramesh protects me from crisis.
30.साव्याघ्रात्विभेति।	She is afraid of the tiger.
31.कवीनांकविषुकालिदासःश्रेष्ठः।/	Kalidas is the best among the poets.
32.मानवानांमानवेषुदिनेशःनिकृष्टः।/	Dinesh is inferior in humans.
33.वाराणसीगंगायाःतटेअवस्थिता।	Varanasi is situated on the banks of the Ganges.
34.वाराणसीधर्माणांसंगमस्थलीअस्ति।	Varanasi is a union of religions.
35.उद्यानेमयूरंपश्य।	Look peacock in the garden.
36.स्वकर्त्तव्यंशीघ्रंकुरु।	Speed up your duty.
37.स्वराष्ट्रसेवाम्अस्माकंधर्मःअस्ति।	It is our religion to serve our nation.
38.एकःवीरःअपरस्यवीरस्यसम्मानंकरोति।	One hero respects the other heroes.
39.पृथगवेशभूषाःअपिवयंसर्वेएकीभूताःस्मः।	Even though we have different costumes, we all are one.
40.उपकारीपुरुषःश्रेष्ठःभवति।	Good man is superior.
41.अद्यवृष्टिःनभविष्यति।	Today it will not rain.
42.त्वंश्वःकुत्रगमिष्यसिकिंकरिष्यसिच?	Where will you go tomorrow and what will you do?
43.सर्वाःछात्राःपत्राणिलेखिष्यन्ति।	All students will write letters.
44.विद्यालयःअस्माकंगृहम्अस्ति।	The school is our home.
45.रामकृष्णःएकःविलक्षणपुरुषःआसीत्।	Ramkrishna was a fantastic Pharisee.
46. सदाचारेणविश्वासःवर्धते।	Faith increases with honesty.
47.विनयःमनुष्याणांभूषणम्अस्ति।	Humility is the glory of human beings.
48.चौराःगृहेअप्रविशन्।	The thieves entered the house
49.गंगाभारतस्यपवित्रानदीअस्ति।	Ganga is the holy river of India.
50.गीतायाःकिंसन्देशःअस्ति?	What is the message of the Gita?

For performing machine translation and understanding the concept we should first develop the workflow of the techniques how the machine translation is performed as shown in Figure 1 and Figure 2 and then reach to the conclusion of choosing best techniques based on the bleu score and mainly we have discussed the workflow of SMT and RBMT techniques in Figure 1 and 2 respectively.
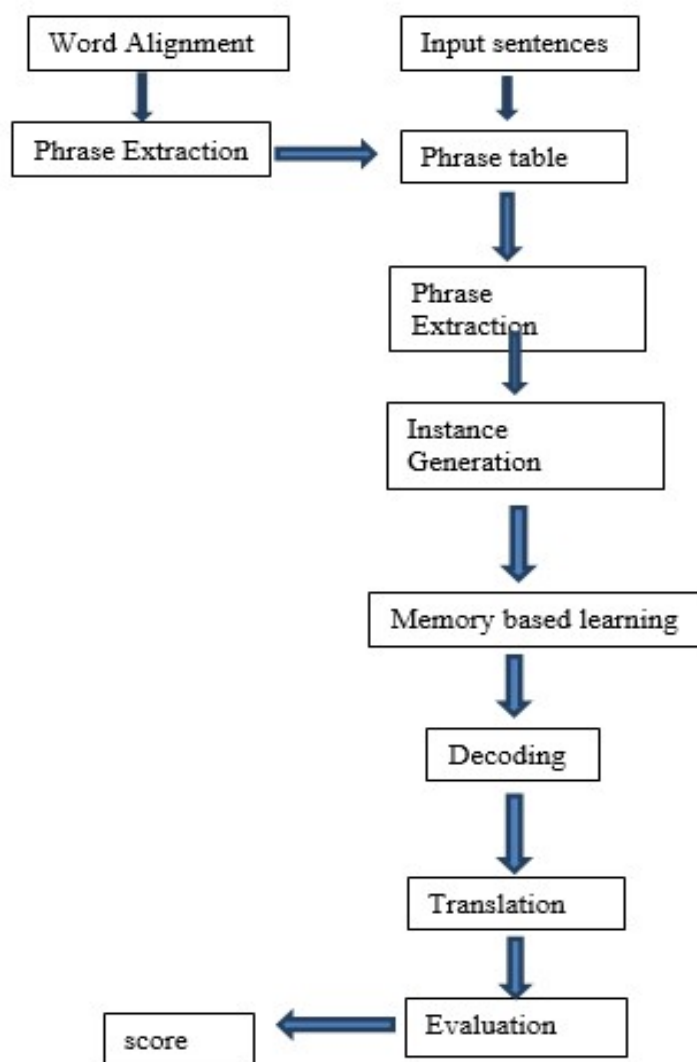

Figure1:SMT WORKFLOW

This figure explains us how the statistical machine translation works by extracting input from the phrase, generating the instance of the input based on the memory based learning and finally decoding the input into the desired language after conducting an evaluation process along with the bleu score which determines the accuracy of the translation.
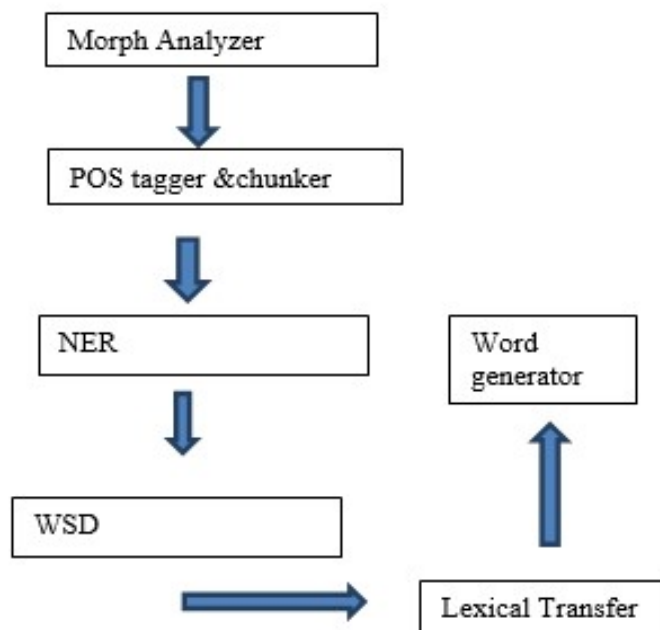
Figure 2: RBMT WORKFLOW

The Rule Based flowchart describes the various techniques which are included in the process of machine translation starting from the morph analyzer and the chunker which distributes the sentence into parts transferring it to the lexical part and then finally the word generator which produces the word in the desired language and then each word by word makes the sentence in the output language.

4. CONCLUSION

Sanskrit is a historically significant language. Sanskrit is the language of the Vedas, ancient poetry, scientific works, and religious scriptures. English is a universal language, and a Sanskrit to English translator can assist anyone in comprehending old texts. Sanskrit isbeing used as a source or target language for machine translation, although it is still difficult to translate vast amounts of text because the concentration is still on small sentences. Different techniques have been utilized, but the rule-based approach has been used by most of the MT.We learned that neural machine translation has several problems that must be overcome.We hope that our research article will encourage everyone to talk about these issues.

Most of the problems have one thing in common is that they fail to show robust method which is the ability of a method to remain unchanged even when some variations are applied to it.It can be utilised as a teaching pedagogy tool in addition to being a learning tool.This will be beneficial for the students and teachers who are involved in the process of learning and teaching Sanskrit language.We can strive to translate interrogative and more complicated statements in the future.We can also examine the results of using several ways to machine translation outside the rule-based approach. The system can be enhanced to support voice translation taking speech (in source language) as input and producing speech (in target

language) as output. We can try to minimize the processing time and the memory requirements of the translator so that the use of the computer resources is optimized.

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CONSUMER SEGMENTATION AND EATING OUT BEHAVIOR IN BANGKOK

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This research aims to study Eating out behaviors and the relationship between dining out choices and consumer groups in Bangkok and vicinities grouped by geographic market segmentation model demographic psychology and according to behavior The research model is a survey research with consumers in Bangkok and its vicinity. A total of 1,595 questionnaires were used. As for the four, there was a statistically significant correlation with eating out behavior at the level. 05 For better and more comprehensive marketing strategy planning Market Segmentation to take advantage of the practice of market segmentation, it is important to consider how costly, time and effort is worth.

Keyword: consumer segmentation techniques consumer

1. Introduction:

 from changes in the economy and society of Thailand, especially in the Bangkok metropolitan area smaller family traits Working outside the home, spending time on commuting between residence and work (Soonthornthada and Lertchaiphet, 2009) resulted in the behavior of consumers living in Bangkok or large cities who used to have cooking habits for eating at home. Instead, buy ready-to-eat food and eat at a restaurant outside your home instead. which is one of the factors that make various restaurant businesses A lot has happened to support and respond to changing consumer behavior.

According to the Kasikorn Research Center (2015) data, it is found that the food business is highly competitive and has a tendency to grow 6.9-8.9 percent from 2014, with an estimated market value of the business in 2015. 0 Between 108,000 and 110,000 million baht, it was found that Thais ate out food was the highest in ASEAN, averaging 13 meals a week, especially in Bangkok. (Manager's Newspaper, 2008) in the increasingly competitive environment of food business. Restaurant business is a must. able to communicate and present products and services that are in demand with customers with efficiency and effectiveness Therefore, the proper market segmentation process is one of the key processes of a business in ensuring its priority over competitors (Anderson et al 2004; Bose, 2012). since geography by demographic According to psychology or behavior, the information that requires analytical techniques is deep, detailed and complex at varying levels. This makes choosing the most appropriate form of market segmentation to describe restaurant use can be challenging. This is especially true for small and medium sized food businesses with limited resources (saleh and ndubisi, 2014), including limited funding and capacity of marketing analytics personnel.

Therefore, this research aims to determine whether the pattern of market segmentation in dining out is appropriate. So that the results can be used as a guideline in the marketing planning of small and medium-sized restaurants. Set goals, position, and accurately determine your marketing mix. or improve the restaurant business in accordance with the needs of consumers to support further higher competition

2. Research objectives

To study the behavior of eating out of consumers in the area To study the relationship between eating out choices among consumers in Bangkok that were grouped by market segmentation model. demographic psychology and according to behavior

3. Literature Review

Concepts and theories related to consumer segmentation. or market segmentation (Market Segmentation) is based on the principle that consumers with similar characteristics will be included in the same group. Each group has different product requirements. The characteristics of each group have many characteristics and variables (Kotler et al, 2005). Market segmentation is very important to any business. This is for various reasons, including as a guideline in determining marketing strategies to compete with competitors in the same business. can meet market demand, can narrow the market or reach a more specific group of customers This makes it possible to use the available resources efficiently. and choosing the right mix for efficiency and effectiveness (bose,2012;Lynn,2011).Kotler et al,2005 identifies consumer market segmentation to reflect customer needs. Can be divided as follows

1. Geographic segmention is the segmentation of the market according to different geographic areas such as provinces, national sectors, etc. to emphasize the response to the diversity of each locality.

Demographic market segmentation

Demographic segmention is the segmentation of a demographic market that includes age, gender, family size, family life cycle, income, occupation, education, religion, ethnicity, and nationality.

Psychological Market Segmentation

Psychographic segmentation is the use of demographic variables to better understand customers. Customers will be segmented according to their lifestyle, personality, life attitude or values.

Behavioral segmentation is the segmentation of the market based on the basis of consumers in various fields such as product use or reaction to the product

The geographic and demographic market segmentation criteria are more accessible than segmentation. According to the second criteria is divided into remaining This is because it is generally used to divide basic customer data. Whereas market segmentation follows psychology, it must be obtained by answering a series of valuation questions. attitude and

lifestyle and behavioral market segmentation Marketers need to have access to the relevant consumer behaviors of their customers.

In market segmentation analysis, there is a process that uses subjective decision making, such as selecting demographic factors in any or all areas in the segmentation. These decisions will ultimately result in the type of restaurant.

research conceptual framework

Illustration 1 Research Conceptual Framework
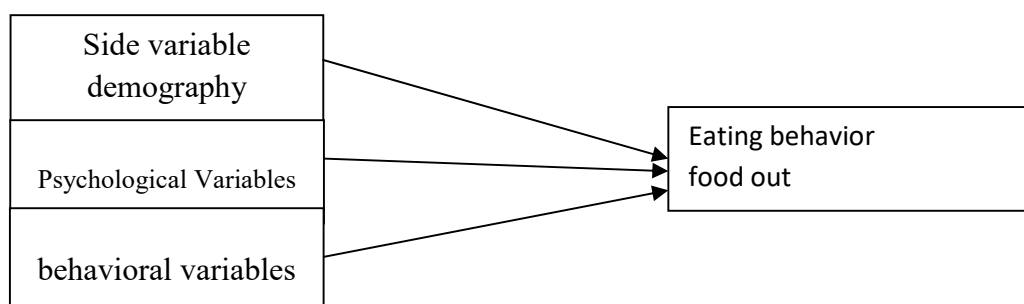
research conceptual framework

The research conceptual framework
The researchers suggest that demographic factors Psychological and behavioral factors were related to eating out behaviors. Hypothesis 1a: High-income consumers. More likely to have consistent eating out behaviors. Hypothesis 1b: Highly educated consumers. Tends to have a consistent eating out behavior, segmentation of the market by values. Attitudes and way of life can be grouped into 7 groups according to the criteria of
Home Oriented, Fashion Oriented and Outgoing, Family Oriented, Health Conscious and Leading Active Daily Life, Socially Conscious and independent love group (Independent) by a group of cautious users and a group of housewives will be careful and carefully considered before making a purchase. and loves to spend most of his time at home. Therefore, it is probably a group that has a normal eating habits. However, the independent group prefers to eat alone and does not like to eat with many people.

4. Population and sample
The population used in this study were residents and work in Bangkok. According to statistics from the Bangkok Data Center, in 2014, there was a population of 5.6 million registered populations, but if the latent population in Bangkok is accounted for as one-third (National Statistical Office, 2015), then the total population in Bangkok may have Up to 10 million people, Bangkok has a total of 50 districts.
    Can be divided into 6 zones as follows:
    1. Central Zone of Bangkok, consisting of Phra Nakhon District, Dusit District, Pom Prap Sattru Phai District, Din Daeng District, Huai Khwang District, Samphanthawong District, Phaya Thai District Ratchathewi and Wang Thonglang districts

2. The Southern Bangkok Group consists of Pathumwan District, Bang Rak District, Sathorn District, Bang Kho Laem District, Yannawa District, Khlong Toei District, Wattana District, Phra Khanong District, Suan Luang District and Bang Na District.

3. The Bangkok North Zone consists of Chatuchak District, Bang Sue District, Lat Phrao District, Lak Si District, Don Mueang District, Sai Mai District, and Bang Khen District.

4. Eastern Bangkok group Consisting of Bang Kapi District, Saphan Sung District, Bueng Kum District, Khan Na Yao District, Lat Krabang District, Min Buri District, Nong Chok District, Khlong Sam Wa District, and Prawet District

5. North Krung Thon Buri Group consists of Thon Buri District, Khlong San District, Chom Thong District, Bangkok Yai District Bangkok Noi District, Bang Phlat District, Taling Chan District and Thawi Watthana District

6. The South Krung Thon Buri Group consists of Phasi Charoen District, Bang Khae District, Nong Khaem District, Bang Khun Thian District, Bang Bon District, Rat Burana District and Thung Khru

sample selection

With the objective sample method (Purposive Sampling), the sample size was set at 1,800 samples to cover Bangkok in all 50 districts, 6 groups, namely Bangkok in the middle zone Bangkok ZoneSouth Bangkok, North Zone Bangkok, Eastern Zone, North Krungthonburi and South Krungthonburi

5. Research tools
The nature of the questionnaire used as a tool for collecting data in this research was divided into 4 parts as follows: general information of the respondents consisted of gender, educational level. Affiliated agency day/month/year of birth salary level and residential area was a questionnaire on values, attitudes and lifestyle. A total of 56 questions (Values, Attitude and Life Style-VALs) from the research of Harcar and Kaynak (2008) were questionnaires on consumption behaviors related to eating instant noodles. and eating canned food was a questionnaire on information about the decision to choose to eat out. Consisting of frequency of eating out. outside the restaurant style and food patterns

6. Data collection
The researcher has collected the data. by distributing a specific questionnaire By distributing questionnaires to those working in the Bangkok Central Zone, all eight areas, totaling 2,000 questionnaires out of the targeted 1,800 sets.

7. Data analysis
Individual factors of the sample The frequency, percentage, mean and standard deviation were analyzed. The proportion of consumers' eating out behaviors in Bangkok and its vicinities was analyzed by using the proportion or percentage of the consumer group according to psychology. Seven clusters were identified and by anonymity (search form), analyzed using Two-step Clustering and K-Mean Clustering techniques, and then the coherence of group members was examined using both analytical techniques. Two-step Clustering and K-Mean Clustering Before further analysis, the relationship between Choosing to eat out with consumers in Bangkok and its vicinities by categorizing different types using the Chi-Square Test statistic

8. Research results

Chi-Square Test Analysis of Eating Out Behavior with Marketing Groups

Test	Per Chi-Square	P Value	Phi	N
address x eating out behavior	17.835	.058	.111	1,450
salary level x eating out behavior	8.948	.062	.082	1,334
education levelx eating out behavior	37.158	.000	.154	1,558
7psychology groupsx eating out behavior	47.962	.000	.178	1,508
Instant noodles behaviorx eating out behavior	25.830	.000	.128	1,574
canned food behavior x eating out behavior	35.443	.000	.150	1,574

The results of this research are consistent with the results of a study by the Kasikorn Thai Research Center that Thai people, especially those in Bangkok, prefer to eat out more than the percentage of Bangkok residents outside of the home rather than one type of grouping alone. Therefore, marketers who market using a single market share can make mistakes. Demographics It was found that the salary level was not a good factor in segmenting the market. It was found that the level of education was more factored into market segmentation than geographic factors. The post-hoc analysis revealed more information that those with a master's degree other than eating out were more likely to eat out. already high They also had a higher proportion of hotel food consumption than other customer segments, where market segmentation by values, attitudes and lifestyles and correlation analysis yielded Phi(0.178), the highest value compared to that. Phi from market segmentation with other means can best describe eating out behavior However, the size of the correlation description is still different, but when the three analyzes are combined, the behavior is better explained, thus, the use of market segments as a guide to marketing strategies further. Should not use only one market segmentation. In addition, in the practical use, it is worth considering the cost, time and effort that it is worth to increase the granularity and accuracy of segmentation to be used in further planning. Research in addition to improving the accuracy of segmentation must pay attention to Develop data collection tools and guidelines for deeper analysis and transformation. 65.7 "Eat some" per month based on market segmentation analysis. with geography, demographics and psychology and behaviors related to the three market segments The model makes it more convenient to understand the analytical eating behavior to be useful in practice. Because in this research, there are 56 questions used to classify groups by values, attitudes and lifestyles, which in practice are very difficult especially for small and medium-sized food businesses. with limited resources

Suggestions for next research

An abbreviated questionnaire should be developed and the validity of the full questionnaire should be tested. For the practice of segmentation of the market to be convenient and economical, data should be collected from the average amount that

consumers spend on dining out and expand the group of respondents to have more groups with good financial standing. Because the respondents in this group It is the group with average general salary levels for those with a bachelor's degree. The financial status of the educated group has a low distribution. and are not classified as high-ranking: which may help explain the relationship between the groups more. but the middle class May eat out regularly but the amount of spending each time is small, etc. Consumers segmentation techniques should be used by advanced analysis using SEM-class analysis techniques and should be randomized. Population samples were increased to verify how consistent they were. Including many more than one level cross tabulation analysis. And in the completeness, there may be problems in the accuracy of the data as the respondents spend less time on the questionnaire and therefore the results are more reliable. Data collection should shift from specific to randomized to reduce the predisposition that the sample is not representative of the actual population, a limitation that further research should address. This was the motivation of the respondents because the research wanted to examine all three market segments. A large number of questions make the questionnaire available.

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SVM USING RBF AS KERNEL FOR DIAGNOSIS OF BREAST CANCER

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This is in continuation to the work done earlier by the Author in the field of Artificial Intelligence and to be more specific Artificial Neural Network. The paper comprises of six sections including Introduction, Literature Review, Methodology, Results, Conclusion and References. In introduction a brief introduction of the problem of cancer is specified. In Literature review some of the resources utilized for the implementation of the idea are mentioned. In methodology the flow in which the experiment is carried out is explained and in results the graphs plotted between the various attributes is shown. Then in the results section the parameters precision, recall and f1-score is shown. At last in the reference section the various sources of knowledge gathering are prescribed. In this paper to be specific we will observe a rbf based SVM approach for classification.

Keywords: Breast Cancer, SVM, Machine Learning, Python.

1. INTRODUCTION

In the current time the whole world is facing a big problem of COVID. The various countries of the world are trying to give their best for handling the current situation. The problem of COVID is related to health. There are various types of diseases from which the people around the world are suffering from. The current paper is dealing with a very catastrophic type of disease called cancer. There are a number of variants of Cancer. In the current paper we are dealing with a cancer called Breast Cancer. This type of cancer is generally found in females although it may be in males also. The signs and symptoms may be majorly categorized as local symptoms, systemic symptoms as well as metastasis. The major causes may include chemical usage like tobacco, having infection from something, hormones, exposure to radiation, heredity, sometimes due to some physical agents like asbestos, diet and exercise and sometimes autoimmune diseases. In this paper we used a Machine Learning approach for diagnosis of Breast Cancer as benign and malignant **Alpaydin (2020)**.

2. LITERATURE REVIEW

Breast cancer is a type of cancer that is developed in the tissues of breast **(Breast Cancer NCI, 2014)**. The symptoms of this type of cancer include some fluid coming out of the nipple, an inverted nipple, and change in the shape of the breast, scaly or red patch in the skin and so on **(Breast Cancer Treatment (PDQ) NCI, 2014.)**. There is a categorization found in it on the basis of development. It may be ductal carcinomas or lobular carcinoma. In this case sometimes both the breasts are removed so that the problem is overcome in high risk females. There are various ways through which we can tackle this problem. The solutions include radiation therapy, targeted therapy, chemotherapy and hormonal therapy. In countries like England and US the recovery rate is very promising. In the current paper we will be visualizing a Machine Learning Technique to make a prediction that whether a male / female based on the data collected on various parameters belong to benign class or malignant class **(What is Machine Learning, 2021)**. Machine Learning is a buzzword in the current time **Mitchell et.al. (1997)**. There are various types of models using which we can go through the above problem. In this paper we have used SVM approach. Also we will look into various relationships obtained between the various parameters measured. In the implementation of the above problem we have made a utilization of a very popular language called Python **Rossum (1993)**. We used it as it is open source. This work is basically a

continuation of the work previously done by the author **Singh (2016), Singh et al. (2016), Singh et al. (2016), Singh(2015), Singh(2015), Singh(2016), Singh(2016), Singh(2016).**

3. METHODOLOGY

The following steps are involved in the Implementation of the above problem of identification of Cancer as benign and malignant using Machine Learning approach i.e. SVM

1. Step1: Necessary imports
2. Step2: Loading of Data from the csv file obtained from Kaggle
3. Step3: Distribution of Classes
4. Step4: Selection of Columns that are unwanted
5. Step5: Removal of the Columns that are of no use
6. Step6: Dividing the Data into Train/Test dataset
7. Step7: Modeling
8. Step8: Evaluation of the Model on important Parameters

4. RESULTS

4.1 Kaggle Data-Set for Breast Cancer

In this paper we made a utilization of Kaggle Data Set for Breast Cancer. There are total 33 attributes in it. The total number of records present is 569. The total number of individual values present in the dataset is 18777. For Training we had taken 455 records and for test we had taken 114 records. Now in this section I will show the various graphs obtained during the implementation of the code.
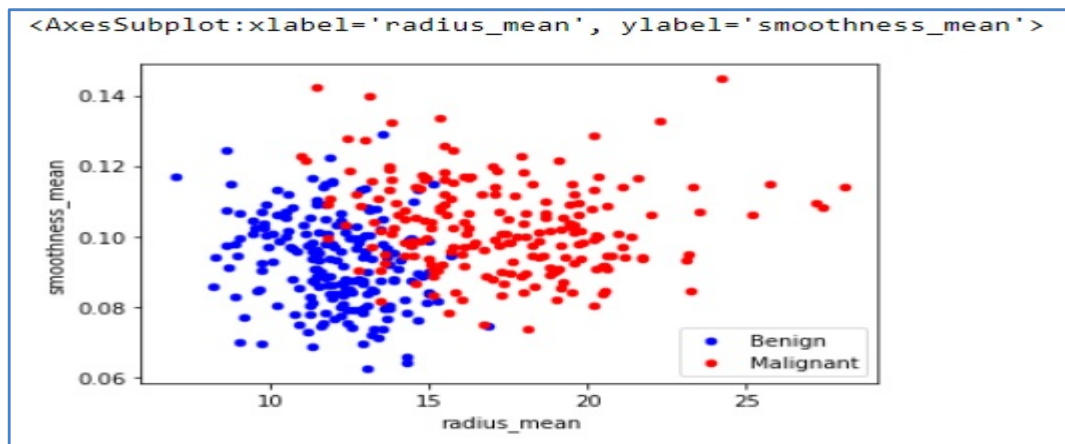
Figure 1: Scatter Plot between radius_mean and smoothness_mean
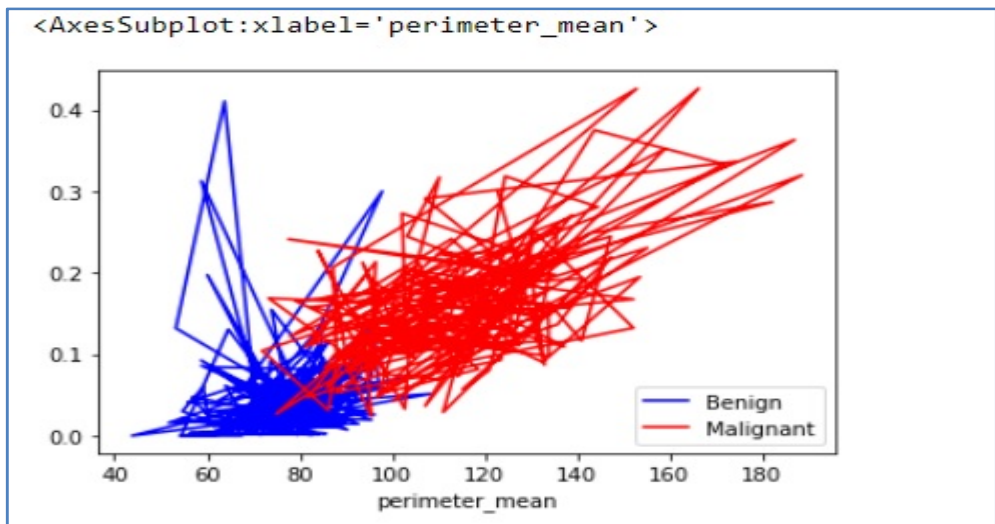
Figure 2: Line plot between perimeter_mean and concavity_mean
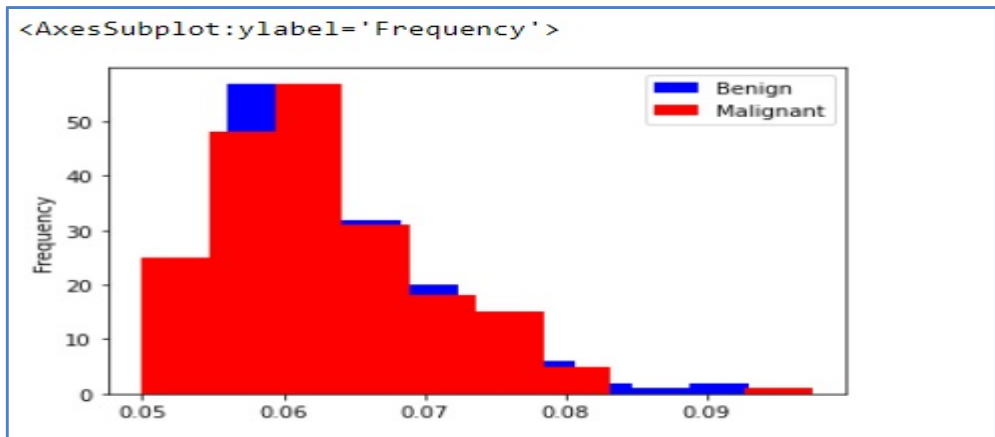
Figure 3: hist plot between texture_mean and fractal_dimension_mean
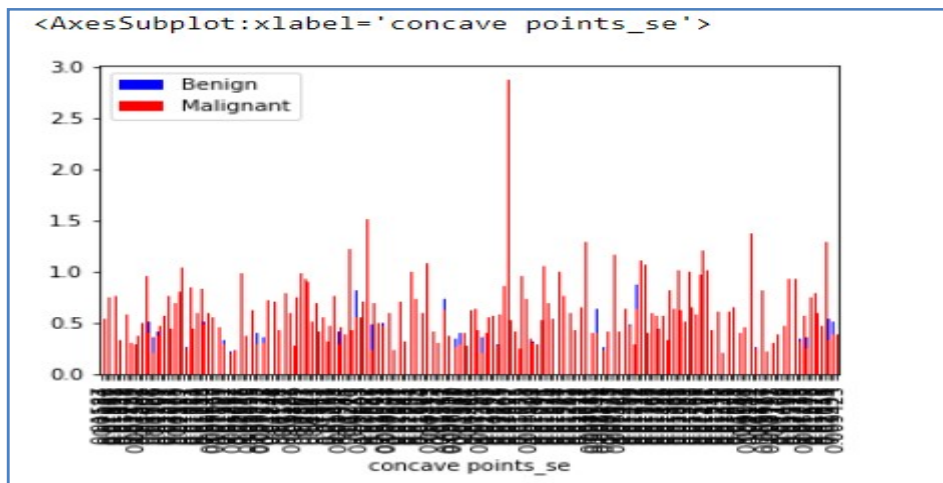
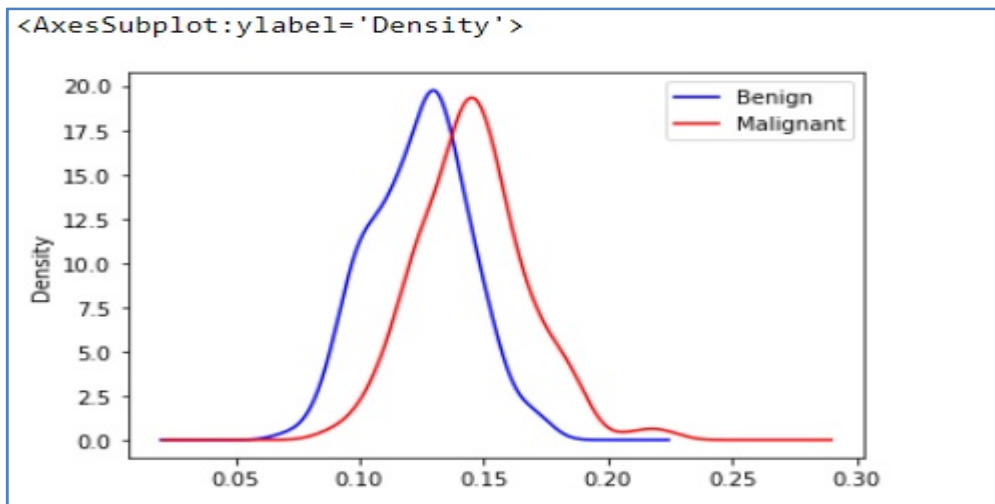**Figure 4:** bar plot between concave points_se and radius_se

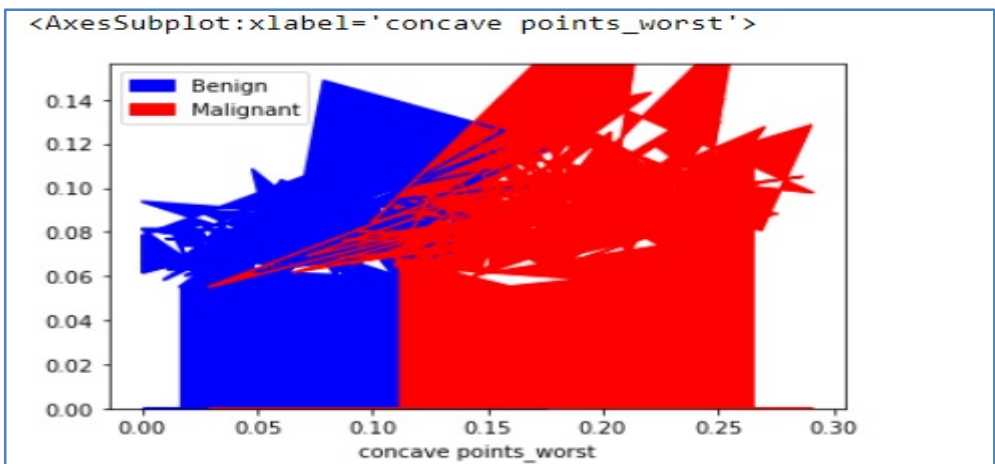**Figure 5:** kde plot between radius_worst and smoothness_worst

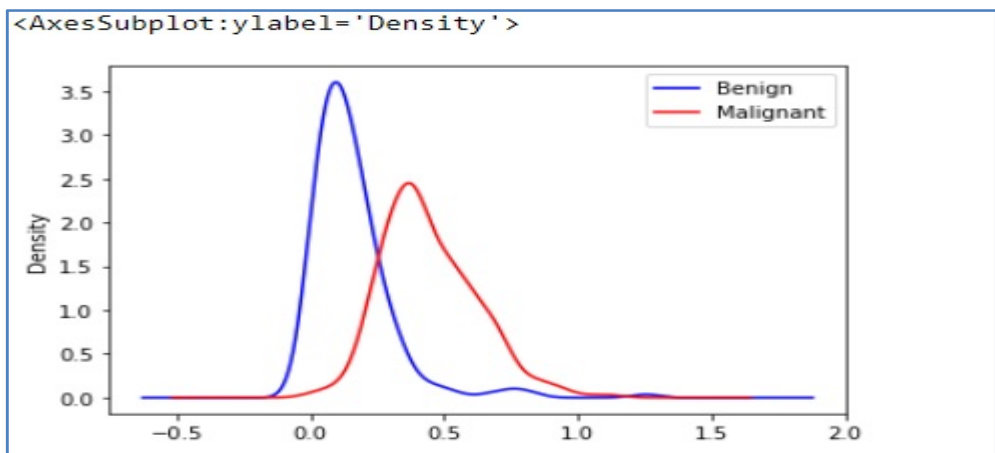**Figure 6:** area plot between concave points_worst and fractal_dimension_worst

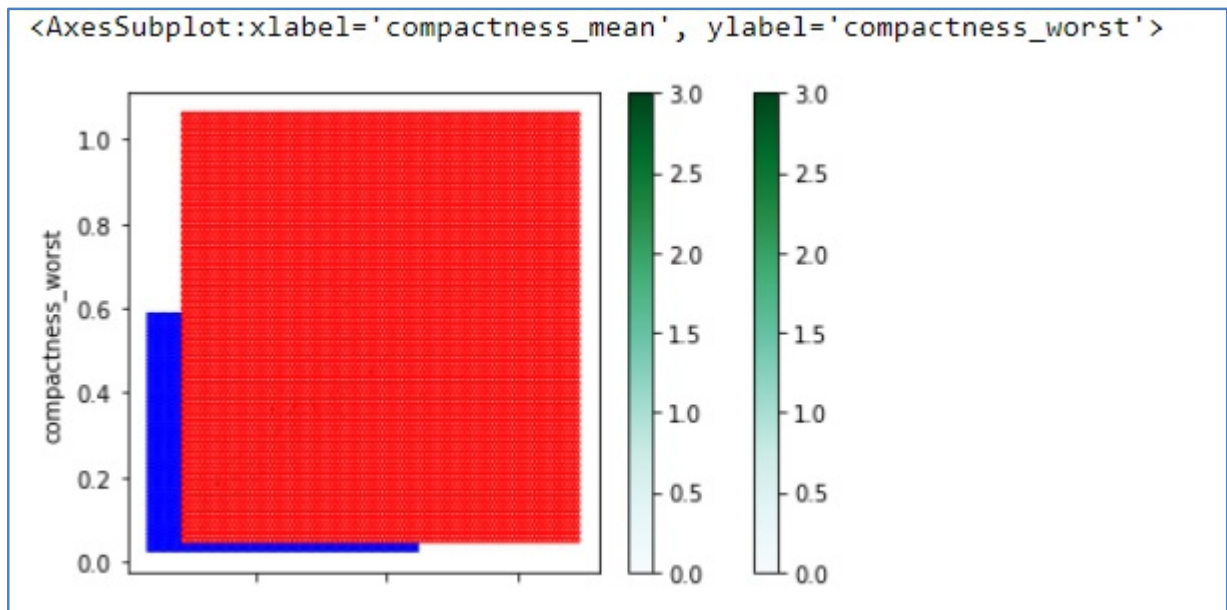**Figure 7:** density plot between texture_worst and concavity_worst

Figure 8: hexbin plot between compactness_mean and compactness_worst

5. CONCLUSION

In this paper we used the support vector machine as the Machine learning approach to perform the classification operation. In the prepared model we use the SVC i.e. the Support Vector Classifier for the classification purpose. In the model we use the rbf as the kernel. At last we use the classification report to give the final Classification report of the model. The classification report obtained in given below

	precision	recall	f1-score	support
B	0.92	0.89	0.90	80
M	0.76	0.82	0.79	34
accuracy			0.87	114
macro avg	0.84	0.86	0.85	114
weighted avg	0.87	0.87	0.87	114

Figure 9: Classification Report obtained through Python Code.

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IN-SILICO IDENTIFICATION OF CYTOCHROME *B*5 FROM KLUVEROMYCETESLACTIS

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XP_452633.1 is a hypothetical protein from *kluveromyceslactis*without any known functions or protein family classification. A BLAST-P search against the non-redundant database (NRDB) returns many homologues of XP_452633.1. Probably the query sequence belong to the family of damage response protein family, which identified highly conserved **cytochrome b5 likeheme/ steroid binding domain**prosite pattern from residues 44- 145 on query sequence sequence, which was well conserved in all the aligned sequences also. So, the protein definitely **cytochrome b5 likeheme/ steroid binding activity.**A phylogenetic tree was generated based on the amino acid sequences of query sequence and its 15 horologes. A rooted UPGMA tree was generated using CLUTAL –W program. Two major clusters were formed in the tree. The unknown protein XP_452633.1 grouped in the first cluster. The closest neighbor of our protein was damage response protein of same genus. Other members in the cluster also belonged to *Candida* genus with similar function. Therefore we can conclude that XP_452633.1 is a protein having **cytochrome b5 likeheme/ steroid binding domain activity**, and may help the organism in stress response. The possible interaction partner of the protein was identified by string tool.

1. Introduction

Kluveromyceslactis is common yeast generally used for genetic studies and different industrial purpose. The name lactiscomes from its ability to utilise lactose and form lactic acid. Earlier the organism was known as *Saccharomyces lactis. K. lactis* have haplontic life cycle whereas *S. cerevisae* havediplontic life cycle. This species is one of the most important species to study different biotechnological applications. It is a suitable system for production of heterologous protein and its ability has been used extensively for various industrial application for production of different proteins[1].

Cytochrome is a family of heme binding proteins able to catalyse the monooxygenase reactions of oxidative metabolism[2]. Cytochrome b5 (CB5) is a important protein of cytochrome family helps in various detoxification and drug metabolism reactions[3]. CB5 remains integrated to Endoplasmic reticulum and is a part of the redox system which is aacceptor of electron in respiration. CB5 is a small heme binding protein found in all kind of organisms including bacteria, fungi, plants and animals[4]. Due to involvement of CB5 in many metabolic reactions it has been studied extensively. Many isoforms of CB5 are known in different organisms. There are 17 isoforms reported in the plant *Oryzasativa* and 5

isoforms were reported in *Arabidopsis thaliana,* however only one isoform of CB5 is reported in mammals[5].CB5 is a cofactor of pleiotrophic types which plays important role in many vital metabolic pathways of the mammalian organism[6].

The genomic sequence of *K. lactis*was deciphered in the year 2004[7]. Which makes it a suitable candidate to study for different biological purpose. In current study we have partially characterized the CB5 protein of *K. lactis.*

2. Methods

2.1 Identification of Putative Cytochrome b5 protein

In order to identify the putative CytB5 in *K. lactis*the CB5 protein sequence of *S. cerevisae*was retrieved from NCBI database. BLAST Analysis was performed using the retrieved sequence with the *K. lactis*genome.The sequence with maximum similarity was taken for further analysis.

2.2 Physical Characteristic of protein

Physical characteristics of the protein was analysed by Phyre[2] [8](http://www.sbg.bio.ic.ac.uk/phyre2/phyre2_output/38ab6259d6a104a9/summary.html). By using the tool molecular weight, theoretical PI, the instability index (II), Hydropathicity, types of amino acids, aliphatic index were calculated.

2.3 Phylogenetic tree

To find out the relationship with the protein of different organism, CB5 protein of *Ashbyaaceris* (AGO09884.1), *Eremotheciumgossypii* (NP_982436.1), *Lachanceamirantina* (SCU95784.1), *Saccharomyces paradoxus* (XP_033769601.1),*Torulasporadelbrueckii* (XP_003679189.1), *Lachanceadasiensis* (SCU82561.1),*Cyberlindnerajadinii* (XP_020070930.1) , *Ascoidearubescens* (XP_020046146.1) and *Suhomycestanzawaensis* (XP_020065084.1) were etrived and checked for similarity with putative CB5 of *K. lactis* by BLAST analysis. Future by using the retrived sequence a phylogenetic tree was constructed by ClustalW tool [9] for analysis of evolutionary conservation of the pratein.

2.4 Prediction of the Domain

In order to find the Domains present in the putative sequence the sequence is subjected to Interproscan analysis[10]. Further the characteristics and similarity of Cytb5 family protein were retrieved along with

the domain structure of the cytb5 like heme binding protein from NCBI CDD tool. Predict protein tool (https://predictprotein.org/)[11]was used to identify the different structural parameters.

2.5 Gene interaction and Co expression analysis

By using STRING tool (https://string-db.org/)[12] the prediction of genes which can interct with the putative protein were predicted and similarly the co-expressed protein were predicted.

3. Result

3.1 Identification of Putative Cytochrome b5 protein

By BLAST analysis to sequences of *K. lactis* showed maximum similarity to the CB5 of *S. cerevisae.* The protein wereuncharacterized protein KLLA0C09757 (Accession number XP452633.1) and dap (Accession no. QUE59916.1). the protein XP452633.1 showed 96.4% similarity and hence was taken as the putative CB5 protein of *K. lactis*. XP452633.1 is a 152 amino acid long protein**(Fig 1).**

MSFIKNFLTGAVKTTADPTGLTQSGSGNEGASSKSNDPIVEGKFYPRTLSKFNGHDDEKIFIAVLG KVYDCSQGRQFYGPSGPYSNFAGHDASRGLATNSFDLDTVRHWDQPIDTLQDLNEQERGALEG WAAHFQKKYPCIGSLEAEPGVNN

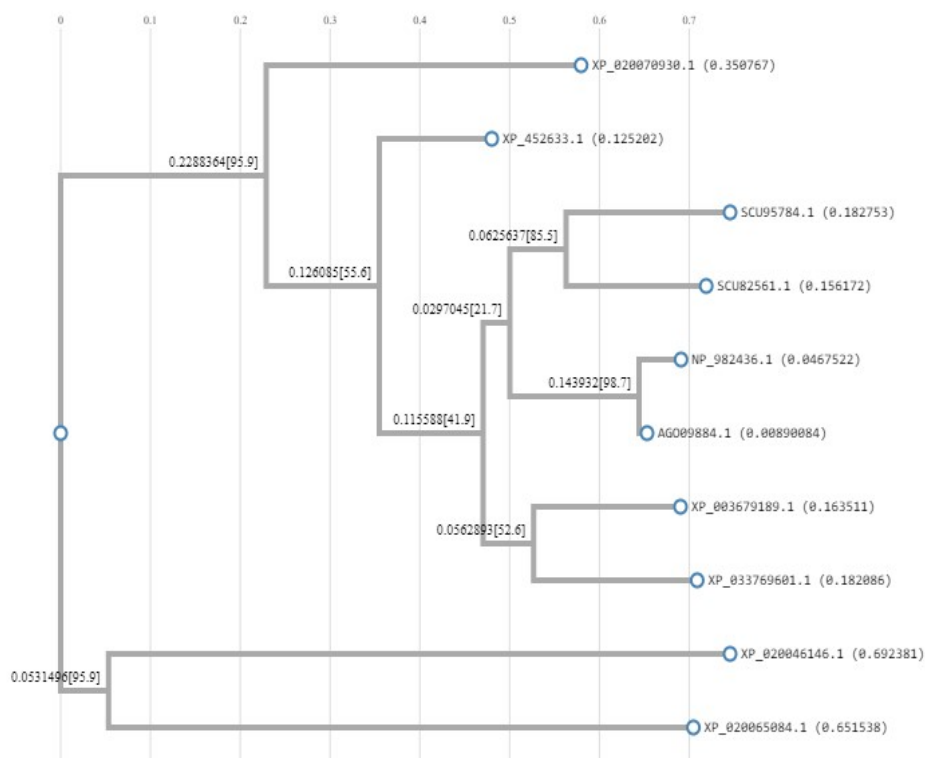**Figure 1: Amino acid sequence of the putative CB5 protein**

Figure 2: Phylogenetic analysis of the Protein with similar proteins of other organism

3.2 Physical characteristics of the proteins

By phyre[2] and Expasy (https://web.expasy.org/protparam/) (Gasteiger, 2003) the physical parameter of the protein was calculated and the ribbon structure (Fig 1b) was generated for the putative CB5 protein. the molecular weight of the putative protein is 16650.19 Da, theoretical PI is 5.27, the instability index (II) is 20.93, Hydropathicity (GRAVY) is 0.628, number of positive amino acid 14 and negative amino acids 19, aliphatic index is 59.4and Ext. Coefficient was 18450 (Table 1).

Table 1: Physical parameter of the protein

Physical Parameter of Protein	Value
Theoretical pI:	16550.19
The instability index (II)	5.27
Aliphatic index:	20.93
Grand average of hydropathicity (GRAVY): -	59.74
Total number of negatively charged residues (Asp + Glu):	0.628
Total number of positively charged residues (Arg + Lys):	19
Ext. coefficient	14

3.3 Evolutionary Conservation of the protein

By BLAST analysis the similarity of the protein was calculated. The puatative sequence showed 73.68 % similarity to *Ashbyaaceris* (AGO09884.1), 73.68% to *Eremotheciumgossypii* (NP_982436.1), 72.85 % to *Lachanceamirantina* (SCU95784.1), 70.86% *Saccharomyces paradoxus* (XP_033769601.1), 70.39% to *Torulasporadelbrueckii* (XP_003679189.1), 70.20% to *Lachanceadasiensis* (SCU82561.1), 65.31%to *Cyberlindnerajadinii* (XP_020070930.1) ,62.26% to *Ascoidearubescens* (XP_020046146.1) and 62.96% to *Suhomycestanzawaensis* (XP_020065084.1) (Table 2). the phylogenetic tree showed that the putative sequence is closest to the most of the organism used for analysis howerver it showed distant relation with *Ascoidearubescens* (XP_020046146.1) and *Suhomycestanzawaensis* (XP_020065084.1).

Table 2 : Percentage similarity of Protein with different related protein

ORGANISM	PROTEIN ACC. NO.	PERCENTAGE SIMILARITY	QUERY COVERAGE
Ashbyaaceris	AGO09884.1	73.68%	99%

Eremotheciumgossypii	NP_982436.1	73.68%	99%
Lachanceamirantina	SCU95784.1	72.85%	99%
Saccharomyces paradoxus	XP_033769601.1	70.86%	99%
Torulasporadelbrueckii	XP_003679189.1	70.39%	100%
Lachanceadasiensis	SCU82561.1	70.20%	99%
Cyberlindnerajadinii	XP_020070930.1	65.31%	96%
Ascoidearubescens	XP_020046146.1	62.26%	69%
Suhomycestanzawaensis	XP_020065084.1	62.96%	72%

3.4 Protein structural characteristics

By using Interpro scan tool the functional domains of the proteins were identified. The protein contains cytochrome b5 like heme/ steroid binding domain (from amino acid 44-145), the protein is classified under cytochrome b5 like heme/ steroid superfamily and is related to the membrane associated progesterone receptor (Fig 3).
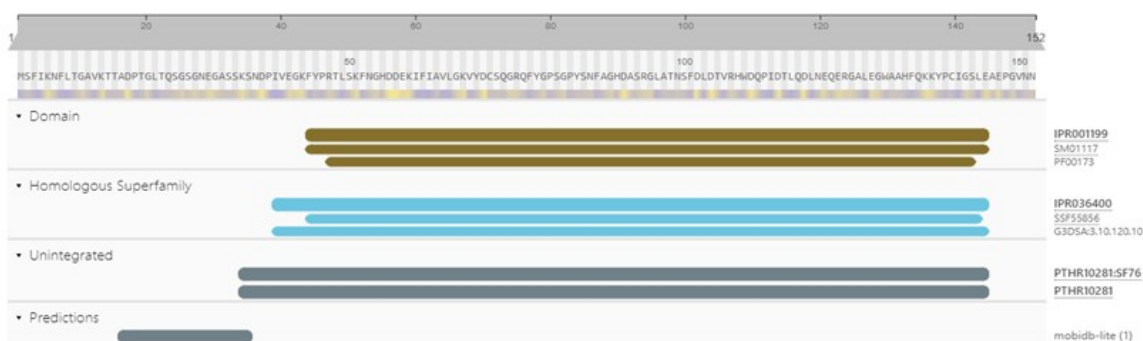
Amino acids	Corresponding
44-145	cytochrome b5 like heme/ steroid binding domain
39-144	cytochrome b5 like heme/ steroid superfamily
39-144	Membrane-associated Progesterone Receptor Component-related

Figure 3: Domain analysis of Putative protein by Interproscan

3.5 Gene interaction and Co expression analysis

By using string tool the possible interaction network of the protein. The network of interaction was predicted by comparing the interaction pattern of *S. cerevisae, A. thaliana, S. pombe, C. elegans, D. melanogaster, D. rerio, H. sapiens, B. Taurus, M. musculus, R. norvegicus and M. domestica.* BySTRING it was established that the protein could interact with COB, OX1, COX2, QCR7, QCR8,

CYT1, Q6CM66, Q6CPD6, Q6CQM0, QCR2 and COX3 like proteins (Fig 4). The possible interaction of the proteins is not established by any experimental method.
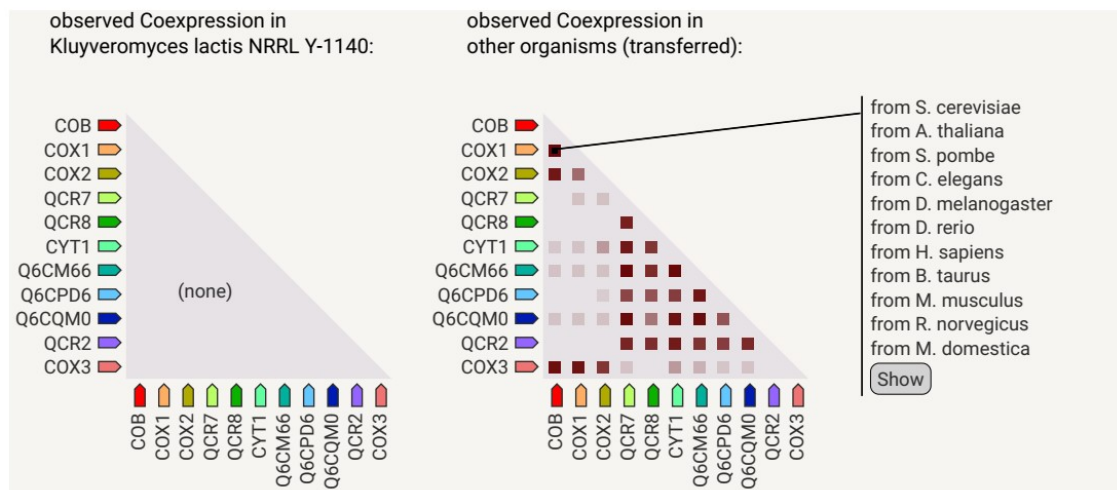

Figure 4: Gene Co-Expression analysis of the Putative protein by STRING.

4. Conclusion

Understanding protein structure is important for many functional analyses. The structure helps in identification of active site, probable substrate/ligand binding site, protein-protein interaction etc. Bioinformatics provides a viable solution for the prediction of protein structure and the characteristics of the protein. In current study we have identified a protein of Cytochrome family Cytochrome *b*5 which is an important protein for respiration and oxidative metabolism.

In this study a putative CB5 was identified by comparison of sequence with similar known protein of *S. cerevisae* by BLAST analysis. The best matched protein KLLA0C09757 (Accession number XP452633.1) was taken as the putative protein. The sequence obtained was analysed and physical characteristics (molecular weight, theoretical PI, the instability index (II), Hydropathicity, types of amino acids, aliphatic index) of the sequence were calculated, which are 16650.19 Da, 5.27, 20.93, 0.628, 19, 59.4 and 18450 respectively. Further the conservation of protein was analysed and it was found closer to the most of the identified protein. By using interproscan and expasy tool the characteristics of the structure of protein and functional domain was identified. Protein protein interaction and coexpression analysis of the protein was done by using string analysis and it was found to be interacted with COB,

OX1, COX2, QCR7, QCR8, CYT1, Q6CM66, Q6CPD6, Q6CQM0, QCR2 and COX3 like proteins. For further confirmation of the structure and interaction partner experimental analysis is needed.

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CALL DATA RECORD ANALYSIS USING MICROSOFT EXCEL

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Call Detail Record (CDR) is a very important source of information in any kind of criminal investigation; this provides lots of connections & information about criminals. However, I need to analyze Call Detail Record in order to extract its value which helps investigation officers to find new connections between other numbers. Real-time streaming data processing is becoming a new trend in Call Detail Record processing. It helps to analyze Call Detail records in real-time and helps in finding the real time location of any criminal and also behaviour of their network in real-time. But these Call Detail Records has a huge volume, variety of data, and different data rate, while current telecom systems are designed without considering these issues in mind. Call Detail Records can be seen as the largest source, and hence, it is applicable to use them (for storage, processing, and analysis). There are considerable research efforts to address the Call Detail Records analysis challenges face in the telecom industry. This paper presents the use of excel in Call Detail Records analysis by using Call Detail Record of any criminal case which has been registered in the year 2014 & solved in the year 2018. In this paper, I am processing Call details records and tracing their locations manually.

KEYWORDS- CDR,excel,tower,crime investigation,crime.

1. INTRODUCTION

The ease of technology opens many doors of opportunities who want to use it wisely, whereas those who misused it result in committing a crime. crime in India has been recorded since British time by NCRB. according to NCRB's recent result cybercrime has been increased from 3.3 % to 3.8 % from the year 2019 to the year 2020. criminals use ICT's to commit crimes. hence, it becomes a most important task for the administration, law & enforcement agencies to reduce the increasing rate of cybercrime, thus criminology comes into the picture .criminology is defined as the study of crime & criminal behavior in order to detect crime patterns & their characteristics. The police department, law & enforcement agencies use CDR to analyze & investigate, criminal cases & behavior. CDR consists of the name of the caller, location of the caller, location of the receiver, type of call, time of call, duration of the call, etc...CDR is a single piece of data that can be understood in one go, but when it comes to deriving some relation from it, it became a tedious job. therefore, data cleansing needs to be done in order to process it for future uses. in my research paper, I have used CDR of a criminal case year 2014 which has been solved in the year 2018, it took exactly four-year to solve, the reason is simple deriving relation between numbers are complex for any investigation officer

2. LITERATURE REVIEW
3.

Pandey (2020)explained how to stay safe while using paytm. Due to ease of Digital India and to comply with different Banking Norms, Paytm is the true companion. Now People rely on Payment as a substitute for Cash Transactions. But it is also vulnerable to different types of Cyber Attacks including Social Engineering, Buffer Overflow, Phishing, etc. If user's Mobile is lost, the paytm account can be easily hacked by Cyber Criminals because 2-AF with OTP is not secure and bypassed by attackers by simply spoofing or stealing OTP sent to the user's Mobile.As a result, fraudsters have adopted easy methods to remotely access your device, which gives them access to all information including banking, connected VPA and other Transactions details. In the same regard, many complaints have been raised regarding Paytm frauds and automatic deduction of money from Paytm Wallet. The volume of data is growing at an increasing rate. This growth is both in size and in connectivity, where connectivity refers to the increasing presence of relationships between data.Social networks such as Facebook and Twitter store and process petabytes of data each day.Graph databases have gained renewed interest in the last years, due to their applications in areas such as the Semantic Web and Social Network Analysis. Graph databases provide an effective and efficient solution to data storage and querying data in these scenarios, where data is rich in relationships.

Kashif et.al (2019) elaborated the benefits of CDR data analysis in mobile network. They have used effective spatio-temporal analysis approach to understand & monitor mobile traffic pattern which helped in policy making & understanding customer behaviour for implementation of smart cities.

Kerina et.al (2018) describes the challenges & opportunities of mobile phone calls in health research. They have used behavioral information from voice recording & text to detect sign of post traumatic stress disorder in returning solider. UK office of Statistics has planned to use CDR to monitor commuter travel & collect census data .

Reshmi et.al (2018) presented computerized model which is connected to web & with mobile phones also of Nigerian Police that's solving & tracking criminals and criminals cases become easy task for Nigerian Police. They have complete information about the criminal like their biometric information's to present travel history, blood group to annual income etc…

Sudhir et.al (2017) presented article mainly circumspect the idea for the use and implementation of data mining technique with advantage & disadvantage. Classifier like decision tree,Bayesian, back propagation, support vector machine are considered as fast learner whereas classifier like nearest - neighbour, case - based reasoning are considered as lazy learner.

Mörner (2017)represented Application of CDR is currently a very interesting and fast evolving topic. Different applications – not only for transport planning – are being developed.But especially when looking at analysis for traffic engineering and transport planning one major point of critique can be heard. It is the analysis of people's movement data and people are concerned about their privacy. This is true not only in western countries but also in e.g. China and Vietnam. To avoid misconception about data usage and privacy implications, the usage has to be communicated very openly. Together with the

information what the data is being used for and how personal privacy is being safeguarded potential benefits for the people actually generating the data have to be communicated.Ideally data remains on the network carrier's computer infrastructure and only aggregated and anonymize information can be extracted. This means that the carriers would have to implement a somewhat open interface to hand over algorithms/questions and the aggregated information. Researchers and companies would have to run their analysis on the carriers' systems and only get back their analysis results without ever getting into contact with the raw data itself. Research still has some steps to go before CDR becomes widely applicable. Identification of transport mode, especially on inner city streets is one of the many current research topics. Additionally, some effort has to be put into the question how the origin and destination of trips are determined. Unlike in household surveys the traveler cannot be asked where a trip started and ended. To overcome these obstacles a combined effort of data scientists and traffic and transport researchers is needed, never losing privacy implications out of sight.

Sarmah et al. (2017)represents today, Cybercrime has caused a lot of damages to individuals, organizations and even the Government. Cybercrime detection methods and classification methods have come up with varying levels of success for preventing and protecting data from such attacks. Several laws and methods have been introduced in order to prevent cybercrime and the penalties are laid down to the criminals. However, the study shows that there are many countries facing this problem even today and the United States of America is leading with maximum damage due to cybercrimes over the years. According to the recent survey carried out it was noticed that year 2013 saw the monetary damage of nearly 781.84 million U.S. dollars. This paper describes the common areas where cybercrime usually occurs and the different types of cybercrimes that are committed today. The paper also shows the studies made on email related crimes as email is the most common medium through which cyber crimes occur. In addition, some of the case studies related to cybercrimes are also laid down.

Giridhar et.al (2016) elaborated the problem that occur during CDR analysis when data collected from a single telecom operator .they have proposed anew architecture which include CDR, CRM & subscriber's master data with central data ware for analysis. They have used OLAP tools for visualization & generating reports of findings.

Alan et.al (2016) presented article about rules & regulations on how to plan & process data to get clear,accurate and desired research result of your data set while working on Microsoft excel. With the help of MS Excel, we can perform auditing of data ,pilot study, remove unwanted data , draw graph ,charts.

Amin et.al (2015) described new framework for clustering & predicting crime using real data.this paper explained the complete process of classification & clustering of crime data, generation of testing & training data, removing of unwanted data & how to optimize those data. They have used decision tree & k-mean algorithm to predict crime and also mentioned the issues occurs during & after formation of clusters & how to overcome from this issue.

Soumya et.all (2015) explained the processing of CDR for business analysis using data ware house and how to analysis market share of different mobile companies for future business application .Tracking of mobile phone helped a lot in understanding the requirement of individual as well as meeting the social-economic requirement and decision making of corporate sector.Thus, snowflake schema & fact constellation schema has been used while making important decision using data ware house.

Natwar et.al (2013) represented data mining method to predict churn of Asian telecom operator. They have used voice,sms,demographic,billing churn history information. KPI based model & T-SNACS model combined with graph technology have been used in this paper

4. EXPERIMENTAL WORK

Call Detail Record (CDR): Call Detail Record (CDR) is the detailed record of all the telephonic calls that pass through a telephone exchange or any other telecommunications equipment. The record is maintained by the concerned telephone exchange and contains call details such as time of the call, duration of the call, source and destination number, completion status of the call, etc. Call detail records serve a valuable purpose of revenue generation for telephone service providers and are critical for law enforcement, whenever required. CDR is also used for VOIP and is a file containing all usage details such as source of origin and destination point of the call, usage period of the IP and the total amount charged during the billing period. Call Detail records are maintained by telephone exchanges emitting information in the form of tickets, with respect to individual customers/users.getting CDR is not an easy task, anybody cannot have it with an ease, as it's an confidential data which cannot be authorized to any one without permission.

Below is my experimental dataset which I got from CG Cyber Crime Cell for research purpose only. with the help of CDR log, I will track criminal location. CDR log consists of calling A party number, called B party number, time of call, duration of call . first cell id, second cell id/ last cell id, type of the call, imei no, imsi no, type of connection, sms center , routing area code.

CALLED A PARTY / CALLED NO. - A actual mobile number that was typed or dialed in the interface.

CALLED B PARTY -mobile Number where the call is dialed from .

DURATION OF CALL- tells about duration of call with specific phone number.

FIRST CELL ID - location of party A,

SECOND CELL ID- Location of party A when call ended

TYPE OF THE CALL- we can easily identify what type of call it was . mtc stands for mobile terminated call ,moc stands for mobile originated call,smt stands for surface mount technology .

IMEI NO.- IMEI stands for international Mobile Equipment Identity . it's just your finger print . it's 15 digits unique number of each devices.

IMSI NO.- stands for International Mobile Subscriber Identifier. It's 14-15 digit number which specify a mobile subscriber by their SIM {Subscriber Identification Module } card.

TYPE OF CONNECTION - Whether its a post paid / pre paid

Image 1 - Complete image of CDR

Image 2 - Image showing bottom of CDR .

Note: Image 1 & 2 both are real image of CDR. Free from any kind of data cleaning.

Image 3 - Showing CDR log after removing unwanted data.

Cell id is a unique ID which is allotted to mobile tower by mobile company . Using cell id a tower can be identified from all over the world, even with the help of this we can located them on google map.

Let us understand what is cell id & how it can be splits onto four parts.

40478-60015-10023

Here **404** is mobile country code of India

78 is mobile network code of state like Airtel, Docomo, Jio , BSNL etc…

60015 is LAC location area code - this code belongs to MP circle.

10023 is cell identifier - longitude & latitude .

Image 4 - Showing list of all cell id

Image 5 - Showing Criminal location

* **All fieds** are required, otherwise errors may occure.

Mobile Country Code	404
Mobile Network Code	78
Location Area Code	60015
Cell ID	10023

(Search) (Clear)

Lat=26.512070 Lon=77.995377

Image 6- showing longitude & latitude

cellphonetrackers.org/gsm/map.php?var=cell&mcc=404&mnc=78&lac=60015&cid=10023

Cell tower: 404-78-60015-10023.
Location: 26.512070,77.995377.
Operator: Madhya Pradesh & Chattishgarh.
Bands: GSM.
Here is your link, copy and paste it anywhere to share with anyone.

https://cellphonetrackers.org/gsm/map.php?var=cell&mcc=404&mnc=78&lac=60015&cid=10023

View neighboring cell towers in this area, click here.

Image 7 - Showing Geo-location of criminal on google map.

5. CONCLUSION

In this paper, I have tried how to predict criminal location using CDR with the help of MS Excel.Through this analysis, we were able to trace their location & locate them on google map too .If CDR log contains unwanted data it will not provide you desired result which you are looking for.so before preceding any CDR log, it is advised to clean the data set than go for future work.

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CONSUMER BEHAVIOR ANALYSIS OF BUFFET RESTAURANTS IN BANGKOK

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The objectives of this study were (1to study the demographics of food consumers at buffet restaurant (2 to study the behavior of using buffet restaurant service. A sample of 400subjects was used by using questionnaires as a study tool. The collected data were processed using percentage and mean t-test statistics. ANOVA analysis was performed using F-test (One-way ANOVA), Correlation. and Multiple Regression Analysis. The results of the study found that the majority of respondents were female, 251 (%62.75), aged 30-21years, (%51.75) 207, educational background, bachelor's degree, occupation of private employee / company employee, status, single The average monthly income is 15,25 - 001, 000 baht. It can be concluded that the type of consumers who choose to use the service. Grilled pork and Shabu Shabu in a similar amount and used 2-1times per month. The type of person who goes to the buffet restaurant too. Most of them choose to go with their lover or 3-2friends the most, and often do not go to the service alone. The budget for using the buffet restaurant is 399 - 200baht per person, which is the price that people choose to use the most. The most time when consumers choose to enter is – 19.00 21.00hrs. Saturday is the day that consumers choose to use the service the most. Where to use buffet restaurant mall It is the place where consumers choose to use the service the most. How to choose a buffet restaurant, use the walk-in method rather than making a reservation in advance. Factors that make you go to one restaurant more often than others. Good service, good atmosphere, delicious sauces or sauces unlike other places, clean, good food quality, variety, promotion is the most important factor that Consumers will choose to use the service. Secondly, there is enough parking space. and near the accommodation is the last factor. Who has the most influence on the decision to choose buffet restaurant service, boyfriend, brother or sister, parents have the most effect on decision making. Knowledge of Shabu Buffet restaurant Various online advertising media such as Facebook, Instagram, Line@ are the most popular nowadays for consumers to eat buffet more and more. because the price is cheap good value for money and there is a variety to choose from Suggestions for entrepreneurs It makes them aware of the factors affecting behavior in using Shabu-type restaurants. (1Should pay attention to the variety of food types in the restaurant. (2Should pay attention to the price of food. should focus on the right price Not set too expensive. (3Should focus on the service. (4Shabu restaurant operators. should focus on promoting

Keywords: Restaurant, Consumer Behavior

1. Introduction

Thai people as known for being a craftsman chooses of food quality and Eat good taste Many people have the ability food with a mellow taste, but with changing social conditions. The hustle and bustle means there not time to cook at home. atmosphere requirements to relax The pursuit of family fun or in a group of friends Restaurant operators are accelerating to adapt to the behavior of consumers conscious of the value of food. (Mrozik, 2019) The Making past of restaurant business has always grown favorably and which the growth rate of the restaurant market value. (Threevitaya, 2003.) It will be found that all of them are Asian restaurants, which is probably that result of the popularity of Thai food has changed according past era. The food trend from western countries is widespread but nowadays there is a trend of eating Asian food. (Batra, 2008) Because of the image that has a meticulous cooking method and a taste that is pleasing to Thai people's tastes, value for money will become an important factor that customers give weight in deciding to use a restaurant. (alilvand, Salimipour, Elyasi, Mohammadi, 2017)

In the past, most restaurant business operators (Yama, & Mahamud, 2020). will choose to offer value for money in the form of promotions, discounts, more than other forms of promotions May result in customers waiting to choose to eat at the restaurant. Only during the promotional period in the form of a discount. This will lead to a long-term impact on the income of the restaurant business. coupled with higher business costs, whether The cost of raw materials, energy, labor, including the rental of the premises. The greater the pressure factor, the profit of the business will decrease. (Enz, 2004)

In addition to the promotion can receive a discount through focusing on other factors such as taste, food, nuances and diversity of food. shop decoration, service, etc. The restaurant business operators must focus on encouraging consumers to have expenses. higher food intake per person Expanding the consumer base to a greater extent as well as attracting customers to use the service repeatedly While general restaurants have advantages such as restaurants in the area. and more flexible service periods. As a result, general restaurants Still able to serve customers, family groups, friends groups and corporate catering with a large number of guests. and choose to eat to socialize from lunch to So far the meal is well worth it. (Ing, Zheng Lin, Xu, Thurasamy, 2020),

Food is an important factor in human life. Consuming food that is nutritious, useful and sufficient to meet the needs. of the body each day will make the body healthy and strong which will lead to have a good quality of life in the end At present, due to social and economic conditions as well as values and attitudes including the adoption of foreign cultures which plays an important role in the consumption behavior of consumers both in terms of lifestyle and daily food consumption in all genders. (Johnson, 2000) Every age in Thai society has changed. This can be seen from the adoption of various buffet food cultures. from abroad, such as a Japanese buffet Korean food buffet or even Thai food buffet itself which is becoming very popular nowadays especially inworking age consumer society It can be seen from the expansion of the buffet restaurant's branches. The number of buffet food workers has been increasing rapidly in Thailand since when there is no conclusive evidence. But it became popular in the 16th century, where the word buffet (Buffet-Fat) is derived from the French word "buffet" means eating with a variety of snacks. (Jiemin, 2011)

The type is placed on the table for the invited guests to choose to eat with drinks. While chatting before the host invites you to the dining room table. a staple in the next lunch or dinner In Thai, the word "buffet" is used to refer to a food service where all the food is placed on the table and the guests walk in to pick up food. That by myself, sometimes there may be a helper to arrange food on a plate. But the guests have to pick up those food themselves Currently, the word buffet in Thai has expanded to mean a type of food sales in which many food vendors arrange food. (FUNG, Luke, 2007) like and charge the price of food individually with shoppers picking up food for themselves and eating fully satisfied There are also many kinds of food arrangements, such as a Thai buffet. Japanese buffet Vegetarian Buffet porridge buffet Grilled Buffet This is a marketing strategy of buffet restaurant operators, both foreign brands such as Shabushi Oishi or Thai brands such as Hot Pot. or even in a hotel Five stars also have a buffet food service to serve customers. In order to meet the needs of consumers in terms of value and variety in the form of Consumers of different types of food (Barrios, & Costell, 2004)

In addition to the competitive situation of restaurant operators in the type of shabu-grilled buffet restaurant and other types of restaurants that can be replaced, the cost tends to be higher economic downturn It can be an obstacle for this type of restaurant. As already mentioned Grilled Shabu Buffet Restaurant Still have to face problems from medical cases that have proven that consumers of shabu buffet food regularly. will have a chance of getting cancer Nowadays, whether TV, television, radio, newspapers or websites Announcing that eating shabu buffet regularly will have a negative effect on health. As a result, some consumers who are health conscious Try to reduce your consumption of grilled food. or avoid to the transition to healthy eating that are in the trend instead Shabu-grilled restaurant Strategies need to be developed and ready to improve and change to keep up with the situation outside all the time (Arisa Tiyasuwan, 2009) From the above information Therefore, the researcher was interested

in studying food consumption behavior at buffet restaurants. used as a guideline for service development meet the needs of consumers to achieve satisfaction to increase the number of customers who use the buffet restaurant service

2. Research objectives

To study the marketing mix factors affecting the behavior of using buffet restaurant service.

To study the behavior of using buffet restaurant service

To compare the behavior of using buffet restaurants Classified by personal information

To study the relationship between marketing mix factors and the behavior of using buffet restaurant services.

3. Research methodology

Population and samples used in the studyThe population used in the study were buffet food consumers in Bangkok.A total of 400 samples were selected for this study.(Cochran, W. G. 1954).unidentified sample size was calculated at the 95% confidence level as follows:

Formula n = P (1-P)(Z2) /(e2), population unknown.

n = sample size

P = probability of the number of samples to be randomized from the entire population.

e = sample sampling error

z = the level of confidence set by the researcher

(At the 95% confidence level, z is 1.96)

Represent n = (.50)(1-.50)(1.962)/(.052)

n = (.5)(.5)(3.8416)/.0025

n = .9604/.0025

n = 384.16

4. Methods for collecting data

There are methods for collecting data as follows:Information obtained from research studies from various sources, including textbooks, documents and other relevant research results.Information obtained from responding to the questionnaire of the target group and get it back by yourself Conduct a complete check This ensures that the questionnaire is complete, complete and can be used for further analysis

4.1 Data processing and analysis

Processing the data obtained from the questionnaire with a computer program by finding the rateThe percentage (Percentage) and average (Mean) program Microsoft Excel, which is a package program for creating pie charts (Pie Chart) and bar charts (Bar Chart) with an explanation of the results. and bring the results obtained from the chart to present for analysis according to the characteristics of various variables Analysis of marketing mix factors related to buffet restaurant behavior (Overview of marketing mix factors)

Marketing mix factor	Behavior of using buffet restaurant service			
	r	ค่าSig	relationship level	Degree
Product	.250**	0.000	same direction high	1
Price	.152**	0.002	same direction high	5
Distribution	.126**	0.012	same direction high	7
marketing promotion	.147**	0.003	same direction high	6
Personal	.162**	0.001	same direction high	4
service process	.224**	0.000	same direction high	2
physical appearance	.191**	0.000	same direction high	3
Average overview	.156**	0.000	same direction high	

Statistical significance level of .01

Marketing mix factors were related to buffet restaurant behavior. (Overview of marketing mix factors) Average overviewThere is a very high degree of correlation in the same direction (r) =.156

Consider the relationship from the correlation coefficient (r) in descending order as follows:

1. Product marketing mix factors It was related to the behavior of using buffet restaurant service. (Overview of marketing mix factors) Very high level of correlation in the same direction (r) =250

2. Marketing mix of service processes It was related to the behavior of using buffet restaurant service. (Overview of marketing mix factors) The level of correlation was very high in the same direction (r) =224.

3. Marketing mix of physical characteristics It was related to the behavior of using buffet restaurant service. (Overview of marketing mix factors) High level of correlation in the same direction (r) =191

4. Personnel marketing mix factors It was related to the behavior of using buffet restaurant service. (Overview of marketing mix factors) High level of correlation in the same direction (r) =162

5. Price marketing mix factor It was related to the behavior of using buffet restaurant service. (Overview of marketing mix factors) High level of correlation in the same direction (r) =152

6. Marketing mix factors in marketing promotion It was related to the behavior of using buffet restaurant service. (Overview of marketing mix factors) High level of correlation in the same direction (r) = 147

7. Distribution marketing mix factors It was related to the behavior of using buffet restaurant service. (Overview of marketing mix factors) High level of correlation in the same direction (r) =126

Marketing mix factors influence behavior of buffet restaurant service.

Hypothesis 3: Marketing mix factors influence behavior of buffet restaurant service as follows:H0: Marketing mix factors have no influence on buffet restaurant behavior.H1: Marketing mix factors influence behavior of buffet restaurant use.for the statistics used in the analysis A stepwise multiple regression analysis will be used, considering that the tolerance of tolerance is not less than 10 values, the expansion factor of variance (VIF) has. values less than 10The results of the data analysis using statistical comparisons of marketing mix factors influencing behavior of buffet restaurant service. The results of the comparative data analysis can be summarized as follows:

Comparison of marketing mix factors influencing behavior of buffet restaurant service

Marketing mix factors	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)					
Marketing mix factors					
1. ด้านผลิตภัณฑ์	226.969	66.281	.252	3.424	.001*
2. ด้านราคา	-58.036	63.917	-.069	-.908	.364
3. ด้านช่องทางการจัดจำหน่าย	-77.406	59.693	-.096	-1.297	.195
4. ด้านส่งเสริมการตลาด	6.025	54.866	.008	.110	.913
5. ด้านบุคลากร	-37.901	65.062	-.047	-.583	.561
6. ด้านกระบวนการ	136.753	69.408	.163	1.970	.050*
7. ด้านลักษณะทางกายภาพและการนำเสนอ	49.636	73.250	.055	.678	.498

Comparing marketing mix factors influencing behavior of buffet restaurant service, it was found that product (sig=0.001) and process (sig=0.050) had influence on buffet restaurant service behavior. statistically significant at the .05 level

5.   Summary of results, discussion of results and recommendations

Consumption behavior of buffet restaurant This survey research aimed to study the marketing mix factors affecting buffet restaurant service behavior and buffet restaurant consumer behavior. It is a quantitative study. (Quantitative Research) using a questionnaire of 400 sets as a tool to collect data and use statistics for data analysis, Chi-Square and Multiple Regression Analysis. The results of the data analysis can be summarized as follows:

Marketing mix From the study of the marketing mix of buffet restaurant service It was found that the total number of respondents was 400, which can be divided into sections as follows:

The overall product aspect is at a very important level (= 4.367) comprising The food was fresh, clean, safe (=4.593) satisfied with the quality. and food taste (=4.575), the items are diverse enough to meet the needs (=4.435), the reputation of the restaurant (=4.128), and the food is of high nutritional value (=4.108), respectively.

The overall price aspect is at a very important level (=4.376), consisting of Food prices are reasonable for the quality (=4.457). Value for money compared to other restaurants (=4.425), price tags are clearly displayed (=4.408),and payments can be made by both credit card and cash (=4.215), respectively.

The distribution aspect as a whole was at a very important level (= 4.242), consisting of The store's opening-closing time is convenient (=4.280), its location is close to home/residential (=4.280), the location has convenient parking (=4.280) and the convenience of using the service inside. Shop (=4.090) respectively

In terms of overall marketing promotion, it was at a very important level (=4.210) comprising The attractiveness of the promotion (=4.382), there are discounts on special occasions such as birthdays (=4.318), there are advertisements such as Facebook brochures (=4.120), and there is a loyalty card for discounts (=4.022.) respectively

As for the people as a whole, it was at a very important level (= 4.366) comprising Employees take good care of customers (=4.508), there are sufficient number of employees to provide services (=4.407), employees have good personality, politeness (=4.405), employees are able to recommend new menus (=4.280) and employees are very knowledgeable. Knows about food well (=4.230), respectively.

The overall service process was at a very important level (=4.455), consisting of The speed of food service (=4.530), the introduction of pre-service discounts (=4.465), the proper ordering of the service queue (=4.457), and the repeating of the orders that customers order every time. to prevent errors (=4.368), respectively.

Physical characteristics as a whole were at a very important level (= 4.347) comprising Cleanliness of utensils and equipment (=4.590) Clean service place (=4.568) There is a place to sit and sit and wait to be served adequately (=4.272) The shop is decorated to be beautiful, good atmosphere (=4.267), the

name of the shop looking. clearly visible and unique (=4.265) and employees are assigned to dress according to the atmosphere of the store (=4.125), respectively

Discuss the results of the recommendations in the study.The study authors have suggestions from the study for buffet restaurant operators as follows:

1. Should pay attention to the classification of food in the restaurant. To have a variety to make customers feel worthwhile. There is a special menu, weekly menu. or always new menu to reduce the monotony of customers

2. The price should be set according to the quality of food and the quality of service that meets the standard, clean and hygienic.

3. Should develop or train employees in the store To be ready to provide services and impress customers. Serve customers with enthusiasm, attention, prompt and courteous service.

4. The store should be introduced through social media that the target customers use. Organize promotional activities during times when there are few users. to increase sales

Suggestions for the next study

Should study the factors affecting the service quality of the buffet restaurant.

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A STUDY OF TOPOLOGICAL PROPERTIES OF PDN AND HEX-CELL INTERCONNECTION NETWORK

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This paper elaborates the mapping and Topological Properties of interconnection network. Mapping between processor is done for a study of geometrical structure between processor. The new communication pattern and relation can be explored by studying the topological properties of interconnection network. We present the mathematical pattern that may useful for study the communication and complexity of architecture. Graph model are used to represent the efficiency of communication between the processors. The bitwise representation of node of architecture and its links are the major theme for the study of connectivity and its complexity of the Hex-Cell and PDN. In this paper we will be studying the structure of functions in terms of the topology of its level sets.

Keywords: Interconnection Network, Hex-Cell, PDN, PDS, Topological Properties.

1. INTRODUCTION

Interest in Interconnection Network has been growing for many years because of its potential for high performance computing. A perfect difference network is a robust, high performance interconnection network for parallel and distributed computation. PDNs and Hex-Cell may be desirable for large networks with wired connectivity, but definitely they do offer attractive alternatives for wireless Parallel architectures. Many Researchers has already explored these interconnection network for parallel processing network [1] and some topological properties of PDNs and parallel algorithms [2] [3] [4] were suggested. Here we presented a finding in a form of lemmas. Perfect Difference Network and Hex-Cell has a good balance between degree, diameter and scalability.In this Paper We explored the vital and important issue of structural relationship, topological properties/invariant used for PDN (Perfect Difference Network) and Hex Cell. We present the mathematical pattern for study of complexity of Interconnection Network to investigate new ways to optimize number of links and efficient message passing mechanism. We are also tried to explore the computational features of overlapped architecture that is common to a large class of problem[4][5]. For example link overlap may important study in many intersection applications. Graph model are used to represent the efficiency of communication between the processors. The Binary representation of component of architecture and its links are the major theme for the study of connectivity and its complexity of the Hex-Cell and PDN[5][6].

*Lemma 1: There are 1*a+(l-1)*p liks in outer layer HC(d) .*

Proof:

From the topological properties of Hex-cell it is clear each Hex-Cell has six node [7][8][9] and all the links are are external. And HC (2) has eighteen external links with one inner and six outer Hex-Cell HC (2) contains three (3) rows. The following fact is also presented same things.
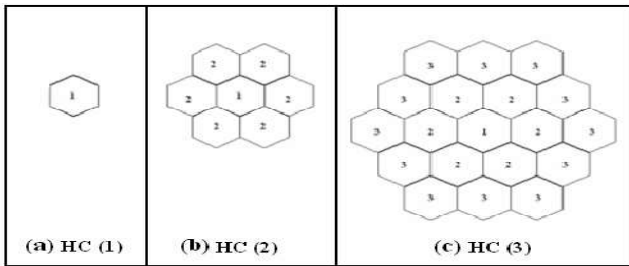
Fig. 1: (a) HC (one) (b) HC (two) (c) HC (three) [6]

Now, consider the lemma, given equation is [1{a+(l-1)p}].

Where p represent the skip value of links between HC(1) and HC(2) , l represent the level number of HC(d), and a is the number of external links at level 1 of HC(d).

Example using the reference of fig2:

Level 1:

HC(1)		[1{a+(l-1)p}]
TotalHex-Cell	1	1{6+(1-1)12}
Node	6	1{6+0}
Row	1	6
Edges	6	

Level 2:

HC(2)		[1{a+(l-1)p}]
TotalHex-Cell	7	1{6+(2-1)12}
Node	24	1{6+12}
Row	3	18

Level 3:

HC(3)		[1{a+(l-1)p}]
TotalHex-Cell	19	1{6+(3-1)12}
Node	54	1{6+2*12}
Row	5	1{6+24}
		30

From the above analysis we found that

- Level one (1) has 6 external links.
- Level 2 has 18 external links
- Level 3 has 30 external links.

Now its proved,Hex-Cell(D) has **[1{a+(l-1)p}]** External liks.

Lemma 2: The relation between left skip node and right skip node in PDN is

$$\sum_{i=1}^{n-3} l_i = \sum_{i=n-3}^{1} r_i$$

Proof: The Perfect Difference Network (PDN) is based on a PDS and the total number of nodes is $(\delta^2 + \delta + 1)$[8]**.** The relation between left skip node and right skip node is shown by following fact.

Left Skip Node	Right Skip Node			
	□□□	□□□	□□□	□□□
1	4	10	18	28
2	3	9	17	27
3	2	8	16	26
4	1	7	15	25
5		6	14	24
6		5	13	23
7		4	12	22
8		3	11	21
9		2	10	20
10		1	9	19

2D Reperesentation of Hex-Cell and PDN.

	0	1	2	3	4	5
0	0	1	0	0	0	1
1	1	0	1	0	0	0
2	0	1	0	1	0	0
3	0	0	1	0	1	0

| 4 | 0 | 0 | 0 | 1 | 0 | 1 |
| 5 | 1 | 0 | 0 | 0 | 1 | 0 |

Adjacency matrix of Hex-Cell Having 6 nodes.
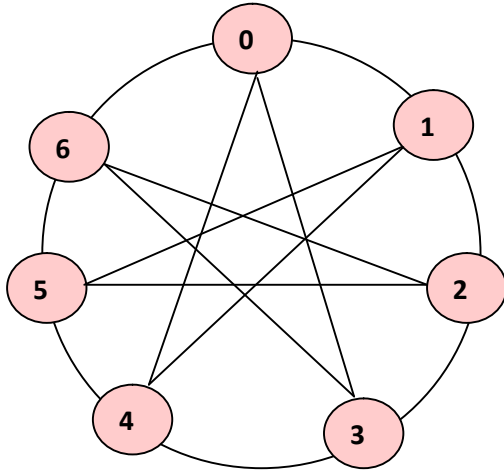
Perfect Difference Network with 7 Nodes[10][11][12]

	0	1	2	3	4	5	6
0	0	1	0	1	1	0	1
1	1	0	1	0	1	1	0
2	0	1	0	1	0	1	1
3	1	0	1	0	1	0	1
4	1	1	0	1	0	1	0
5	0	1	1	0	1	0	1
6	1	0	1	1	0	1	0

Adjacency Matrix of PDN Having 7 Nodes

2. CONCLUSION

This paper presents topological properties to study the connectivity of interconnection networks namely, Hex-Cell and Perfect Difference Network. As the number of processors increases in a system, the processing speed increases. The basic architecture of Hex-Cell and PDN is explored. We have also discussed some basic parameter for analysis of PDN & Hex-cell . We tried to shows Structural parameter of hex-cell . Our main contribution in this paper is extracting some computational aspect of Hex-Cell, Perfect Difference Network (PDN) Using graphical model. Extracting these kinds of expression/pattern in order to describe topological properties of Hex-Cell, Perfect Difference Network (PDN) can have several benefits. For Example matrix representation of Hex-cell and PDN helps us for making circuit and

calculate diameter of these architecture. Presently we are trying to derived some relations between nodes to improve architecture further we may develop communication algorithm and to make it more suitable for highly parallel system.

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EVALUATING TEACHERS' AND STUDENTS' PERCEPTION ON USE OF ICT IN ONLINE TEACHING-LEARNING DURING COVID-19 LOCKDOWN: A CASE OF CHHATTISGARH STATE OF INDIA

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COVID-19 pandemic has changed the thought process of people of entire world. Education system of India is also affected due to this pandemic. During the first wave of COVID-19 entire Teaching-Learning was shifted from face-to-face to online mode. This was the time when teachers as well as students were not aware about many online Information and Communication Technology (ICT) tools. Chhattisgarh state of India is lacking in terms of ICT infrastructures like availability of computing devices as well as high speed internet connectivity. During the lockdown a questionnaire was developed to assess online Teaching-learning process. Samples collected from Higher Education Institutes (HEIs) of Chhattisgarh on the basis of 15 items, was analysed using t-test and ANOVA through SPSS software. The objective was to know the opinion of the teachers and students about online Teaching-Learning during lockdown. Analytical study was on the basis of four groups namely gender, institute type, discipline and classes teaching/Class studying.Empirical results show that perception of teachers and students on the basis of all the above did not differ i.e. their perceptions on utilization of ICT in online Teaching-Learning during lockdown are similar for different groups except for the discipline group of student.

Keywords:COVID-19,Information and Communication Technology (ICT), Teaching-Learning, Online Teaching-Learning.

1. Introduction:

There is a great impact of COVID-19 pandemic in Higher Education system of India. Online was the only way to continue the Teaching-Learning process. Many vendors have provided online tools to carry on online Teaching-Learning during the lockdown and was a new experience not only for the teachers and students but for government and management of Higher Education Institutions (HEIs). Many have come up with solutions of Video conferencing tools to conduct online classes and Learning Management System (LMS) to disseminate learning materials to the students as well as to conduct un-proctored examination. The state of Chhattisgarh of India has also faced similar problem during lockdown. The entire process of Teaching-Learning was held up and most of the HEIs have unaware about online Teaching-Learning. The Higher Education department of state has released order to continue Teaching-Learning process through online mode. Initially students and teachers have faced problems in the new process. Most of them have faced problems about utilization of many online tools. Slow internet connectivity was also one of the major hurdles of online Teaching-Learning. In spite of having all these challenges HEIs of the state have played important role to continue online Teaching-Learning during lockdown due to COVID-19 pandemic. Due to all these challenges and problems it was necessary to study the mentality or opinion of the teachers as well as students of HEIs. Many authors have done this in their respective areas. All these papers were mostly published in the year 2021. Most of the studies were based on specific geographical areas. Shifting from face-to-face Teaching-Learning into online due to COVID-19 lockdown was studied by Peimani et. al (2021), author has pointed out fewindicators for online Teaching-Learning. Comparison between face-to-face and online teaching was made by Naik L.

et. al (2021) . Perception of students and teachers on online Teaching-Learning is one of the important aspects which was studied by Mishra et. al (2020) and Bordoloi et. al (2021). It was also pointed out and analyzed that online Teaching-Learning has many challenges and drawbacks (Haron et. Al, 2021) they concluded that online Teaching-Learning process is a challenging due to many factors like slow internet connectivity and lack of ICT infrastructure. In one more study Simamora (2020) has pointed out challenges in study of arts related subjects. Another subject specific study was done by Aziza (2021), they studied what is the most important platform for mathematics teaching. Hassan M. (2020) has reviewed many articles about challenges and conclude that people have faced infrastructure problems, internet availability and quality also they did not have reliable LMS to deliver contents.

However very few researchers (Joshi et. al, 2020) have carried out their research in Indian context to analyze the use and impact of ICT in Teaching-Learning process specially during COVID-19 lockdown. COVID-19 has provided an opportunity to learn ICT tools for Teaching-Learning and enforced teachers and students of the HEIs to utilize it during the lockdown (Gabriela et. al, 2020; Lorente et. al, 2020; Nuere& de Miguel, 2020). Many teachers were unaware about utilization of ICT tools and they have learnt it during the lockdown itself. A recent studies(Mishra et. al, 2020) reflects how ICT was utilized during the lockdown. Many other researchers were also carried out in context of utilization of ICT in Teaching-Learning process. Joshi et. al (2020) have carried out their research in the Indian context to analyze the use and impact of ICT in the Teaching-Learning process, especially during COVID-19 lockdown. Other authors Gabriela et. al (2020), Lorente et. al (2020) and Nuere et. al (2020) have also done their studies on utilization of ICT tools in online teaching during lockdown in this context a recent study by Mishra et. al (2020) explores the same in more detail. On the other hand online Teaching-Learning has its own advantages and disadvantages or challenges and opportunities which has been explored by Haron et. al (2021) and Hassan (2020). Peimani N. et. al (2020) have also pointed out challenges and opportunity of online teaching.Authors (Quinn &Buzzetto-Hollywood, 2021)have analysed the perception of students for digital learning solution in hospitality accounting and found that students were satisfied with all digital learning solutions. This study was carried out as a pilot study tom inform and guide future research. In one more research (Teeter et al., 2007) have studied students perception regarding initial feeling towards use of education technology in the classroom. In another research (Lippincott, 2006) have studies about the effect of education technology on learning in accounting course.

Above research papers reflects that in the changing world ICT based Teaching-Learning is a need to enhance quality in education and for smart education. Also in spite of having many challenges and drawbacks of online Teaching-Learning, It was the only option during lockdown , This research work explores the opinion of teachers as well as students to share their thought about online Teaching-Learning in special reference to HEIs of Chhattisgarh state of India. The data collected through google form was analyzed in four different groups namely gender, Institute type, discipline and classes teaching/Class studyingfor both teachers as well as students. The difference on opinion on the basis of above groups reflects that thought process of different groups are different on online Teaching-learning.

2. **Research Design:**
A research designis the arrangement of the conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure, Actually, research design is the conceptual structure within which research is conducted, it constitutes the blueprint for the collection, measurement, and analysis of data. The research design can be divided into following (Kothari C.R. and et al., 2021):
    i.   Sampling Design
    ii.   Observational Design
    iii.   Statistical Design
    iv.   Operational Design

2.1. Questionnaire

Due to impact of COVID-19 in Teaching-Learning process, the proposed research work has incorporated the situation of COVID-19 also and a separate questionnaire has been developed so that impact of ICT can be studied and also a comparative study before and after COVID-19 can be done. It is very clear that ICT based Teaching-Learning has achieved a new dimension due to COVID-19 pandemic therefore this study is very much significant. There are 7 different sections of this questionnaire, which are as below:
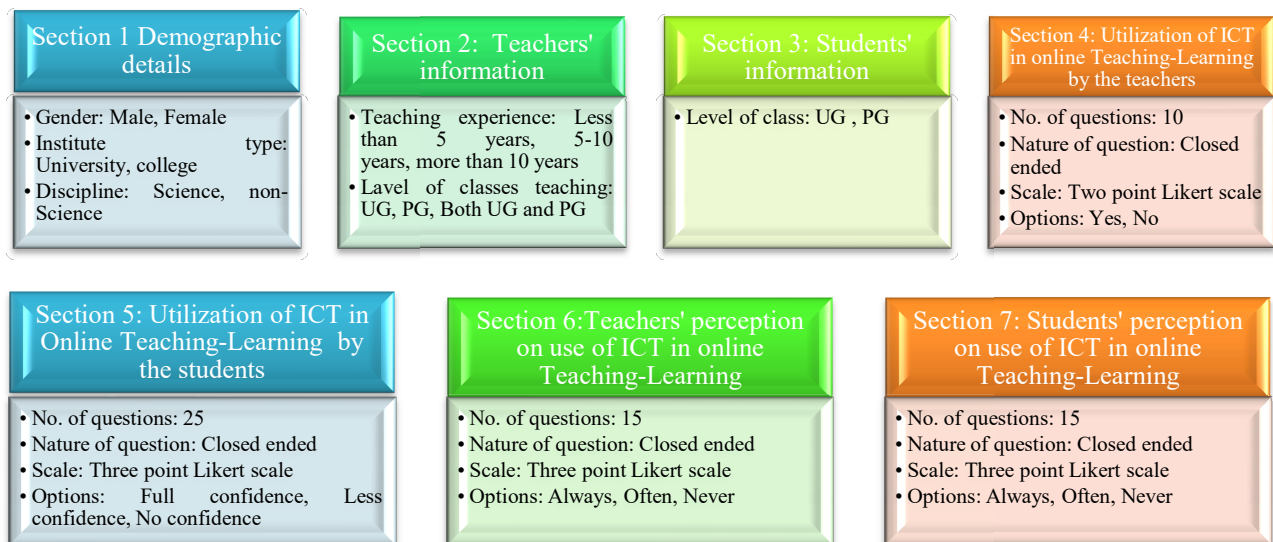
Figure 1: Different sections and its detail of questionnaire developed for analyzing ICT as online Teaching-Learning.

2.2. Population and Sample:

In survey research the researcher has to collect data from some portion of population and therefore sampling is required. Population is a small portion od universe while sample is a small part or subset od population. Population and sample considered for this research work are as follow:

2.2.1. **Population:**

This study is based on the state of Chhattisgarh, India, where there are many HEIs affiliated to university. As per the annual report of 2020-2021 (2021) of higher education department of the state there are 23 universities out of which 09 are public universities and 14 are private universities. Only traditional multidisciplinary public (06 universities) and private universities and its affiliated colleges under the higher education department of Chhattisgarh, India are considered as population of the study. Since data were collected online through google form hence it is decided to cover larger population of the state. The details of HEIs in Chhattisgarh, India are shown in Table 1.

Table: Details of HEIs in Chhattisgarh

Particular	Detail
University	State University: 09, Private University: 14, Total: 23
College	Government college:253, Private college: 257, Total: 510

2.2.2 Sample:

Well defined small representative portion of the population is called sample. It is not possible to have a sample which truly represents the population. There are two types of sampling methods: Probability and Non-probability sampling. In this research work random sampling method was used which is a type of probability sampling. The implication of random sampling (Kothari C.R. and et al., 2021) are as follow:

   i.   It gives each element in the population an equal probability of getting into the population.

  ii.   It gives each possible sample combination an equal probability of being chosen.

        The details of sample collected from teachers and students are shown respectively in Figure 2 and 3. There are total 735 samples collected from teachers and 1179 samples collected from the students using random sampling method.
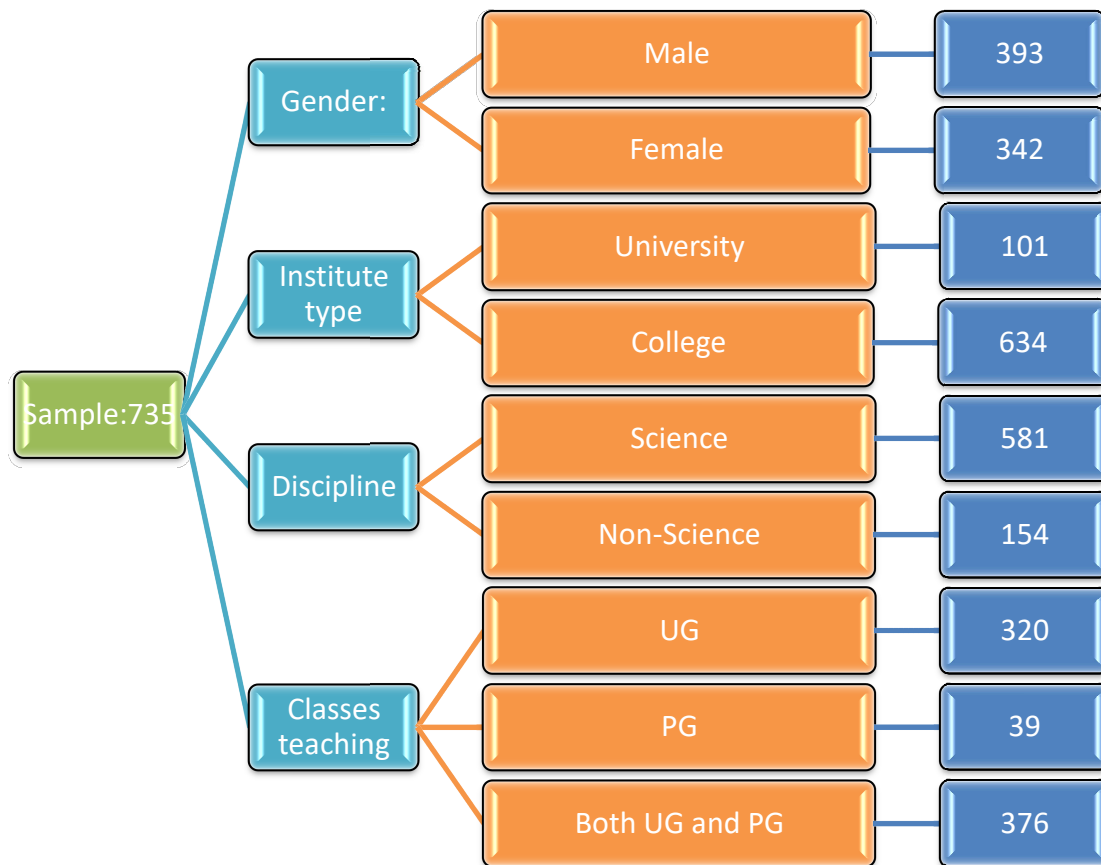
Figure 2: Detail of sample collected from teachers.
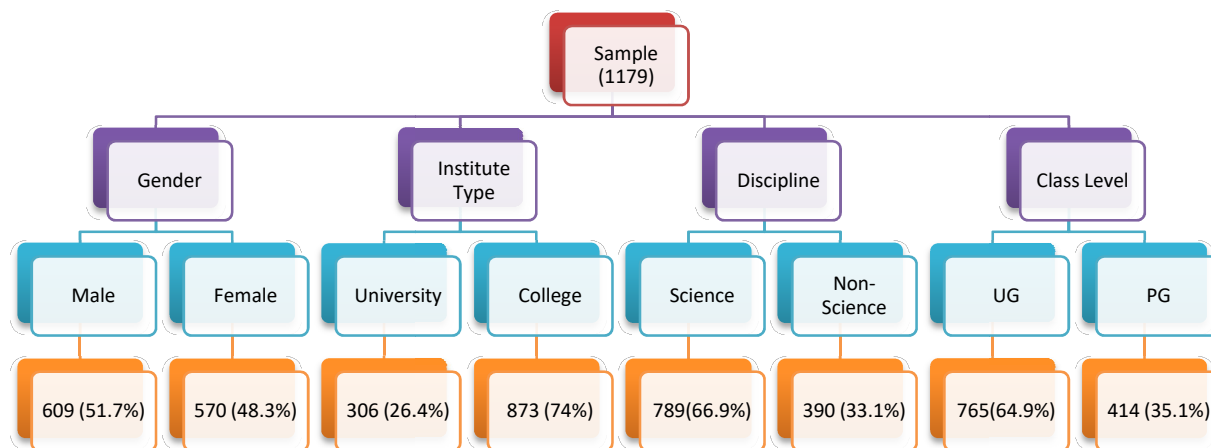
Figure3: Detail of sample collected from students.

2.3 Delimitation of the study:

The above study was delimited to the multidisciplinary colleges and universities of the Chhattisgarh state of India.

3. Data Analysis and Interpretation:

Analysis refers to do some computational work using statistical techniques while interpretation refers to the task of drawing inferences from the collected facts after an analytical study (Kothari C.R. and et al., 2021).

3.1 Statistical technique: The following two statistical techniques were used for data analysis and interpretation:

i. **T-test:** The independent sample t-test compares the means between two unrelated groups on the same continuous dependent variable.

ii. **ANOVA:** This technique is important in the context of all those situations where comparison of more than two populations is required(Kothari C.R. and et al., 2021). The one way analysis of variance (ANOVA) is a parametric alternative used to determine whether there are any significant differences between the means two or more independent groups (Naik et al., 2016).

3.2 Hypothesis Testing: In order to test the above four hypothesis t-test and one way ANOVA were used. As it is known that t-test is used when there are two variables and when there are more than two variables then ANOVA is used. In this study we have four different groups and these groups have either two variable or three variables. On the basis of number of variables either t-test or ANOVA were used to test the hypothesis. The analytical study was carried out using SPSS software. Data collected through google form were imported in Excel and loaded into SPSS to analyze. As stated study was carried out both for students as well as for teachers and accordingly hypothesis are decided. The test details of hypothesis and its testing for both teachers and students are as follow:

i. **Teachers' perceptions on use of ICT in online Teaching-Learning during lockdown due to COVID-19**

H01: There is no significant difference in between Male and Female teachers' perception towards utilization of ICT in Teaching-Learning during lockdown due to COVID-19.

Table 1: Comparison of perceptions of teachers towards utilization of ICT in online Teaching-Learning during lockdown due to COVID-19w.r.t. their gender.

Gender	N	Mean	Std. Deviation	t-value	Remark
Male	393	0.3003	0.526	0.437	Not significant
Female	342	0.2836	0.5000		

Statistical data shown in Table 1 reflects that there are 393 Male teachers and 342 female teachers whose means are 0.3003 and 0.2836 respectively, the calculated value of t is 0.437. Degree of freedom will be N1+N2-2 = 393+342-2=733. The tabulated t-value for df=733 is 1.960 which is not significant (tabulated t-value> calculated t-value) at 0.05 significant level. It means hypothesis H01 is accepted/Not rejected and hence we can say that perception on utilization of ICT in online Teaching-Learning during lockdown due to COVID-19of Male and Female teachersis similar.

H02: There is no significant difference in between university and college teachers' perception towards utilization of ICT in Teaching-Learning during lockdown due to COVID-19.

Table 2: Comparison of perceptions of teachers towards utilization of ICT in Teaching-Learning during lockdown due to COVID-19w.r.t. discipline.

Discipline	N	Mean	Std. Deviation	t-value	Remark
Science	581	0.3012	0.525	0.889	Not significant
Nonscience	154	0.2597	0.468		

Statistical data shown in Table 1 reflects that there are 581science teachers and 154non-science teachers whose means are 0.3012 and 0.2597 respectively, the calculated value of t is 0.889. Degree of freedom will be N1+N2-2 = 581+154-2=733. The tabulated t-value for df=733 is 1.960 at 0.05 significant level which is not significant (tabulated t-value>calculated t-value). It means hypothesis H02 is accepted/Not rejected and hence we can say that perception on utilization of ICT in online Teaching-Learning during lockdown due to COVID-19 of science and non-science teachers is similar.

H03:There is no significant difference in between university and college teachers' perception towards utilization of ICT in online Teaching-Learning during lockdown due to COVID-19.

Table 3: Comparison of perceptions of teachers towards utilization of ICT in Teaching-Learning during lockdown due to COVID-19w.r.t. type of institution.

Institute type	N	Mean	Std. Deviation	t-value	Remark
University	101	0.326	0.567	0.720	Not Significant
College	634	0.287	0.505		

Statistical data shown in Table 1 reflects that there are 101university teachers and 634college teachers whose means are 0.326 and 0.287 respectively, the calculated value of t is 0.720. Degree of freedom will be N1+N2-2 = 101+634-2=733. The tabulated t-value for df=733 is 1.960 at 0.05 significant level, which is not significant (tabulated t-value> calculated t-value). It means hypothesis H03 is accepted/Not

rejected and hence we can say that perception on utilization of ICT in online Teaching-Learning during lockdown due to COVID-19of university and college teachers is similar.

H04: There is no significant difference among the teachers' perception teaching in HE situated in urban, semi urban and rural areas towards utilization of ICT in online Teaching-learning during lockdown due to COVID-19.

Table 4: Comparison of perceptions of teachers towards utilization of ICT in Teaching-Learning during lockdown due to COVID-19w.r.t. classes teaching.

Source of variance	Sum of Squares	df	Mean Square	F	Remark
Between Groups	0.212	2	0.106	0.399	Not Significant
Within Groups	193.725	730	0.265		
Total	193.937	732			

Statistical data shown in Table 4 that F-value is 0.399 and tabulated F-value for degree of freedom 2/730 is   which is not significant (tabulated F-value < calculated F-value) at 0.05 significant level. It means hypothesis H4 is accepted/Not rejected and hence we can say that perception on utilization of ICT in online Teaching-Learning during lockdown due to COVID-19 of teachers having less than 5 years, 5-10 years and more than 10 years' experience is similar.

ii.   Students' perceptions on use of ICT in online Teaching-Learning during lockdown due to COVID-19

H05: There is no significant difference in between Male and Female students towards   utilization of ICT in Teaching-Learning during lockdown due to COVID-19

The analytical tables to check above hypothesis and its corresponding results are as follow:

Table 5: Comparison of perceptions of students towards utilization of ICT in Teaching-Learning during lockdown due to COVID-19w.r.t. their gender.

Gender	N	Mean	Std. Deviation	t-value	Remark
Male	570	0.56	0.650	0.381	Not significant
Female	609	0.58	0.677		

H06: There is no significant difference in between university and college students towards utilization of ICT in Teaching-Learning during lockdown due to COVID-19.

Table 6: Comparison of perceptions of students towards utilization of ICT in Teaching-Learning during lockdown due to COVID-19w.r.t. discipline.

Discipline	N	Mean	Std. Deviation	t-value	Remark
Science	855	0.60	0.683	2.711	significant
Nonscience	324	0.49	0.602		

H07:There is no significant difference in between science and non-science students towards utilization of ICT in Teaching-Learning during lockdown due to COVID-19.

Table 7: Comparison of perceptions of students towards utilization of ICT in Teaching-Learning during lockdown due to COVID-19w.r.t. type of institution.

Institute	N	Mean	Std. Deviation	t-value	Remark
University	306	0.64	0.665	1.986	Significant
College	873	0.55	0.662		

H08: There is no significant difference among the students studying in college situated in urban, semi urban and rural areas during lockdown due to COVID-19.

Table 8: Comparison of perceptions of students towards utilization of ICT in Teaching-Learning during lockdown due to COVID-19w.r.t. their classes teaching.

Level of class	N	Mean	Std. Deviation	t-value	Remark
UG	765	0.62	0.676	3.047	Significant
PG	414	0.49	0.633		

4. Conclusion:

COVID-19 situation has shifted entire Teaching-Learning process from Face to Face to online mode, entire country started conducting classes in online mode. The higher education department of state of Chhattisgarh, India has also taken many initiatives for online Teaching-Learning through web portal as well as through its own App: HECGOnline. This research work emphasizes on perception of teachers as well as students of the state towards utilization of ICT in Teaching-Learning. The study was done specifically to compare the perception of various groups. Samples were collected through well designed google form and data were collected. The analytical study revels that there is no significant difference in perception on utilizing ICT in Teaching-Learning in between various groups of teachers with respect to their gender, Discipline, Institute type and Classes teaching. On the other hand there is difference in perception of students studying in UG and PG classes on utilization of ICT in Teaching-Learning during lockdown due to COVID 19, for other groups perception are found similar. Hence it can be concluded that COVID 19 situation affect all the groups of teachers as well as students and all they had similar thought process about utilization of ICT in Teaching-Learning.

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SENTIMENTAL ANALYSIS OF A PERSON AND CONVOLUTION NEURAL NETWORK IN DEEP LEARNING

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Sentimental analysis is a high used buzz in current research. It is a computational method of expression, sentiment, and views of a person on a given text. In our work, we have taken more than five thousand views from different people on a common topic. We have selected the CNN model to test our data set. Model his trained and tested all the given percentage of sentiments. After tearing our model gives 82% of accuracy.

Keywords: Sentimental Analysis, Convolution Neural Network, Deep Learning.

1. INTRODUCTION

With the rapid growth of digital content over the internet, it is very essential to develop a model that extracts meaningful information from the internet in bilingual language [1][2][3]. Sentiment analysis was introduced as a tool for automatic extraction of insight and useful information from the user-generated data Sentiment analysis is a field of study whose main objective is to identify and examine the components of a person's opinion [3][4]. Deep learning approaches have been proposed for different sentiment analysis tasks and have achieved state-of-the-art results [5][6].

1.1 Sentimental Analysis

Sentiment analysis is a powerful text analysis tool that automatically mines unstructured data (social media, emails, customer service tickets, and more) for opinion and emotion, and can be performed using machine learning and deep learning algorithms [6][7]. Sentiment analysis is an important area of natural language processing that can help inform business decisions by extracting sentiment information from documents [8][9]. Sentiment Analysis (SA), which is often also referred to as opinion mining or comment mining in the literature, is a discipline of NLP-based text analysis whose goal is to determine the writer's feelings about a particular topic [10][11].

1.2 Deep Learning and Sentimental Analysis

Deep learning approaches have been proposed for different sentiment analysis tasks and have achieved state-of-the-art results [11][12]. Sentiment analysis is intensively used in many applications, such as reputation management, product reviews, and political debates. Deep Learning was introduced in 1986 by Rina Dechter and google trends "says" that the algorithm continues to grow to start "booming" around 2014. Research conducted using deep learning has been done in many fields [13][14].

1.3 Convolution Neural Network in Sentimental Analysis

Convolution Neural Networks (CNN) complexity architectures have been growing incessantly. The embedded platforms are limited resources in industrial application [15][16]. The system is run time budget essential to design efficient models [17][18]. The run-time improvement is multiple techniques used with minimal loss of accuracy. During this base, CNN is used in various sentimental analysis work with high accuracy [19][20]

2. METHODOLOGY

In our work, we have asked more than five thousand people to write their views on the current political situation of the world. We have taken their views as data set for our CNN model.

First, find word embed using input data, then trains a CNN model using those embed data.

Figure 1: Model of Sentimental

3. EXPERIENTIAL WORK

3.1 Data Set

Based on our NLP document we have trained the CNN model and generated parameters given in the following table. We have taken these sample datasets for accuratefindings. Output is as follows.

	A	B	C	D	E	F	G	H	I
1	S.no.	lr	dim	ws	epoch	minn	maxn	wordNgrams	
2	1	0.9	5	4	1	2	3	1	
3	2	0.9	5	4	1	2	3	2	
4	3	0.9	5	4	1	2	3	3	
5	4	0.9	10	5	1	3	4	1	
6	5	0.9	10	5	1	3	4	2	
7	6	0.9	10	5	1	3	4	3	
8	7	0.9	20	6	1	4	5	1	
9	8	0.9	20	6	1	4	5	2	
10	9	0.9	20	6	1	4	5	3	
11	10	0.9	40	4	1	5	6	1	
12	11	0.9	40	4	1	5	6	2	
13	12	0.9	40	4	1	5	6	3	
14	13	0.9	5	5	1	6	3	1	
15	14	0.9	5	5	1	6	3	2	
16	15	0.9	5	5	1	6	3	3	
17	16	0.95	10	6	2	3	4	1	
18	17	0.95	10	6	2	3	4	2	
19	18	0.95	10	6	2	3	4	3	
20	19	0.95	20	4	2	4	5	1	
21	20	0.95	20	4	2	4	5	2	
22	21	0.95	20	4	2	4	5	3	
23	22	0.95	40	5	2	5	6	1	
24	23	0.95	40	5	2	5	6	2	
25	24	0.95	40	5	2	5	6	3	
26	25	0.95	5	6	2	6	3	1	
27	26	0.95	5	6	2	6	3	2	
28	27	0.95	5	6	2	6	3	3	
29	28	0.95	10	4	2	4	4	1	
30	29	0.95	10	4	2	4	4	2	
31	30	0.95	10	4	2	4	4	3	

Figure 2: data set

4. RESULT AND ANALYSIS

On the basis of the sample dataset given in the above dataset. We have plotted some graphs given below.
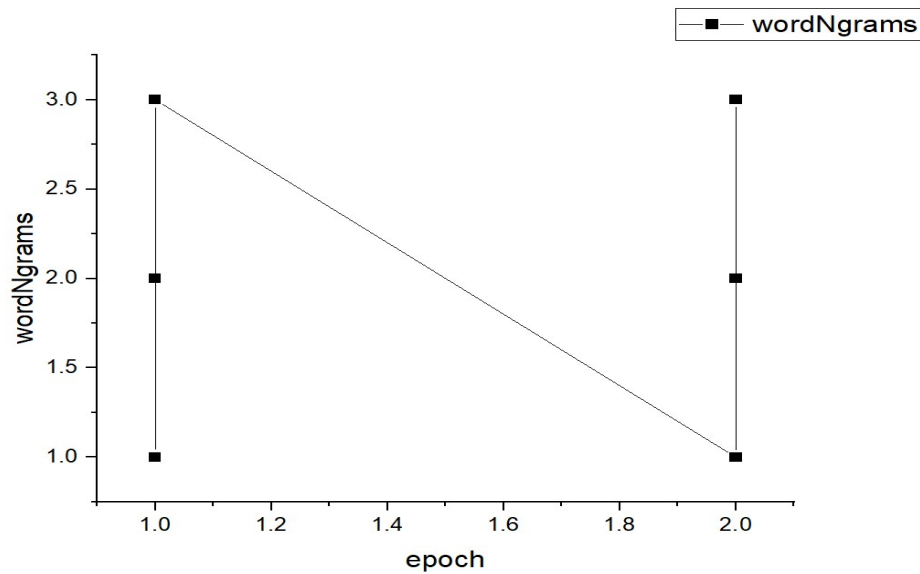
Figure 3: Graph Representing Learning Rate with respect to Number of Epoch

After running our dataset in Deep Learning classifier, we got the following results. These results were analyzed under four parameters.

4.1 Accuracy of our Work

As we know that
True Positive (TP): Number of words correctly classified
True Negative (TN): Number of words correctly classified
False Positive (FP): Number of words mistakenly classified
False Negative (FN): Number of words correctly classified
False Negative Rate (FNR): FNR= FN/(TP-FN)
True Positive Rate (TPR): TPR/Recall: Recall=TP/(TP+FN)
Precision = TP/(TP+FP)
Accuracy (ACC): ACC=(TP+TN)/(TP+TN+FP+FN)
F1- Score (F1): F1=2*Precision*recall/ (Precision + Recall)
In our work, we have taken Accuracy's five peak indexesfor all of the Gaussian types. The maximum Hight of each peak is -0.044. center gravity ranges from 101. Degree of freedom 137, and Adjacent R-Square 3.45596. Number of data points is 152 and chi^2 is 2.64041.
Linear Fit
We have considered the Accuracy test for the Linear fit data set. The equation for nodes is
Y = a + b * x

Input data is from the range 1 to 28. There is no masked data and bad data in the linear fit dataset.

Accuracy is under two sections interception and slope. Their parameter and value standard error, t-value, and probability.

Statistical values of Accuracy

Table 1: Statistical Values

Name of Points	Accuracy
Number of Points	30
Degrees of Freedom	28
Residual sum of squares	0.00467
Pearson's r	0.86651
R-Square (COD)	0.75083
Adj. R-Square	0.74194

Summary of Accuracy

In this section Accuracy is calculated under the two-section first intercept second is the slope. Value of intercept is 0.88621 and slope is 0.0025, standard error of intercept is 0.00484 and slope is 2.72468e-4, t-value of intercept is 183.20995 and slope is 9.18559, probability>|t| is 1.15033e-44 and slope are 6.06544e-10.

Analysis of Variance

We have done ANOVA testing to find out the influence of the dependence factor Age on the independent factor body structure of Elephant. In this section, Accuracy calculates three sections first one is a Model, the second one is Error, the third one is Total. DF is model value 1, the Error value is 28, and the Total value is 29. The Sum of Squares in the Model value is 0.01408, the Error value is 0.00467, Total value is 0.01875. Mean square in the Model value is 0.01408, Error value is 1.66852e-4-Value in the model 84.375, probability>F is model value 6.06544e-10.

5. CONCLUSION

The sentimental Analysis domain is very much worked in Deep Learning. This domain is used in industrial and professional areas to makedecisions regarding employ working capabilities. Deep learning helps us to train the model with a large no of data set and use that model for our work. In this paper we have taken employs view in certain domains and trained our model with the data set we have collected. The accuracy of our model is tested by using a Confusion matrix. Our model gives 82% accuracy. In the future with different data set and try to increase the accuracy of our model.

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ANALYSIS OF PSYCOLOGICAL AND PHYSICAL IMPACT OF COVID19 PANDEMIC THROUGH MACHINE LEARNING TECHNIQUE

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Adoption of machine learning and data mining in health care is to minimize errors in predicting disease, prescription of medicines, perception of individuals, and detection of diseases in its early stage. The proposed research aims to develop an intelligent decision making model that shall aid in revising medical pedagogies and remedial instructions and precaution and guidelines for human beings identified with low immunity and weak body strength, well before they face major clinical problem. This model shall also recognize the behaviour of patient and on the basis of their behavioural symptom we can predict who is most vulnerable to disease or at low risk. We will also try to find out post COVID-19 effects on patients and psychological impact of any pandemic on their lifestyle.This paper is an extensive coverage of integration of algorithms and logic with various data mining and machine learning techniques to handle healthcare and uncertainty at various levels to incorporate human type reasoning in modelling. Naive Bayes, K. Nearest neighbor and many more techniques can be used for Classifying people. We are planning to collect data set with different clinical and non-clinical behaviours. It involves a combination of techniques from numerous domains such as machine learning, organizing databases and information retrieval.

KEYWORDS: Machine Learning, Data Mining, Naïve Bayes, Clustering, Co-relation Analysis.

1. INTRODUCTION

Data Mining is the process involved in identifying interesting, interpretable, useful and novel information and extracting them from the data. The information shall be processed further to arrived decisions on a particular task. It has been used for many years in the fields of business, health care, engineering and research organizations to examine through bulk data like patient records, sales history of a commodity, seismic data of a particular location etc. Adoption of machine learning and data mining in health care is to minimize errors in predicting disease, prescription of medicines, perception of individuals, use of traditional medicines, detection of diseases in its early stage and avoiding fake medical insurance claims. Diseases such as cardiac disease, cancer, bone fracture etc. can be diagnosed by adopting data mining techniques. It involves a combination of techniques from numerous domains such as machine learning, organizing databases and information retrieval.

There are several major data mining techniques that have been developed and used in data mining projects. These techniques include association, classification, clustering, prediction and sequential patterns. Fuzzy logic is capable of supporting, to a reasonable extent, human type reasoning in natural form by allowing partial membership for data items in fuzzy subsets. Integration of fuzzy logic with data mining techniques has become one of the key constituents of machine learning in handling the challenges posed by the massive collection of natural data. This thesis is an extensive coverage of integration of fuzzy logic with various data mining and machine learning techniques to handle healthcare and

uncertainty at various levels to incorporate human type reasoning in modeling. Since data mining is a computer-based technology, it is quite natural to build the principles of data mining using Re-production Neural Networks. But this study aims to use data mining techniques for modeling the behavior patterns of human interaction with various systems. The human behavior is always fuzzy in nature and it is very difficult to model human behavior patterns with crisp neural networks data mining systems. The modeling of imprecise and qualitative knowledge, as well as handling of uncertainty at various stages is possible through the use of fuzzy sets.

In data mining, Clustering is used for segmenting objects into similar groups. Using crisp clustering technique an object can become the member of only one cluster and the membership is either fully inclusive (inlier) or exclusive (outlier). A review of crisp clustering techniques and illustration of k-means algorithm and reproducing neural networks are performed in this work to have clear idea about clustering principles. But in humanistic approach the object segmentation is different as because the object can become the member of more than one cluster at a time with varying degrees of association. Using fuzzy clustering techniques, data mining segmentation can be implemented exactly the way humans organize objects. The central idea in fuzzy clustering is the non-unique partitioning of the data in a collection of clusters with membership values between zero and one. The non-zero membership values with a maximum of one show the degree to which the data point belongs to a cluster. Fuzzy k-means (FKM) algorithm incorporates the fuzzy concepts in clustering and this is used in wide range of application domains. In this thesis, the FKM algorithm is introduced and illustrated to bring out the advantages and limitations of the algorithm.

The outbreak of Corona virus (Covid19) started with first cases on December 2019, in Wuhan (China). The first reported case in South America was in Brazil on 26 February 2020, in Sao Paulo city. The strategy to stop the infections in the country was a partial lockdown to avoid the propagation of the virus. On 28 January 2020, Ministry of Health of Brazil reported a suspected case of Covid19 in Belo Horizonte, Minas Geris state, recently one student returned from China. The same day were reported two suspected cases in Porto Alegre and Curitiba. The first confirmed COVID-19 case was reported in Brazil, a man of 61-year-old who returned from Italy. The patient was tested in Israelita Einstein Hospital in Sao Paulo state. On 14 May, more than 200 000 cases were confirmed, this number double during the first days of May. A regular monitoring and remote detection system for individuals will assist in the fast-tracking of suspected COVID-19 cases. Moreover, using such systems will generate a huge amount of data, which will provide many opportunities for applying big data analytics tools that are likely to improve the level of healthcare services. There is a large number of open-source software such as the big data components for the Apache project, which are designed to operate in a cloud computing and distributed environment to assist in the development of big data-based solutions. Furthermore, there are several key characteristics of big data called the Six V's, namely, Value, Volume, Velocity, Variety, Veracity, and Variability. However, the original definition of the big data key characteristics considers only three Vs, namely Volume, Velocity, and Variety. The big data characteristics apply to data acquired from the healthcare sector, which increases the tendency to use big data analysis tools to improve sector services and performance.

2. LITERATURE REVIEW

The proposed research aims to develop an intelligent decision making model that shall aid in revising medical pedagogies and remedial instructions and precaution and guidelines for human beings identified with low immunity and weak body strength, well before they face major clinical problem.

This model shall also recognize the behavior of patient and on the basis of their behavioral symptom we can predict who is most vulnerable to disease or at low risk.
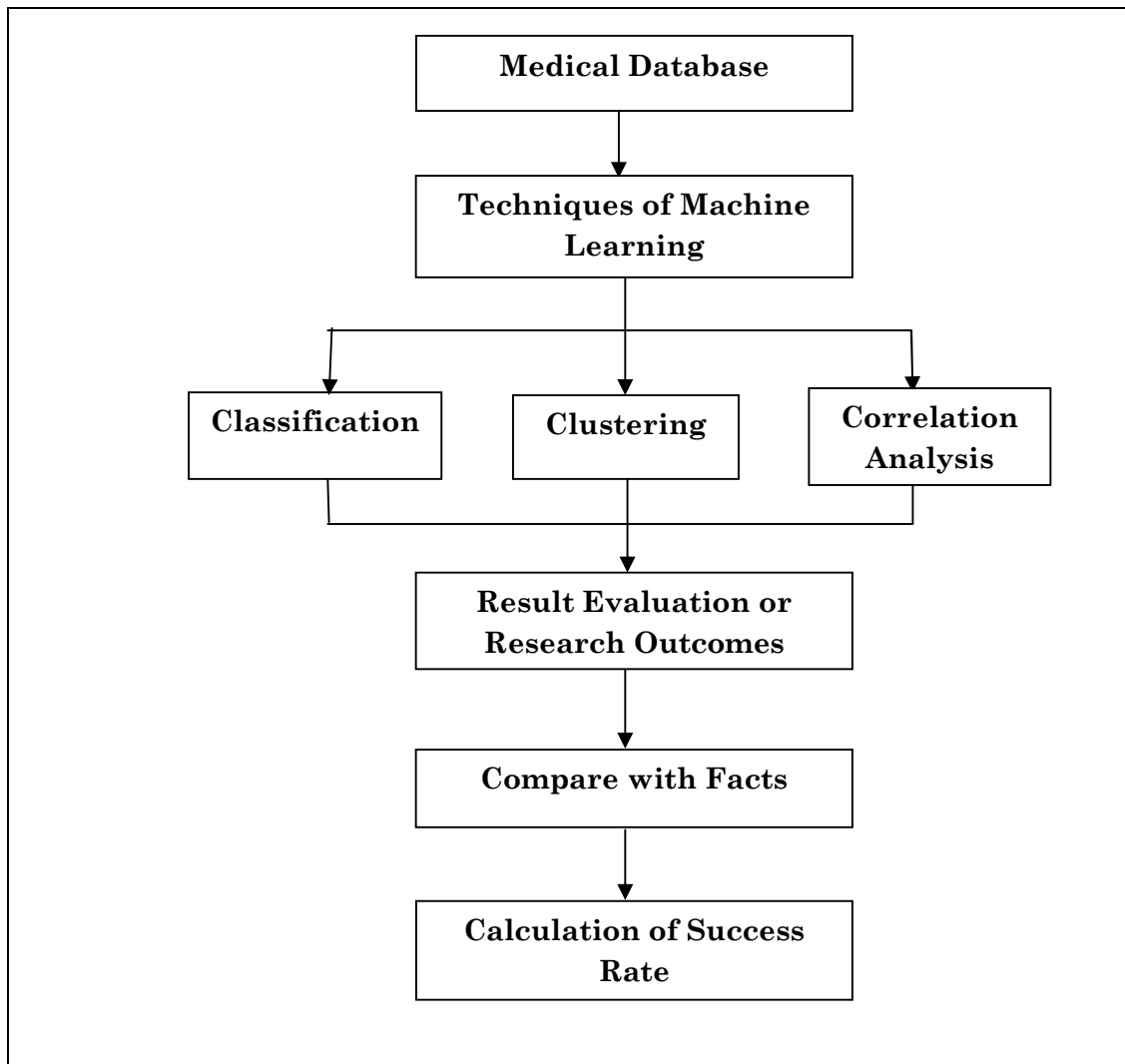
Figure-1: exploring the flow of our work in brief

Research Design

The Research design adopted for the present study is mixed design - Descriptive design to understand the quality of life, psychological distress, social functioning and family burden of leprosy patients and One Group pre and post-test design using "before" and "after" measurements to evaluate the subjects' knowledge on COVID 19.

The proposed research aim to develop an intelligent decision making model for prediction of people who is more vulnerable to COVID-19 disease or any other infectious disease. Prediction based on their

clinical and non-clinical behavior. We will also try to find out post COVID-19 effects on patients and psychological impact of any pandemic on their lifestyle. The proposed research aims to enlist the precise decision making dimensions that collectively frame the recommended system of medical field for people who are at risk.
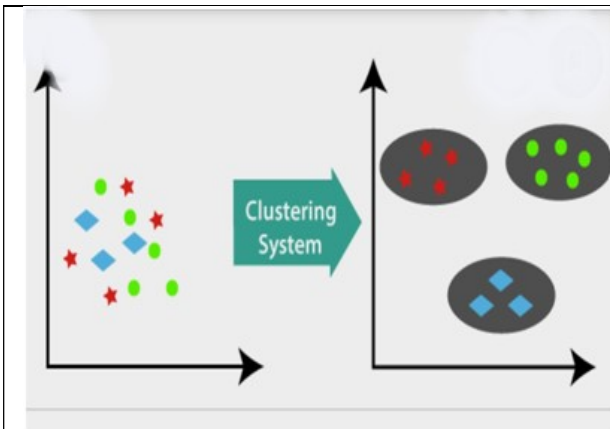
Figure 2: Clustering Algorithm
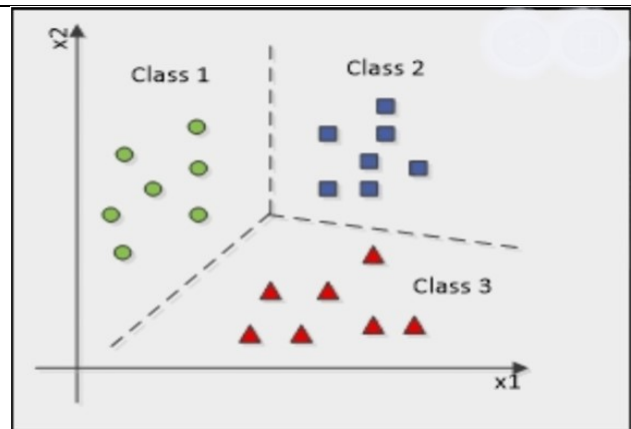
Figure 3: Classification Algorithm
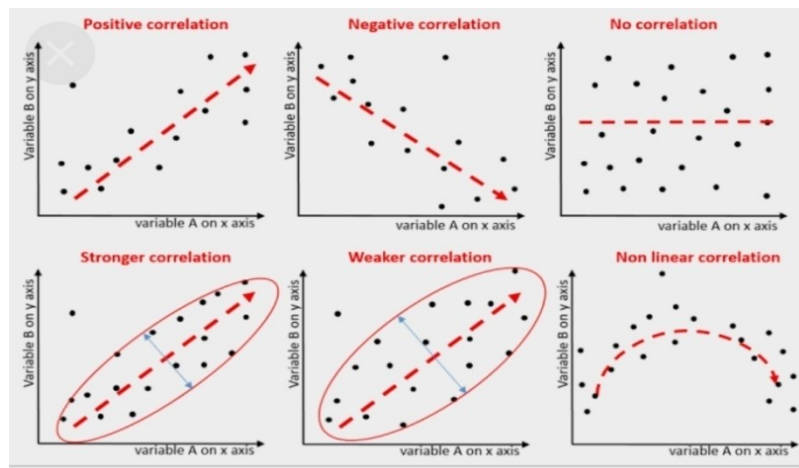
Figure 4: Correlation Analysis to identify Positive, Negative, linear, stronger, weaker variables

In our work we want to mainly classify vulnerable patients who are very nearer to accept infection from outside. Naive Bayes, K. Nearest neighbor and many more techniques can be used for Classifying people. We are planning to collect data set with different clinical and non-clinical behavior.

These dimension moves about the following steps:

- Provide extra remedial data.
- Prediction aim recommends system to suggest some remedial action.

An earnest effort has been made to develop disease diagnosis system that facilitates identification and prediction of the disease from the patient data. The reliance of data mining and machine learning

techniques in classification of disease has been acknowledged and the algorithms are implemented for assisting health care professionals. In this work, a disease diagnosis system using the data mining techniques is developed which can be used by patients, doctors and society as well. Data pre-processing and organization plays a vital role in the final output of the system. Genuine input data ensures the accurate results. The proposed algorithm detects more outliers even with lower record size. The proposed algorithm produces accuracy for disease prediction. The records from the repository can be taken as reports for any further prediction. To exhibit the contributions focused with a societal facet the proposed methodologies have been implemented in health care for disease prediction. This will go a long way to exploit the advancements in this ever-growing technological era and offer innovative remedies to the emerging problems in the medical world.

OBJECTIVES

- To develop a healthcare disease diagnosis system that uses data mining techniques that can be used by all stakeholders.

- To develop and implement a hybrid approach constituting density-based K-means clustering algorithm.

- To generate association rules to identify the classes of categories and to include fuzzy influence rule to further improve the system response to sensitive data. The mass of each class is estimated to predict the possibility and severity of disease.

- To understand the effects of covid-19 including clinical and non-clinical behaviours of human being in society.

- To generate reports for medical analysts on a day-to-day basis, thereby helping them in the decision-making process.

Shikah J. Alsunaidi (2021) The COVID-19 epidemic has caused a large number of human losses and havoc in the economic, social, societal, and health systems around the world. Controlling such epidemic requires understanding its characteristics and behaviour, which can be identified by collecting and analyzing the related big data. Big data analytics tools play a vital role in building knowledge required in making decisions and precautionary measures. However, due to the vast amount of data available on COVID-19 from various sources, there is a need to review the roles of big data analysis in controlling the spread of COVID-19, presenting the main challenges and directions of COVID-19 data analysis, as well as providing a framework on the related existing applications and studies to facilitate future research on COVID-19 analysis. Therefore, in this paper, they conduct a literature review to highlight the contributions of several studies in the domain of COVID-19-based big data analysis. The study presents as a taxonomy several applications used to manage and control the pandemic. Moreover, this study discusses several challenges encountered when analyzing COVID-19 data. The findings of this paper suggest valuable future directions to be considered for further research and applications.

J. P. M. van der Valk (2021) Corona virus disease 2019 is a serious respiratory virus pandemic. Patient characteristics, knowledge of the COVID-19 disease, risk behavior and mental state will differ between

individuals. The primary aim of this study was to investigate these variables in patients visiting an emergency department in the Netherlands during the COVID-19 pandemic and to compare the "COVID-19 suspected" (positive and negative tested group) with the "COVID-19 not suspected" (control group) and to compare in the "COVID-19 suspected" group, the positive and negative tested patients. The patients were either "COVID-19 suspected" (positive and negative tested group) or "COVID-19 not suspected" (control group). This is one of the first (large) study that investigates and compares patient characteristics, knowledge, behavior, illness perception, and mental state with respect to COVID-19 of patients visiting the emergency room, subdivided as being suspected of having COVID-19 (positive or negative tested) and a control group not suspected of having COVID-19. All patients in this study were generally aware of transmission risks and virulence and adhered to the non-pharmaceutical interventions. COVID-19 suspected patients and patients with (pulmonary) co morbidities were significantly more anxious. However, there is no mass hysteria regarding COVID-19. The higher the degree of fear, the more carefully hygiene measures were observed. Knowledge about the coping of the population during the COVID-19 pandemic is very important, certainly also in the perspective of a possible second outbreak of COVID-19.

3. EXPERIENTIAL WORK

Data set: We have observed overall activities about the covid-19 test report, positive cases, etc. activities around kondagaon, Chhattisgarh district.

Data Table-1: District Positive Linelist District- Kondagaon

District Positive linelist Dist- Kondagoan

Sn.	SAMPLE COLLCETION DATE	POSITIVE REPORT DATE	NAME	Age	Sex	Father name	Block	Mo. No.	Place of Admission Hospital/Home isolation	TYPE OF SAMPLE	Contact Tracing Done / Not Done	Testing Status
1	05.06.2020	11-Jun-2020	Vijaypal singh	54	M		Kondagaon	8630904134	Medical College Jagdalpur	RTPCR		
2	12.06.2020	15-Jun-2020	Kamal singh	32	M		Kondagaon	8273960677	Medical College Jagdalpur	RTPCR		
3	12.06.2020	15-Jun-2020	Satyaveer singh	53	M		Kondagaon	6395552583	Medical College Jagdalpur	RTPCR		
4	08.07.2020	10-Jul-2020	Ajit Netam	27	M		Baderajpur	9821636091	Medical College Jagdalpur	RTPCR		
5	08.07.2020	10-Jul-2020	Umang singh	16	M		Kondagaon	9131018427	Medical College Jagdalpur	RTPCR		
6	14.07.2020	14-Jul-2020	Dr. T. Kavya Raddy	32	F		Kondagaon	9482159280	DH Kondagaon	RTPCR & Rapid Antigen		
7	14.07.2020	14-Jul-2020	Dr. Aaditya Raddy	34	M		Kondagaon	9959934321	DH Kondagaon	RTPCR & Rapid Antigen		
8	14.07.2020	14-Jul-2020	T. Venkat Raddy	65	M		Kondagaon	8790052800	DH Kondagaon	Rapid Antigen		
9	11.07.20	15-Jul-2020	Ramesh	24	M		Kondagaon	7828835784	DH Kondagaon	RTPCR		
10	11.07.20	15-Jul-2020	Dileshwar	19	M		Kondagaon	6382462968	DH Kondagaon	RTPCR		
11	11.07.20	15-Jul-2020	Bhakchand	16	M		Kondagaon	8103558608	DH Kondagaon	RTPCR		
12	11.07.20	15-Jul-2020	Vamdev	18	M		Kondagaon	6261046368	DH Kondagaon	RTPCR		
13	11.07.20	15-Jul-2020	Ashok	18	M		Kondagaon	8459656883	DH Kondagaon	RTPCR		
14	11.07.20	15-Jul-2020	bituram	33	M		Kondagaon	9525955023	DH Kondagaon	RTPCR		
15	14.07.2020	17-Jul-2020	Sujata Raddy	60	F		Kondagaon	8790052800	DH Kondagaon	RTPCR		
16	16.07.2020	19-Jul-2020	Dilip singh	39	M		Kondagaon	7000287091	DH Kondagaon	RTPCR		
17	16.07.2020	19-Jul-2020	Vimla singh	55	F		Kondagaon	7000287091	DH Kondagaon	RTPCR		
18	16.07.2020	19-Jul-2020	Raisingh kashyap	16	M		Kondagaon	7722598469	DH Kondagaon	RTPCR		
19	19.07.2020	19-Jul-2020	Sukdu Korram	18	M		Kondagaon	8817028061	DH Kondagaon	Rapid Antigen		
20	17.07.2020	21-Jul-2020	S.Ramasamy	35	M		Kondagaon	8939779978	DH Kondagaon	RTPCR		
21	17.07.2020	21-Jul-2020	Ganesh prasad	47	M		Kondagaon	8840730653	DH Kondagaon	RTPCR		

Sample and sample size

Sample of at least 150 patients or more who are suffering from COVID have to be drawn at least 50 or more from each of the at least 3 centers respectively using simple random sampling method through random table and who will meet the inclusion criteria for the study constitutes the sample size. We have observed overall activities about the covid-19 data daily report of vaccination, dose/vaccines availability processes, etc. around kondagaon, Chhattisgarh district.

Data Table – 2: Covid-19 Data Daily Report District, Kondagaon

COVID-19 DATA DAILY REPORT DISTRICT KONDAGAON (CG) DATE - 19.12-2021

Sn.	Block	Sample Tested Target			Positive		Positive rate		Discharge		Recover Rate	Active case				Contact Tracing		Death	
		Today Target	Today Achievement	Total Sample Collection	Today	Cumulative	Today	Cumulative	Today	Cumulative	Cumulative	CCC	Home Isolation	Covid Hospital	Cumulative	Today Target	Today Achievement	Today	Cumulative
1	Keshkal	315	0	57055	0	2410	#DIV/0!	4.22	2	2392	99.25	0	0	0	0	0	0	0	16
2	Kondagaon	270	36	67853	0	5072	0.00	7.47	0	5004	98.66	0	0	0	0	0	0	0	60
3	Makdi	190	0	51859	0	1302	#DIV/0!	2.51	0	1294	99.39	0	0	0	0	0	0	0	7
4	Pharasgaon	270	14	64971	0	2186	0.00	3.36	0	2174	99.45	0	0	0	0	0	0	0	10
5	vishrampuri	210	0	48299	0	1135	#DIV/0!	2.35	0	1119	98.59	0	0	0	0	0	0	0	11
6	DH	150	5	35156	0	823	0.00	2.34	0	823	100.00	0	0	0	0	0	0	0	0
	Total	1405	55	325193	0	12928	0.00	3.98	2	12806	99.06	0	0	0	0	0	0	0	104

Sn.	District	Home Isolation								COVID HOSPITAL									
		Admission		Referd		discharge		Active		Admission		Referd		discharge		Active		Death	
		Today	Cumulative	Today	Cumulative	Today	Cumulative	Today	Cumulative	Today	Cumulative	Today	Cumulative	Today	Cumulative	Today	Cumulative	Today	Cumulative
1	Keshkal	0	2093	0	21	0	2070	0	2										
2	Kondagaon	0	4921	0	111	0	4814	0	0										
3	Makdi	0	1143	0	15	0	1128	0	0	0	1467	0	130	0	1248	0	0	0	37
4	Pharasgaon	0	1910	0	22	0	1891	0	0										
5	vishrampuri	0	1043	0	5	0	1038	0	0										
	Total	0	11110	0	174	0	10941	0	2	0	1467	0	130	0	1248	0	0	0	37

Sn.	Block		COVID CARE CENTRE DIST. KONDAGAON														Containment Zone/Micro	
			Total Beds	Fill Beds	Vaccant Beds	No. of Oxygen cylinder		Admission		Referd		discharge		Active		Death		
						Jumbo	Small	Today	Cumulative	Today	Cumulative	Today	Cumulative	Today	Cumulative	Today	Cumulative	Active	Cumulative
1	Keshkal	Kasturba Hostel	100	0	100	70	51	0	81	0	14	0	67	0	0	0	0	0	82
2	Kondagaon	P.M. Boys Hostel	100	0	100	31	20	0	80	0	17	0	63	0	0	0	0	0	94
3	Makdi	Kasturba Hostel	50	0	50	15	30	0	55	0	9	0	46	0	0	0	0	0	79
4	Pharasgaon	Aadarsh Hostel	300	0	300	52	50	0	77	0	9	0	68	0	0	0	0	0	106
5	vishrampuri	Boys Hostel	50	0	50	19	41	0	26	0	5	0	21	0	0	0	0	0	24
			600	0	600	187	192	0	319	0	54	0	265	0	0	0	0	0	385
	District	Kondagaon	700	0	700	609	468												

Sampling technique:

At each of the centers, the subjects will be recruited using simple random sampling technique. At least 50 or more subjects admitted in each of the at least 3 centers who are diagnosed as suffering from COVID by the medical officers, will be randomly selected using random table, and the total subjects at least 150 or more from 3 centers and considered as single group age.

Data Table - 3: Based on Overall Doses vaccine stock position done of COVAXIN

COVAXIN 10 Dose & 5 Dose vaccine stock position 01st Nov

Row Labels	CCP	DVS	RVS	SVS	Grand Total
Balod					
Baloda bazar					
Balrampur					
Bastar	6295	6260	0		12555
Bemetara					
Bijapur	215	0			215
Bilaspur					
Dantewada	220	0			220
Dhamtari					
Durg					
Gariaband					
GPM					
Janjgir-Champa					
Jashpur					
Kanker	4165	1920			6085
Kawardha					
Kondagaon	1225	40			1265
Korba					
Koriya					
Mahasamund					
Mungeli					
Narayanpur	1595	160			1755
Raigarh					

METHOD OF DATA ANALYSIS

On completion of the data collection, the data collected will be edited coded and tabulated. The statistical treatment of data is achieved through computer applications, using Basic tools and software. Data analysis comprised appropriate statistical techniques including percentage analysis, multiple regression and correlation. Naive Bayes, K. Nearest neighbor and many more techniques will be employed for comparison of means of psychosocial variables between and males and females. Multiple regression analysis is a method used to study the relationship of a single quantitative dependent variable with several variables. Regression analysis has been found to be very useful in the evaluation of effects of variety of variables, which cannot be subjected to experimental controls but which are nevertheless of primary importance. Hence multiple regression analysis between psychosocial variable and demographic data will be conducted.

4. CONCLUSION

Data on social media contain a wealth of user information. Big data research of social media data may also support standard surveillance approaches and provide decision-makers with usable information. These data can be analyzed using Natural Language Processing (NLP) and Machine Learning (ML) techniques to detect signs of mental disorders that need attention, such as depression and suicide ideation. This article presents the recent trends and tools that are used in this field, the different means for data collection, and the current applications of ML and NLP in the surveillance of public mental health. We highlight the best practices and the challenges. Furthermore, we discuss the current gaps that need to be addressed and resolved.

- The proposed research aim to develop an intelligent decision making model for prediction of people who is more vulnerable to COVID-19 disease or any other infectious disease. Prediction based on their clinical and non-clinical behaviour.
- We will also try to find out post COVID-19 effects on patients and psychological impact of any pandemic on their lifestyle.
- The proposed research aims to enlist the precise decision making dimensions that collectively frame the recommended system of medical field for people who are at risk.
- In our work we want to mainly classify vulnerable patients who are very nearer to accept infection from outside. Naive Bayes, K. Nearest neighbor and many more techniques can be used for Classifying people. We are planning to collect data set with different clinical and non-clinical behaviours.
- The reliance of data mining and machine learning techniques in classification of disease has been acknowledged and the algorithms are implemented for assisting health care professionals.
- In this work, a disease diagnosis system using the data mining techniques is developed which can be used by patients, doctors and society as well.
- This will go a long way to exploit the advancements in this ever-growing technological era and offer innovative remedies to the emerging problems in the medical world.
- To develop and implement a hybrid approach constituting density-based K-means clustering algorithm.
- To understand the effects of covid-19 including clinical and non-clinical behaviours of human being in society.

- To generate reports for medical analysts on a day-to-day basis, thereby helping them in the decision-making process.

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PREDICTIVE SYSTEM ON THE CAR MARKET TREND USING AI & ML

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Automobile Manufacturing is one of the most sophisticated sets of processes in the World. And for the automobile to be Successful in the market, it requires an extensive amount of work to be done in the field of Market Analysis. This is an area of major concern for companies. So, we decided to use a Machine Learning model that would predict based on the history of the Cars Manufactured in India. We analyzed the trend of Market demand and build a predictive model that would predict that whether a car would be successful in the market or not. Many other factors could be predicted using the analysis such as which car colour and type of car should the manufacturer build to maximize sales. There is also a "User Section", wherein the customer can check if the car is value for money, or wait for a more suitable car to be available in the market, which can also predict the price of a new car based on the brand name and other features.

Here we have used a Linear Regression technique to build a Machine Learning model. This model is trained on multiple datasets collected from different sources which are then analyzed and processed to obtain desired results. Thus this paper is a very handy tool for both manufacturers and customers. Since this business of car manufacturing is unceasing, hence the process of data generation is also never-ending. This paper's accuracy will get better with time as more data is available.

Keywords : Predictive System, Car Market, Machine Learning.

1. Introduction

Automobile Manufacturing is one of the most painful process for the car Manufactures in terms of both labour and financial. But if automobile is not well received in the market, the pain and the treasure is lost. For example, for production of new car the company has to setup whole production unit along with its lifeline i.e. Workers. But what if its sales are low or what if the car doesn't match the standards of the population for which the car is manufactured, the whole ecosystem and the hard work goes to vain.

So we decided to come up with a model that would be a boon to this type situation. We have collected automobiles dataset of different companies from different sources, analysed and processed it to obtain the information, upon which our machine learning model is trained. The model is based on Linear Regression technique. The manufacturer could extract from it which type of car to be manufactured, what would be the most prominent colour, what would be transmission type, fuel type, etc.

Apart this there is a "Customer Section", wherein customer can check if the car present in the market is value for money or not. or if any other car is due in the market as per the history of the automobiles manufactured.

The Whole Paper is divided into the 5 parts :-

- Data Collection
- Data understanding and exploration
- Data cleaning
- Data preparation
- Model building and evaluation

2. Literature survey

A predictive system for car fuel consumption using a back-propagation neural network has three components: an information gathering system, a fuel consumption forecasting algorithm, and a performance assessment system. Although there are many factors that influence a car's fuel consumption in a practical drive procedure, the impact factors for fuel consumption in the current system are simply determined as the make of the car, engine style, vehicle type, weight of the car, and transmission system type. An artificial neural network with back-propagation neural network has a learning capability for automobile fuel consumption prediction to test the effect of the proposed predictive system in the fuel consumption forecasting. The results of the prediction showed that the proposed neural network system is successful in predicting fuel consumption and that its performance is adequate [1].

A high-interest study topic has been automobile price prediction, as it necessitates significant effort and expertise on the part of the field expert. For a trustworthy and accurate forecast, a large number of unique attributes are considered. They utilised three machine learning approaches to create a model for forecasting the price of secondhand automobiles in Bosnia and Herzegovina (Artificial Neural Network, Support Vector Machine and Random Forest). However, the approaches suggested were used in a group setting [2].

Their study looks at how sentiment analysis and Google trends data may be used to anticipate automobile sales. Previous study has proven the utility of both approaches for sales forecasting, but the findings of current research for forecasting the sales of high-involvement items such as vehicles are more equivocal. In this study, linear regression models are used to evaluate over 500,000 social media postings for eleven automobile models on the Dutch market. In addition, the results of this study are compared to the prediction capacity of Google Trends. The findings reveal that while social media emotions have limited predictive value when it comes to automobile sales, Google Trends data and social mention volume show substantial results and may be combined into a useful prediction model. The automotive industry may utilise decision tree regression to build a prediction model with temporal delays that can be employed in addition to standard forecasting approaches [3].

The MPC predicts the future behaviour of the leader vehicle (LV) based on the relative distance and relative acceleration of each instant, and the acceleration of the follower vehicle (FV) is regulated based on this behaviour. The MPC aims to keep the relative distance within a safe range by controlling the acceleration. The outcome of the system is compared to the behaviour of real drivers with comparable beginning conditions to evaluate the performance of the developed controller. The simulation findings demonstrate that the MPC controller behaves considerably more safely than real drivers and can give passengers with a pleasant ride [4].

Because in order to stay successful in a competitive market, a leasing firm must provide a competitive lease price. It is important to forecast the future price of a used automobile in order to establish the correct pricing. The lease price might be set to meet the car's value degradation if the depreciation is known. Multiple linear regression analysis is a frequently used method for price prediction. However, there are several elements that influence the pricing, making this critical duty difficult. For high-dimensional data, the conventional regression technique may not be appropriate. Support Vector Regression, a contemporary data mining approach that is independent of input dimension, will be used to solve this possible problem. The accuracy of the predictions will next be compared to the statistical regression model. In specifically, using principles from the field of evolutionary search, a fully automated technique for adjusting and implementing SVR is created. The entire machine learning experiment is based on real-world data from a major German automobile manufacturer [5].

The Prediction of Car Ownership" discussed that for long-term forecasting of automobile ownership, an econometric technique is developed. It is compared to other well-known techniques. It is based on estimates of the percentage of family income spent on automobile purchases, as well as an analysis of car pricing and stock. The technique provides a reasonable approximation of previous levels of automobile ownership in the United Kingdom, as well as a prediction that is comparable to Tanner's for the next 15 years. However, Mogridge forecasts a higher saturation level and, as a result, a larger eventual automobile population in the future [6].

3. Design & Implementation

3.1 Data Set

A data set (or data set) is a collection of data, usually presented in tabular form. Each variable's details are stored in columns and each row represents the corresponding record. The dataset can contain data for one or more items, depending on the number of rows. Each entity is called DATUM.

For example, in our dataset we had Manufacturer name, Model, Vehicle type, Sale number, Fuel type as our columns, which basically represents our variable's detail. and each record/data is accommodated in the single row.

For this paper, we had employed datasets from many different sources and many different authors, analyzed it, processed it into a single dataset upon which our model is trained.

Manufactu	Model	Sales_in_t	_year_re	Vehicle_ty	Price_in_tl	Engine_siz	Horsepow	Wheelbas	Width	Length	Curb_weig	Fuel_capa	Fuel_effici	Latest_La	Power_perf_factor
Acura	Integra	16.919	16.36	Passenger	21.5	1.8	140	101.2	67.3	172.4	2.639	13.2	28	########	58.28015
Acura	TL	39.384	19.875	Passenger	28.4	3.2	225	108.1	70.3	192.9	3.517	17.2	25	########	91.37078
Acura	CL	14.114	18.225	Passenger		3.2	225	106.9	70.6	192	3.47	17.2	26	########	
Acura	RL	8.588	29.725	Passenger	42	3.5	210	114.6	71.4	196.6	3.85	18	22	########	91.38978
Audi	A4	20.397	22.255	Passenger	23.99	1.8	150	102.6	68.2	178	2.998	16.4	27	########	62.77764
Audi	A6	18.78	23.555	Passenger	33.95	2.8	200	108.7	76.1	192	3.561	18.5	22	########	84.56511
Audi	A8	1.38	39	Passenger	62	4.2	310	113	74	198.2	3.902	23.7	21	2/7/2012	134.6569
BMW	323i	19.747		Passenger	26.99	2.5	170	107.3	68.4	176	3.179	16.6	26	6/28/2011	71.19121
BMW	328i	9.231	28.675	Passenger	33.4	2.8	193	107.3	68.5	176	3.197	16.6	24	1/29/2012	81.87707
BMW	528i	17.527	36.125	Passenger	38.9	2.8	193	111.4	70.9	188	3.472	18.5	25	########	83.99872
Buick	Century	91.561	12.475	Passenger	21.975	3.1	175	109	72.7	194.6	3.368	17.5	25	########	71.18145
Buick	Regal	39.35	13.74	Passenger	25.3	3.8	240	109	72.7	196.2	3.543	17.5	23	########	95.6367
Buick	Park Avenu	27.851	20.19	Passenger	31.965	3.8	205	112.2	74.7	206.8	3.778	18.5	24	3/23/2012	85.82841
Buick	LeSabre	83.257	13.36	Passenger	27.885	3.8	205	112.2	73.5	200	3.591	17.5	25	7/23/2011	84.25453
Cadillac	DeVille	63.729	22.525	Passenger	39.895	4.6	275	115.3	74.5	207.2	3.978	18.5	22	2/23/2012	113.8546
Cadillac	Seville	15.943	27.1	Passenger	44.475	4.6	275	112.2	75	201		18.5	22	4/29/2011	115.6214
Cadillac	Eldorado	6.536	25.725	Passenger	39.665	4.6	275	108	75.5	200.6	3.843	19	22	11/27/201	113.7659
Cadillac	Catera	11.185	18.225	Passenger	31.01	3	200	107.4	70.3	194.8	3.77	18	22	9/28/2011	83.48309
Cadillac	Escalade	14.785		Car	46.225	5.7	255	117.5	77	201.2	5.572	30	15	4/17/2012	109.5091

Figure 1: Source datasets 1

Figure 2: Source datasets 2

3.2 Linear Regression

Linear Regression, a field of Statistics, is a Linear Approach for modeling the relationship between the Input   and Output Variables. This is a widely used Concept of Machine Learning yet simple and effective. In this the relationship are modeled using a linear predictor function and Line of Best Fit is then generated. This line is then used to predict the output/unknown parameter.

There are two types of Linear Regression Technique:-

1. Simple Linear Regression
2. Multiple Linear Regression

In Simple Linear Regression, we find the relationship between a single independent variable (input) and a corresponding dependent variable (output). This can be expressed in the form of a straight line, also called line of Best Fit.

The Equation of Simple Linear regression is :
$Y = B0 + B1X + C$
Y represents the Output/Dependent Variable. B0 & B1 represents the intercept and slope coefficient respectively.C represents the Error term.

In Multiple Linear Regression, we find the relationship between 2 or more independent variables (inputs) and the corresponding dependent variable (output) as per the best fit. The independent variables can be continuous or categorical depending on the user's need.

The Equation of Mutiple Linear regression is :

$Y = B0 + B1X1 + B2X2 + B3X3 + \ldots + C$
Y represents the Output/Dependent Variable. B0, B1 represents slope coefficient respectively
X1,X2 represents Predictor Variable, C represents the Error term.
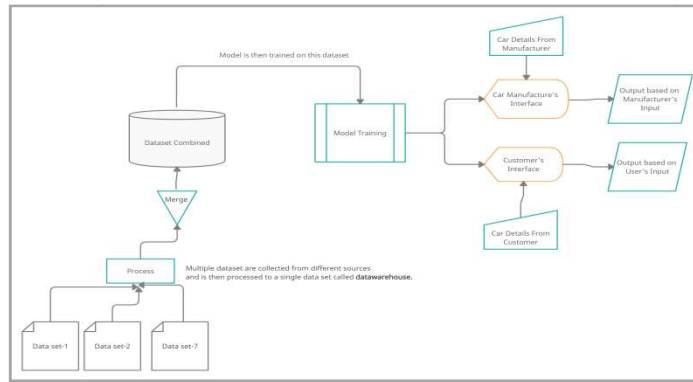
3.3 Model Design

Figure 3: Model Design

4. Module Description

In the paper, to train my model I am using two Regression Models, the Linear Regression model and the Lasso Regression Model, which are part of the linear model of the sklearn library. The other libraries used in the paper are pandas, NumPy, Matplotlib, Seaborn, and metrics and preprocessing from sklearn. Now let's see each of these libraries one by one:-

NumPy is a Python library used for operating with multi-dimensional arrays. It additionally has capabilities for operating in the area of linear algebra, Fourier transform, and matrices.

Pandas is a software program library written for the Python programming language for statistics manipulation and analysis. In particular, it gives statistics systems and operations for manipulating numerical tables and time series.

Seaborn is a remarkable visualization library for statistical picture plotting in Python. It gives stunning default patterns and color palettes to make statistical plots more attractive. It is constructed at the pinnacle of the Matplotlib library and additionally intently included in the data structures from pandas. Seaborn targets to make visualization the principal component of exploring and know-how statistics.

Matplotlib is a popular visualization library in Python for 2D plots of arrays. Matplotlib is a multi-platform statistics visualization library constructed on NumPy arrays.

```python
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.linear_model import Lasso
from sklearn import metrics
from sklearn import preprocessing
```

Figure 4 : Libraries Used in the Paper

Lasso stands for Least Absolute Shrinkage and Selection Operator. It is a type of Linear Regression Model that shrinks the data value towards a central point like mean.

```
2. Lasso Regression

lasso_reg_model=Lasso()

lasso_reg_model.fit(X_train,Y_train)

Lasso()
```

Model Training

```
# Prediction of Training Data
training_data_prediction=lasso_reg_model.predict(X_train)
```

```
# R square Error
error_score= metrics.r2_score(Y_train, training_data_prediction)
print("R square error ", error_score)
```

```
R square error  0.17130651180690104
```

Figure 5 : Training the Model with Lasso Regression

```
1. Linear Regression

lin_reg_model=LinearRegression()

lin_reg_model.fit(X_train,Y_train)

LinearRegression()
```

Model Evaluation

```
# Prediction of Training Data
training_data_prediction=lin_reg_model.predict(X_train)
```

```
# R square Error
error_score= metrics.r2_score(Y_train, training_data_prediction)
print("R square error ", error_score)
```

```
R square error  0.17130651180824064
```

Figure 6 : Training the Model with Linear Regression

Here in the above pictures of code, we first initialized the model into the respective variable which is named lasso_reg_model and lin_reg_model. We then fit the training input and output into the data. After the model is trained (i.e fitted) with the training data, it's time to evaluate the model. First, we evaluate the model with the training data and then with the test data. To assess our model for accuracy, we find the R^2 error of the model. In a regression model, the R2 score also called the coefficient of determination is the statistical measure of the accuracy of the model that shows how much variance in a dependent variable is explained by the independent variable(s).

Exploratory Analysis

Now coming to the data preprocessing step of our Paper, as earlier mentioned that in our paper we had taken datasets from multiple sources so integrating them into a single entity was one of the most painful and time-consuming steps of the paper. Here, we analyzed all the different aspects that could be considered so that our model could predict with greater accuracy.

Importing all datasets

```
df1=pd.read_csv("Datasets/Car_sales.csv")

df2=pd.read_csv("Datasets/car data.csv")

df3=pd.read_csv("Datasets/CAR DETAILS FROM CAR DEKHO.csv")

df4=pd.read_csv("Datasets/Car details v3.csv")

df5=pd.read_csv("Datasets/cars_ds_final.csv")

df6=pd.read_csv("Datasets/cars_ds_final_2021.csv")

df7=pd.read_csv("Datasets/datasets3.csv")

df8=pd.read_csv("Datasets/indian-auto-mpg.csv")
```

Figure 7 : Importing the Datasets

5. Dataset Preprocessing

Dataset preprocessing is the process of cleaning up the data so that it can be given to our model and the model trains on it without any hindrance. In this step, we adapted many different techniques to get the desired data. Among them, was to segregate the year of manufacture from the date and month of manufacture as shown below. We did this by splitting the column using the str. split() function and splitting it whenever we found the '/' symbol. Similarly, we split many different columns to extract the meaningful data from it.

	Manufacturer	Name	Price	Mileage	Year	Fuel	Transmission
0	Acura	Integra	215000.0	28.0	2012	NaN	NaN
1	Acura	TL	284000.0	25.0	2011	NaN	NaN
3	Acura	RL	420000.0	22.0	2011	NaN	NaN
4	Audi	A4	239900.0	27.0	2011	NaN	NaN
5	Audi	A6	339500.0	22.0	2011	NaN	NaN

Figure 8 : Sample Final Dataset made

Data Set Split

This is the last step before the model is trained, it is called so because in this step we split the dataset into two halves- the training and testing dataset. We have kept the testing data 20% of the original dataset which is 23237 rows. This Train dataset is used to train the model and the test part is used to check the accuracy of the model.

Splitting data into Train and test data

```
X=df.drop(['Price'],axis=1)
Y=df["Price"]
```

```
X_train,X_test,Y_train,Y_test= train_test_split(X,Y,test_size=0.2, random_state=2)
```

Figure 9 : Train- Test Split.

6. Results

The model predicted quite well in the case of Linear Regression the training data with an R^2-score *0.17130651180824064* while in the case of test data it was *0.17836986214106343*. The Graph of the prediction and the Z-Score is as follows:

```
# R square Error
error_score= metrics.r2_score(Y_train, training_data_prediction)
print("R square error ", error_score)
```

```
R square error  0.17130651180824064
```

```
# Visualising the actual price and predicted prices
```

```
plt.scatter(Y_train, training_data_prediction)
plt.xlabel("Actual Price")
plt.ylabel("Predicted Price")
plt.title("Actual Price vs Predicted Prices")
plt.show()
```
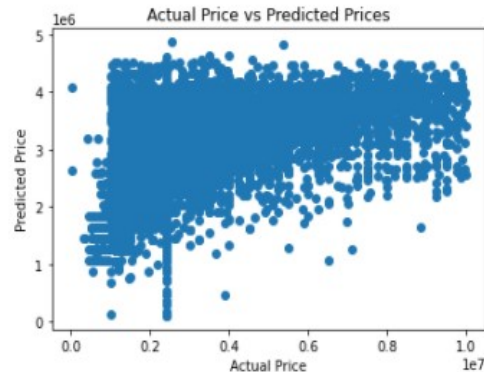

Figure 10 : Result of Linear Regression on Training Data

```
error_score= metrics.r2_score(Y_test, testing_data_prediction)
print("R square error ", error_score)
```

R square error 0.17836986214106343

```
plt.scatter(Y_test, testing_data_prediction)
plt.xlabel("Actual Price")
plt.ylabel("Predicted Price")
plt.title("Actual Price vs Predicted Prices")
plt.show()
```
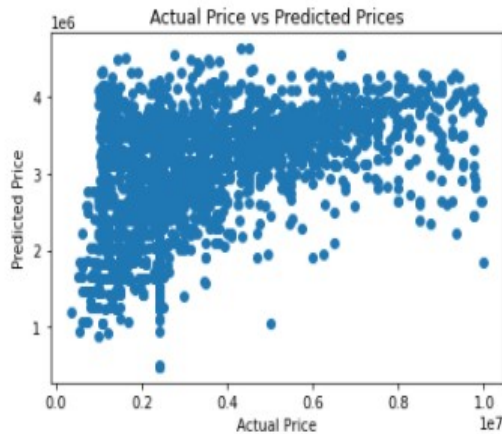

Figure 11 : Result of Linear Regression on Testing Data

In the case of Lasso Regression, the R2-score is 0.17130651180690104 on training data and 0.17836978200409426 on the test data which is quite good.

```
# R square Error
error_score= metrics.r2_score(Y_train, training_data_prediction)
print("R square error ", error_score)
```

R square error 0.17130651180690104

```
plt.scatter(Y_train, training_data_prediction)
plt.xlabel("Actual Price")
plt.ylabel("Predicted Price")
plt.title("Actual Price vs Predicted Prices")
plt.show()
```
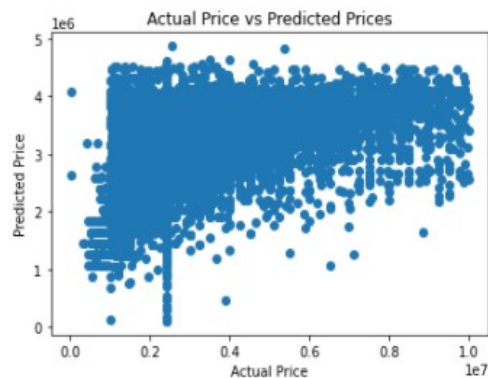

Figure 12 : Result of Lasso Regression on Training Data

```
error_score= metrics.r2_score(Y_test, testing_data_prediction)
print("R square error ", error_score)

R square error  0.17836978200409426
```

```
plt.scatter(Y_test, testing_data_prediction)
plt.xlabel("Actual Price")
plt.ylabel("Predicted Price")
plt.title("Actual Price vs Predicted Prices")
plt.show()
```
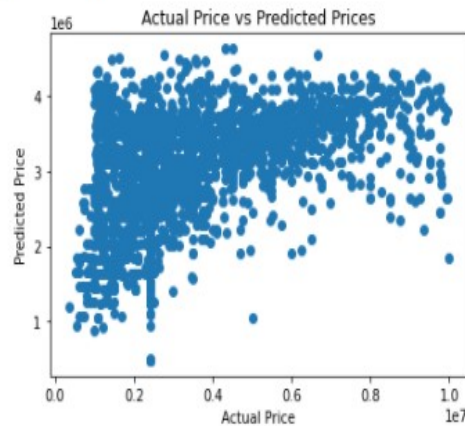

Figure 13 : Result of Lasso Regression on Testing Data

7. Conclusion

In this paper I was able to understand what it takes for a data scientist of a car manufacturing firm to be able to analysis the market for a good car to be released as per the demands. Although poor dataset availability in this field, I was able to extract the present dataset of second hand cars and use it to predict the market value of the new car.

Though it was all from my side, but there are many scope of improvements in this paper. If in future a more reliable and variety of dataset is available to us, we would also analyze different aspects like colour of car, state of sale of car, type of car, top speed of car, total sales of car and many more.

Also this paper can be integrated to front end section to create a user friendly interface, where users can find the right car for themselves or for the firm owners where they can see if the car which they are planning to release would be a boom or crash in the market. The model in future will become more accurate as more datasets will be provided to it. The model can also be used to learn itself from the queries of the customer as well as can conduct the important analysis of the market demand which would a major boost for the manufacturing firm.

Through this Paper, I was able to learn many new concepts which is commonly used in the field of Data Analysis. I was able to implement all of the features on my own and it is first major success in my career as a Data Scientist.

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PRELIMINARY PHYTOCHEMICAL SCREENING AND *IN – VITRO* ANTIBACTERIAL EFFICACY OF CRUDE EXTRACTS OF SOME HERBACEOUS WEEDS AGAINST PATHOGENIC BACTERIA

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Several wild herbaceous plants have exclusive defense properties against pathogens due to various bioactive compounds that synthesized as secondary metabolites. In the present investigation, the preliminary phytochemical screening and *in-vitro* antibacterial efficacy of 10 herbaceous weed plants from local area have been carried out. *Blumea lacera* L., *Xanthium strumarium* L., *Ageratum conyzoides* L., *Eclipta prostrata* L., *Acmella ciliata* Kunth, *Lagascea mollis* Cav., *Sonchus oleraceus* L., *Tridax procumbens* L., *Sphagneticola trilobata* (L.) Pruski and *Grangea maderaspatana* (L.) L. Poir plants were collected from rural area of Bilaspur division and identified by Google lens with the help of Taxonomic keys. Aqueous, Ethanol and Methanol crude extracts of these plants were screened for phytochemicals and examined for antibacterial efficacy against pathogenic bacteria *E. coli* -ATCC10536 and *Staphylococcus aureus* -ATCC25923 by measuring zone of inhibition for both pathogens applying well diffusion method, comparing with the potentiality of standard antibiotics. Preliminary qualitative phytochemical screening showed the presence of alkaloids, flavonoids, glycosides, terpenoids, steroids, saponins and tannins in these plants. Methanol extracts was found most effective solvent for inhibiting bacterial growth, whereas the ZOI in case of 100% methanol extracts of *Blumea lacera* L. and *Ageratum conyzoides* L. was found to be more sensitive (19-22 mm ZOI) in comparison to *Xanthium strumarium* L., *Acmella ciliata* Kunth, *Sonchus oleraceus* L., *Tridax procumbens* L. and *Sphagneticola trilobata* (L.) Pruski (16-19 mm ZOI) an intermediate followed by least *Eclipta prostrata* L., *Lagascea mollis* Cav. and *Grangea maderaspatana* (L.) L. Poir (10-15 mm ZOI). The antibacterial efficacy was found in corresponding manner – Antibiotic > *Blumea lacera* L. > *Ageratum conyzoides* L. > *Xanthium strumarium* L. > *Acmella ciliata* Kunth > *Sonchus oleraceus* L. > *Tridax procumbens* L. > *Sphagneticola trilobata* (L.) Pruski > *Eclipta prostrata* L. > *Lagascea mollis* Cav. > *Grangea maderaspatana* (L.) L. Poir. Results obtained from this comparative study allow the choice of *Blumea lacera* L. and *Ageratum conyzoides* L. as a good source of antibacterial efficacy and may provide safer and cost-effective way of treating bacterial infections. The results also support ethno-medicinal use of plants reported earlier. Present study revealed that studied plant extracts could be efficacious remedial and herbal antibiotics, particularly both in controlling Gram-positive and Gram-negative human pathogens.

Keywords: Phytochemical, Herbaceous weed, Antibacterial, Pathogenic Bacteria, Ethnomedicinal Plant and Medicinal weeds.