



# ROHINI

## COLLEGE OF ENGINEERING & TECHNOLOGY

Approved by AICTE and Affiliated to Anna University (An ISO 9001 : 2015 Certified Institution)  
Near Anjugramam Jn., Palkulam, Variyoor (Post), Kanyakumari - 629401.

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# International Conference On Automation, Intelligent Computing & Communication

DATE: 07-07-2023

ORGANIZED BY

DEPARTMENT OF ELECTRONICS AND COMMUNICATION  
ENGINEERING  
ROHINI COLLEGE OF ENGINEERING AND TECHNOLOGY





**ROHINI**  
COLLEGE OF ENGINEERING AND TECHNOLOGY  
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# **INTERNATIONAL CONFERENCE ON AUTOMATION INTELLIGENT COMPUTING & COMMUNICATION CONFERENCE PROCEEDINGS**



**ROHINI COLLEGE OF ENGINEERING AND TECHNOLOGY**

Near Anjugramam JN, Kanyakumari Main Road, Palkulam, Tamilnadu, India.

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**DEPARTMENT OF ELECTRONICS AND COMMUNICATION**

## **ABOUT THE INSTITUTION**

Rohini college of Engineering and Technology (RCET), founded in the year 2012 by Shri.K.Neela Marthandan, a great Industrialist and philanthropist, stands out as a prestigious Institution of higher learning with a mission of pursuing excellence in education and research. The Institution is run by Dr.N.Neela Vishnu as the pro chairman and Dr.V.M.Blessy Geo as Managing Director. The institution, with dynamic community of students offers 8 undergraduate programs, 6 postgraduate programs and a research program in the Department of Mechanical Engineering with accomplished faculty, high class facilities and premium hostels. The Project cost of Rs.26,75,000/- sanctioned by AICTE under the Modernization and removal of Obsolescence Aspirational-(MODROB-ASP). Project sanctioned worth Rs.5, 00,000/- by Tamil Nadu State Council for science and Technology (TNSCST) for the proposal “Mapping of Science and Technology needs of Tamil Nadu”. The outcome of the faculty research is published in major research journals and reputed international conferences in India and abroad. The Institute facilitates the placement training activities with the help of industry experts and corporate trainers to prepare the students industry-ready, apart from providing placement training right from First year in the regular schedule for the Distinctive Syllabus framed. Over 90% of the eligible students are placed in reputed companies such as Cognizant Technology Solutions (CTS), Capgemini, Infosys, Tata Consultancy Services, Wipro India Limited, Ramco Systems, Nggawe Nirman Technologies etc., with high salary package

## **ABOUT THE DEPARTMENT**

The Department of Electronics and Communication Engineering was established in the year 2012. The Department offers an Under Graduate program [B.E] in Electronics and Communication Engineering and PG program [M.E] in Communication Systems. The major goal of the Department of Electronics and Communication Engineering is to produce highly knowledgeable, competent and resourceful young engineers who can perform well in a wide variety of job profiles. To achieve this, curriculum provides a strong foundation in both the analytic and technological aspects of Electronics and Communication Engineering. The department has experienced and dedicated faculty members specialized in various fields of research. It also provides ample opportunities to students to work on mini-projects, develop communication skills, explore internship opportunities in industry and take part in national and international design contests and also collaborating in the hackathon

## **ABOUT THE CONFERENCE**

This Conference will explore the new horizon of innovations from distinguished researchers, scientists, and eminent authors in academia and industry working for the advancements in Science, Engineering and Technology from all over the world. International Conference on Automation Intelligence computing and Communication (ICAICC)-2023 aims to bring together. Academicians, Scientists, Research Scholars and Students, to share and disseminate information on knowledge and scientific research works related to Automation, Intelligent Computing and Communication topics and confers the practical challenges encountered and the solutions adopted. The conference will create a path to establish a research relation for the authors and listeners with opportunities for promoting research and developing technologies. We received around 90 conference papers & 85 papers are shortlisted for Conference Presentation





### **From Chairman's Desk**

Dear All, “Learning gives creativity, creativity leads to thinking, thinking provides knowledge, knowledge makes you great”- Dr.A.P.J.Abdul Kalam. These words by - Dr.A.P.J.Abdul Kalam perfectly describe our aim at Rohini College of Engineering and Technology. Beyond providing a sound education, we wish to provide our students a holistic learning experience for life. Our aim is to teach students to LEARN, not just STUDY. Hence, we strive to travel beyond the boundaries of mere books. We have realized that the future is abstract and unknown but the youth in our hands are real and can be Molded. Engineers play the most vital and important role in nation building. They create new inventions using best engineered technologies to make human life more comfortable, secure and productive. In modern times, nations which have rich engineering and experienced technological domains are flourishing economically and are providing better lives to their people We have excellent potential to grow in diversified areas and excel in Engineering and technological fields. We need enormous number of engineers and managers to write next story of success. We have identified the needs of modern engineering, technology for modern age students, with a vision and mission accompanying transparency, accountability and accessibility which keeps us abreast. I can proudly say that Rohini College of Engineering and Technology is the most modern and sophisticated multidisciplinary institution, imparting quality education and providing a wide and varied arena for the staff and students to showcase their academic and extracurricular talents. With relentless efforts, the college aspires to orchestrate the students' potential for the enrichment and progress of society by equipping them with technical expertise and soft skills. Our well qualified and experienced Teaching faculties guide the students to hone their talents to excel in this competitive world. I am proud to say that once our students step in, they step out with self-confidence and knowledge to face all future endeavors with full conviction. Fly in the plane of Ambition, Land in the Airport of Success, The luck is yours the wish is mine. May your future always shine. Good Luck.



### **Pro Chairman's Message**

Dear All, My heartfelt congratulations to the Head of the Department of ECE at RCET and her team of students and professors for their continued dedication, commitment, hard work and collective creative energies, who have labored hard to bring out the magazine for the academic year 2022-23. As the Pro chairman of the institution, my heart swells with pride to see the ECE department blossoming and spreading its fragrance of excellence and unfold its petals of quality education. With each progressing year, the ECE department of RCET has strengthened its prime objective and commitment to provide quality education with an elemental emphasis on character formation. The teaching faculty of ECE department comprising a group of qualified, talented and dedicated members consistently emphasize upon enforcing discipline among students with quality classroom teaching and wholesome education. This magazine serves as a channel to express thoughts, imagination and creativity into words. This edition of the conference proceedings encapsulates the arrested moments of yet another eventful year in its flow. The ICAICC 2023 conference proceeding faithfully mirrors multifarious activities and the harmonious growth of the ECE department of RCET and also proves to be an outlet for the talent of the engineers of tomorrow



### **Managing Director's Message**

Dear all, “If you are not willing to learn No one can help you If you are determined to learn No one can stop you” -Zig Ziglar

I am glad to know that the ECE department of RCET is bringing out the issue of ICAICC 2023 conference proceeding. The conference beautifully records the splendid moments of the 2022-2023 academic year. It is a reflection of the enthusiasm, passion, intensity and dedication of teachers for the profession they have chosen. The report reflects that the year 2022-2023 has been yet another vibrant and progressive year for the ECE department of RCET. It serves as a platform to display the creative thoughts and talents of the students. Initiatives like this provide opportunity to the students and encourages their talents. The department not only strives to transform students into professional graduates but also sensible and responsible young active citizens. I hope that they continue to create delightful academic excellence and a bounty of opportunities to make budding engineers, competent enough to face the future. I would like to extend my warm greetings to the HOD, staff and the students of the ECE department and send my best wishes for their future endeavors.



### **Principal's Message**

Dear All, you are capable more than you know, I am very glad to see your technical growth and your efforts toward the organization of “ICAICC 2023” from the department of Electronics and communication engineering. I whole heartedly appreciate the hardwork, dedication and devotion of all those who made it a successful publication. I am happy to appreciate the diligent efforts and contribution in ICAICC 2023. Education is not just it getting marks. It is in exploring the whole world. My sincere wishes to the Hardworking faculties who are the pillars of this event who spent their golden time to make the students believe that they can.





### **HOD's Message**

Dear All, At the outset, I would like to thank the Management and Principal for their continuous support and Guidance, Faculties and students for doing exemplary support and contributions in the department! It gives me immense pleasure to note that the editorial board brings out conference proceeding ICAICC-2023. It is great to find students as winners and participants in co-curricular and extracurricular activities which certainly prove that our students are adequately equipped and possess necessary skill-sets to bring such laurels to the Institution and Department. The Department aims academic progression, skill development, inculcating research value, bringing out hidden talent of students as well as faculty members through activities like Guest lectures, Faculty Development Programs, Research workshops, Technical Symposium, Mini-Project Expo etc. I am sure that by reading these pages you will get a bird's eye view about activities of ECE Department

# CONFERENCE COMMITTEE

## ORGANIZING COMMITTEE

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- Dr. Muthumanikandan V, Assistant Professor(SG) School of Computer Science and Engineering Chennai
- Dr. R. Brinda, Assistant Professor EEE, GCE, Srirangam.

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**DATA-CENTRIC AUTHENTICATION INTEGRATING  
CERTIFICATE COLLECTION AND DATA RETRIEVAL WITH IN-NETWORK**

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Big data raises a strong demand on a network infrastructure to support the secure and efficient data retrieval with in-network caching. Information-Centric Networking (ICN) is an emerging approach to satisfy this demand, where big data are ubiquitously cached at the intermediate physical entities (IPEs) in the network and users retrieve the published data from the close copy holders. For the ICN, the unpredictability of users, IPEs, copy holders, and publishers during in-network big data retrievals poses a challenge to design a data-centric authentication mechanism to inhibit the malicious users to flood data requests and prevent the fake data from being cached and provided. However, the existing work only provides the authentications between users and publishers and suffers from the delay enlargement problem. To solve these problems, we design a trust model, namely a suspension-chain model (SCM), which is a trust chain that seamlessly merges certificate authority (CA)-based trust and neighbor-based trust. Based on SCM, we propose the DCAuth integrating certificate collection and packet forwarding, where the suspension certificate chain can be constructed for realizing any authentication to the unpredictable users/IPEs/publishers without accessing servers. Extensive simulations have been conducted to compare DCAuth with the existing work, which shows that delay can be greatly reduced and attacks can be efficiently prevented by DCAuth.

**A CONVOLUTIONAL NEURAL NETWORK EMPOWERED: DECODING  
FACIAL EXPRESSIONS WITH UNMATCHED PRECISION**

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Our research team presents a novel approach in this study, introducing a lightweight convolutional neural network (CNN) specifically designed for real-time and large-scale facial emotion recognition. To achieve superior classification results, we validate the effectiveness of our model by implementing a continuous vision system that utilizes the proposed CNN model architecture for emotion classification. Leveraging the power of face recognition computer technology, our model extracts personal information from facial expressions to accurately assess an individual's state and intent. We construct a CNN model that effectively learns local features of the eyes, eyebrows, and mouth, with the final recognition result obtained through fusion of the model's outcomes. Our experimental results demonstrate an impressive accuracy of 98.6% for the proposed CNN Model Engineering, surpassing existing systems.

**ANALYSING IMPERFECT INFORMATION FOR BUSINESS  
OPPORTUNITY EVALUATION BY DATA-DRIVEN ENTREPRENEURS**

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Business opportunity assessment with an information-driven method may not be a simple or direct procedure. The accomplishment of the business opportunity is dependent upon outer market factors, including economic situations for businesspeople when all is said in done and administrative systems influencing access to customer and work markets and fund. The business visionary may have a constrained or no influence over such outer conditions. In this way, the data stream important to finish up the monetary standpoint of the market (positive or negative) for the business opportunity may not be accessible (i.e., the market data might be defective). Besides, the “genuine market” possibly shrouded when that data isn't noticeable. This undertaking intends to build up an algorithmic information examination method for business visionaries to break down inadequate information from outer market factors for a speculation portfolio under the information driven point of view of enterprise. The ideal speculation portfolio adjusts the exchange off between expected returns and market data and is furtherly directed by the businessperson's hazard inclination and operational deficiencies. The proposed somewhat watched Markov choice procedure (POMDP) model sets up a probabilistic connection between a noticeable and the shrouded advertise process by means of the business visionary's venture portfolio. At that point the model recognizes a probabilistic data measure to evaluate the association between the perceptible and undetectable procedure to all the more likely comprehend the condition of the market for the business opportunity. With the probabilistic data measure, the business visionary at that point could develop and test new speculation portfolios that are most appropriate for the market concerning businessperson hazard inclination and operational deficiencies.

Keywords—Business, Business Opportunity Assessment, Businessperson

## BLOCKCHAIN-BASED DYNAMIC SECURE DISTRIBUTED GROUP KEY MANAGEMENT FOR MOBILE COMPUTING

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Mobile edge computing (MEC) is a promising edge technology to provide high bandwidth with to mobile users. However, the MEC infrastructure raises major security when the shared resources involve sensitive and private data of users. This paper proposes a novel block chain-based key management scheme for MEC that is essential for ensuring secure group communication among the mobile devices as they dynamically move from one sub network to another. In the proposed scheme, when a mobile device joins a sub network, it first generates a key pairs for digital signature and communication, and broadcasts its public key to peer users in the sub network block chain. The block chain in the sub network packs all the public key of mobile devices into a block that will be sent to other users in the sub network. This mobile device to communicate with its peers in the sub network by encrypting the data with the public key stored in the block chain. When the mobile device moves to another sub network in the tree network, all the mobile devices of the new sub network can quickly verify its identity by sub network block chain. Furthermore, when the mobile device leaves the sub network, it does not need to do anything and its records will remain in the block chain which is an append-only database. In mobile edge computing, group communication can be used to transmit messages to all group members with minimal resources. The group key directly affects the security of the group communication. Most existing group key agreement protocols are often flawed in performance, scalability, forward or backward secrecy, or single node failure. Therefore, this paper proposes a block chain-based authentication and dynamic group key agreement protocol. With our protocol, each group member only needs to authenticate its left neighbor once to complete the authentication, which improved authentication efficiency. In addition, our protocol guarantees the forward secrecy of group members after joining the group and the backward secrecy of group members after leaving the group. Theoretical security analysis shows that the proposed scheme can defend against the 51% attack and malicious in the block chain network utilizing. Moreover, the backward and forward secrecy is also preserved. Experimental results demonstrate that the proposed scheme outperforms two baselines in terms of storage.



## Analyzing Liver Cirrhosis and Treatment Methods using Image Texture

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Hepatitis and prolonged drunkenness can cause liver scarring (fibrosis) and cirrhosis. The liver detoxifies the body and generates vitamins and minerals. Cirrhosis is liver damage. Your liver heals after every insult. This technique causes scarring. Hepatic cirrhosis, often known as liver cirrhosis, is the final stage of a liver disease caused by scar tissue. Symptoms usually take time to appear. The liver purifies blood. It aids digestion, nutrient storage, and blood sugar regulation. Cirrhosis causes liver failure. This page reviews liver cirrhosis. Fibrosis causes cirrhosis, the final stage of chronic liver disease. It's a top 10 US murderer. Cirrhosis can cause hepatic dysfunction and portal hypertension. Ascites, varices, hepatic encephalopathy, hepatocellular carcinoma, hepatopulmonary syndrome, and coagulation abnormalities are some of the problems of these disorders alone or in combination. Cirrhosis and its consequences reduce life expectancy and quality. Cirrhotic patients must be treated methodically. Doctors must learn to identify and address these issues to improve patient outcomes. We searched for cirrhosis therapy and effects data to create this paper.

**Keywords-** Alcohol, fatty liver, liver, and cirrhosis

**A Modified Hierarchical Attribute-Based Encryption Access Control  
Method for Mobile Cloud Computing**

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Cloud computing is an Internet-based computing pattern through which shared resources are provided to devices on demand. It is an emerging but promising paradigm to integrating mobile devices into cloud computing, and the integration performs in the cloud based hierarchical multi-user data-shared environment. With integrating into cloud computing, security issues such as data confidentiality and user authority may arise in the mobile cloud computing system, and it is concerned as the main constraints to the developments of mobile cloud computing. In order to provide safe and secure operation, a hierarchical access control method using modified hierarchical attribute-based encryption (M-HABE) and a modified three-layer structure is proposed.

## CLUSTERING OPTIMIZATION ALGORITHM FOR DATA MINING BASED ARTIFICIAL INTELLIGENCE NEURAL NETWORK

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Due to the rapid development of information technology and network technology, there is a lot of data, but the phenomenon of lack of knowledge is becoming more and more serious. Data mining technology has developed vigorously in this environment, and it has shown more and more vitality. Based on Spark programming model, this paper designs the parallel extension of fuzzy c-means. In order to enhance the performance of fuzzy c-means parallel expansion, the improvement strategy of k-means during the initialization phase is borrowed, and k-means// is extended to fuzzy c-means to obtain better clustering performance. Combined with Spark's programming model, this paper can obtain extended parallel fuzzy c-means algorithm. Several experiments on the data set of the algorithm proposed in this paper have shown good scalability and parallelism, effectively expanding fuzzy c-means clustering to distributed applications, greatly increasing the scale of the data processed by the algorithm. This improves the robustness of the algorithm and the adaptability of the algorithm to the shape and structure of the data, so that the parallel and scalable clustering algorithm can more effectively perform cluster analysis on big data. Three algorithms were simulated on MATLAB platform. We use simple data sets and complex two-dimensional data sets, and compare with the traditional fuzzy c-means algorithm and fuzzy c-means algorithm based on fuzzy entropy. Experiments show that the scalable parallel fuzzy c-means algorithm not only greatly improves the anti-noise performance, but also improves the convergence speed, and it can automatically determine the optimal number of clusters.

**CHALLENGES EVOLVED IN BUILDING A COMPLEX SOFTWARE SYSTEM**

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New advancement in the field of Software Engineering increases more issues and problems. After reviewing quite a few research papers & articles in the field of Software Engineering, we obtained various challenges that rise in building a complex software system. This paper describes several challenges evolved in building a complex software system.

**Keywords** – Challenges, Complex Systems, Software Engineering.

## AN EFFICIENT APPROACH FOR MEDICAL IMAGE ENCRYPTION IN CLOUD

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With the advancements in e-healthcare services, it is possible to provide remote medical services to patients and swifter first aid. Medical images play an essential role in e-healthcare applications for providing quick and better remote diagnosis and treatment to patients. Medical images generally comprise secret details about the patients and are therefore prone to various security threats during their transmission over public networks. Thus, it is required to secure these images prior to their communication over public networks. But due to distinctive properties of medical images, like higher correlation and redundancy among the pixels, and larger size, it is required to design an efficient encryption model to resist against various security threats. In this project, presents an ROI based near lossless image compression method that incorporates the Set Partitioning in Hierarchical Trees (SPIHT). and an efficient encryption model for medical images is proposed. To obtain the secret keys, six-dimensional hyperchaotic map (SDHM) is proposed. Firstly, plain medical image is divided into three channels such as red, green, and blue. Secret keys are used to diffuse these channels. Lastly, encrypted channels are concatenated and final encrypted medical image is obtained. Extensive experiments are drawn by considering the benchmark medical images. Also, comparisons are performed among the proposed SDHM and competitive techniques by considering various performance metrics. Comparative analysis reveals that the proposed SDHM achieves remarkably good performance than the existing encryption models.

**Keywords-** Medical Image, SPIHT, SDHM, Cloud Storage.

**Secure And Privacy Enhancing Cloud Brain For Human Memory Data Uploading  
and Dispersion System**

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We live in a world permeated with technology. One's last will and testament is an important document. A will or testament is a legal document that expresses a person's (testator) wishes as to how their property (estate) is to be distributed after their death and as to which person (executor) is to manage the property until its final distribution. No matter where you choose to keep your will, you should let your executor, alternate executor, and close family members know that the will has been created, where it is being stored, and how they can access it if something happens to you. The project is to upload human asset data into a Cloud storage. This methodology is used to secure the asset files in an innovative way.

***Index Terms*** - last will, human asset, cloud storage.

## Recursive Z Model SDLC for Health Care Industry

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Abstract - Software Development Life Cycle (SDLC) is a systematic procedure about how the software should be developed. Even though there exist several SDLC, there is no flawless model for developing medical device software. Medical domain software's are normally considered as safety critical software's, since they require high level of quality, and do not compromise failures. We have made an attempt to address these challenges & problems by proposing a new SDLC model which could be useful for developing medical software in health care.

**Index** – healthcare, medical, software development.

## Heart attack recognition system using Internet of things

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Nowadays numerous persons are mislaying their life owing to heart attack and shortage of medical attention to patient at correct stage. Hence, in this innovation heart attack recognition system using Internet of things. The patient will carry hardware having sensors with android application. The heartbeat sensor will allow checking heart beat readings and transmit them over the internet. The user may set the high and low level of heartbeat limits. Once these limits are set the system can start monitoring the patient's heartbeat and as soon as the heart beat readings goes above or below the limit set by the user the system will send an alert about high or low heartbeat as well about chances of heart attack.

**Keywords-** Heart rate sensor, Monitor, Detect, IoT, Android smart phone.



## **Glaucoma detection using structural and non structural features automatically**

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Glaucoma is a chronic disease often called “silent thief of sight” as it has no symptoms and if not detected at an early stage it may cause permanent blindness. Glaucoma progression precedes some structural changes in the retina which aid ophthalmologists to detect glaucoma at an early stage and stop its progression. Fundoscopy is among one of the biomedical imaging techniques to analyze the internal structure of retina. Our proposed technique provides a novel algorithm to detect glaucoma from digital fundus image using a hybrid feature set. This innovation proposes a novel combination of structural (cup to disc ratio) and non-structural (texture and intensity) features to improve the accuracy of automated diagnosis of glaucoma. The proposed method introduces a suspect class in automated diagnosis in case of any conflict in decision from structural and non-structural features. The evaluation of proposed algorithm is performed using a local database containing fundus images from 100 patients. This system is designed to refer glaucoma cases from rural areas to specialists and the motivation behind introducing suspect class is to ensure high sensitivity of proposed system. The average sensitivity and specificity of proposed system are 100 and 87 % respectively.

**Keywords:** Computer aided diagnostics, Cup to disc ratio, Fundoscopy, Glaucoma detection, Machine learning

**Hybridization of Data Mining and Optimized  
Neural Network Techniques using Big data  
for the Prediction of Stock Market.**

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The stock market is non-linear in nature, making forecasting a very complicated, challenging and uncertain process. Employing traditional methods may not ensure the reliability of stock prediction. In this paper, we have applied both data mining and optimized neural network in stock prediction with big data. Data mining allows for useful information to be extracted from a huge data set whilst neural network is capable in predicting future trends from large databases; the hybridization of both these techniques can therefore achieve much reliable and robust prediction. This paper has attempted to make a better prediction result for a complicated stock market. In this research, we have collected data from IT Sector organizations of the Dhaka Stock Exchange, which is an emerging stock market and applied K-means clustering of data mining to select the highly increasing securities, Non linear autoregressive neural network technique is applied to predict the stock price. The prediction performance through the hybridization is evaluated and positive performance improvement of prediction is observed which is encouraging for investors.

***Index Terms*** - Big data, data mining, artificial neural network, stock prediction, market index, K-means clustering, nonlinear autoregressive neural network.

## MULTI-NETWORK TRUST-AWARE CLOUD SERVICE SELECTION MECHANISM IN PEER-ASSISTED ENVIRONMENTS

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Within the vast landscape of cloud service providers, each offering a multitude of virtual machines (VMs) with diverse configurations, selecting the appropriate VMs becomes a crucial concern for companies. A well-informed service selection not only enhances productivity and efficiency but also reduces costs. However, due to the modular nature of requests, conflicts between requirements, and the impact of network parameters, a systematic approach becomes imperative for effective service selection. To address this challenge, we introduce a groundbreaking framework, named "PolyCloud Assisted (PCA)", designed specifically for the hybrid environment encompassing peer-assisted, public, and private clouds. PCA tackles the service selection problem by identifying conflicts between requests and enterprise policies, identifying suitable services based on requirements, and minimizing VM rental and end-to-end network expenses. By leveraging resources from multiple clouds and optimizing overall costs, PCA employs a combination of set theory, B+ tree, and greedy algorithms to achieve its objectives. Our simulation results exhibit that PCA can reduce cloud-related costs by up to 30 percent and deliver responses at least seven times faster compared to recent studies.

Keywords: Virtual machines, Play cloud assistant, greedy algorithms.

## Dual Optimization Deep Learning Model for Diabetic Retinopathy Severity Classification

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In developed countries, Diabetic Retinopathy (DR) is the main factor contributing to avoidable blindness in people of working age. A healthy retina is made up of blood vessels, optic discs, and the macula; any abnormalities to these components are indicators of a real eye ailment. This research proposes machine learning techniques for detecting diabetic retinopathy by using Convolutional Neural Network (CNN). The classification of retinal lesions from non-lesions using CNN classifiers is examined. Retinal images can be evaluated using machine learning-based medical image analysis. The Contrast-limited adaptive histogram equalization (CLAHE) Filter is used for preprocessing the input image. The Fuzzy C-Means (FCM) is used for image segmentation section. The Speeded-Up Robust Features (SURF) is used for feature extraction and finally CNN proposed and hybrid genetic and ant colony optimization (HGACO) algorithm is used for clarify the DR images. The method also examines the datasets for the identification, classification and segmentation of diabetic eye disease that are obtainable from retinal fundus images. The experiment outcomes demonstrate the higher performance of our suggested strategy (up to 95% accuracy) and indicate that the proposed model predicts all stages of DR in contrast to the current methods.

## AN EARLY FLOOD DETECTION SYSTEM USING MOBILE NETWORKS.

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In this paper, an early flood warning system has been studied and developed. The system consists of an early flood warning station powered by solar energy, a monitoring center, and a notification system. The flood warning station is equipped with the water level sensor and the precipitation sensor. The data, which is received from sensors, will be stored in memory card and transmitted to monitoring center via GPRS protocol. The functions of monitoring center are to receive, analyse data from the stations and send results to notification system where warning can be generated to the considered residential areas. The warning levels of flood can be set up easily by using the buttons in the circuit board or by using the SMS message from user's mobile phone. A website was also created to display the river water level, rainfall and the predicted information for the next few hours.

**AN ALGORITHM BASED CHAOTIC SEQUENCE  
PROBABILISTIC COMMUNICATION DELAY AND ITS  
APPLICATION TO IMAGE ENCRYPTION**

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Due to the extensive demand for digital images across all fields, the security of multimedia data over insecure networks is a challenging task. The majority of the existing modern encryption schemes are merely developed that ensure the confidentiality of the image data. This manuscript presents a new image encryption scheme that ensures confidentiality, user authentications, and secure key sharing among the communicating parties. Initially, the users share a secret parameter using Diffie-Hellman over the elliptic curve and pass it through SHA-256. Afterwards, the proposed scheme uses the first 128-bits for the confidentiality of the data, while the remaining 128-bits are for authentication. In the encryption algorithm, the confusion module is achieved by affine power affine transformation. At the same time, the diffusion module is attained through highly nonlinear sequences, which are generated through the elliptic curve. Experimental testing and the latest available security tools are used to verify the effectiveness of the proposed algorithm. The simulation findings and the comparison of the proposed scheme with the existing image encryption techniques reveal that the suggested scheme offers a sufficient degree of security. Furthermore, the outcome of the simulation results divulges several advantages of the proposed scheme, including a large key space, resistance to differential attacks, high efficiency, and strong statistical performance.

**AN EFFICIENT, SECURE AND LIGHTWEIGHT AUTHENTICATION SYSTEM  
FOR VANETS USING ANFIS-WOA AND LBK**

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Vehicular network comprises a number of vehicles and other components interconnected by versatile sensors to facilitate communication and has authentication as its core backbone. The current authentication protocols either prioritize security or lightweight features. However, privacy during authentication is vital. This project proposes a secure, efficient, and lightweight authentication system for VANETs by using an ANFIS-based WOA (Whale Optimization Algorithm). The proposed work is a hybrid combination of WOA and ANFIS for feature reduction and uses location-based keys to ensure an effective and secured network. The Adaptive Neuro-Fuzzy Inference System (ANFIS) integrates neural networks and Fuzzy Logic principles and has the ability to take advantage of both within a single framework. The Whale Optimization Algorithm (WOA) is used for feature selection and tuning parameters of the ANFIS. At the ANFIS stage, the testing set is used to evaluate the performance of the VANET environment. The secret keys are generated and managed using location-based keying (LBK) namely the Lagrange polynomial. Moreover, extensive performance analysis with the existing authentication schemes shows that the proposed algorithm is better in computation cost, communication cost, and energy cost. This project is implemented with NS2 software.

**Keywords:** VANET, ANFIS-WOA, Lagrange polynomial

**A new approach to quantify network security by ranking of security metrics in  
image recognition**

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Packet classification is a core function in network and security systems; hence, hardware-based solutions, such as packet classification accelerator chips or T- CAM (Ternary Content Addressable Memory), have been widely adopted for high-performance systems. With the rapid improvement of general hardware architectures and growing popularity of multi-core multi-threaded processors, software-based packet classification algorithms are attracting considerable attention, owing to their high flexibility in satisfying various industrial requirements for security and network systems. For high classification speed, these algorithms internally use large tables, whose size increases exponentially with the ruleset size; consequently, they cannot be used with a large ruleset. To overcome this problem, we propose a new software-based packet classification algorithm that simultaneously supports high scalability and fast classification performance by merging partition decision trees in a search table. While most partitioning-based packet classification algorithms show good scalability at the cost of low classification speed, our algorithm shows very high classification speed, irrespective of the number of rules, with small tables and short table building time. Our test results confirm that the proposed algorithm enables network and security systems to support heavy traffic in the most effective manner.



## **Gesture-Net: Harnessing Graphical Neural Networks for Cutting-Edge Hand Gesture Recognition**

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Hand gestures are one type of communication. Gesture recognition provides a smart, natural, and convenient human-computer interaction (HCI) approach. It is an important part of HCI and has a wide range of applications in engineering and intelligent devices. It shows great potential in the control of bionic hands, virtual game control, sign language translation, and intelligent robotics. Thus, Hand gesture recognition is a crucial aspect of human-computer interaction, enabling natural and intuitive communication. In this research, we propose a novel approach for hand gesture recognition utilizing the deep learning technique. Our method combines a Fragmentary Fourier Transform (FrFT)-based iterative feature extraction technique with Graph Neural Networks (GNNs) for classification. Image filtering and contrast enhancement are used during the pre-processing phase. The FrFT is employed to capture the time-frequency information of hand gestures, allowing for enhanced representation. By iteratively selecting and refining features, our approach aims to improve discriminative power. The windowing and t-test approaches are used for the selection of features. The utilization of GNNs enables the capture of spatial dependencies and relationships between key points. We evaluated our approach on the comprehensive Hand gesture recognition dataset, which provides a diverse set of hand gesture data. Thus, this research presents a novel approach that leverages FrFT and GNNs for hand gesture recognition. By effectively capturing time-frequency information and spatial dependencies, our method advances the field of hand gesture recognition and paves the way for more sophisticated applications in human-computer interaction. The results demonstrate the efficacy of our method in achieving high recognition accuracy for hand gestures. The combination of FrFT-based feature extraction and GNN-based classification yields promising results, underscoring the potential of this technique for accurate hand gesture recognition.

**Keywords:** Graphical Neural Networks, FrFT, Hand Gesture Recognition, Extraction, Classifications.

## ANALYSIS AND DESIGN OF CHANNEL ESTIMATION IN UPLINK MULTIUSER MIMO-OFDM SYSTEM

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An efficient channel estimation algorithm based on second-order statistics of time division duplex (TDD) multiuser massive multiple-input multiple-output (MIMO) systems. The algorithm uses the received signal correlation to determine the most significant lags (MSLs) of the received signal. First employ these MSLs to propose a novel set containing the channel's four most significant taps (MSTs). Then, by using them, an efficient semi-blind iterative algorithm called enhanced modified-subspace pursuit (EM-SP). It uses the set mentioned above and two theoretical results to estimate an arbitrary number of MSTs efficiently. Simulation results show that the normalized mean square error (NMSE) of the proposed EM-SP algorithm is much smaller than that of the subspace pursuit (SP) and orthogonal matching pursuit (OMP) algorithms at the cost of 0.3 % and 2 % more computational complexity for the channels with three and six nonzero paths, respectively. Moreover, the NMSE of it is very close to that of the optimal genie-aided least square algorithm.

## ALLEVIATION OF WAVE DISTURBANCES IN OFDM SYSTEMS USING ML-MMSE EQUALIZER

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Wireless communication is the transfer of information between two or more points that are not physically connected. Wireless technology is widely used. OFDM is a potential technology for optical wireless communications because it has excellent spectrum efficiency. Additionally, it has numerous suggestions for enhancing the capacity and BER performance of equalizers. Electromagnetic wave disturbances are unwanted noise or interference in an electrical path or circuit caused by an outside source. It is also known as radio frequency interference. It can cause electronics to operate poorly, malfunction, or stop working completely. It can be caused by natural or human-made sources. So predicting disturbances is essential in orthogonal frequency division multiplex systems (OFDM). This project proposes a new ML-MMSE equalizer technique used for mitigating wave disturbances in OFDM systems. Encoders and decoders are used to convert the digital signal to an analog signal on the transmitter side and the analog signal to a digital signal on the receiver side. Quadrature phase shift keying (QPSK) modulators are used to change the amplitude and frequency of a carrier signal in order to transmit information. The Inverse Discrete Fourier Transform (IDFT) technique is used to demodulate the modulated signals. Additive white Gaussian noise (AWGN) is often used as a channel model. The Minimum Mean Squared Error (MMSE) equalizer is used in digital communication systems to reduce the effects of noise and errors. By applying the MMSE and ML equalizers to the AWCN channel, the performance of ML is better than other schemes. The QPSK Demodulator Block demodulates a signal that was modulated using the quadrature phase shift keying method. This block accepts a scalar or column-vector input signal. The success of this experiment led to the use of the methodology for possible improvements. This project is implemented using MATLAB software.

## DEEP RNN-ELM BASED MANET INTRUSION DETECTION WITH STACKED SPARSE AUTOENCODER

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The rapid development and popularization of Mobile Ad-hoc Network (MANET) have brought many security issues in network. Intrusion detection system, an effective security technology which can efficiently detect malicious data in complex network environment. Due to the complexity of MANET, traditional intrusion detection systems are ineffective. To cope up with the issues, the deep RNN-ELM based MANET intrusion detection has been proposed in this paper. The NSL-KDD dataset has been employed for MANET intrusion detection. The stacked sparse autoencoder has been utilized for feature extraction which converts high dimensional data to low dimensional data. On the extracted features, the recurrent neural network (RNN) is used to learn the behaviour of the important features and at end layer the extreme learning machine (ELM) classifier is employed as a classification model to determine the occurrence of intrusions in the MANET with higher detection rate.

## Energy-Efficient beyond 5G Multiple Access Technique with Time Splitting Concurrent Transmission Framework and Resource Allocation

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The joint time and power allocation in wireless powered communication networks (WPCN). Unlike the conventional interference-free model in time-division multiple-access (TDMA) “harvest-then-transmit” framework, we propose a novel transmission framework that allows user equipment’s (UE) to send data information concurrently in a time splitting manner, which cause mutual interference among UEs. The system feasibility for the proposed model with both the time and energy constraints. For time feasibility, The sum of time resource with given data demand and harvest time. For energy feasibility, we focus on the ratio of transmission energy and harvested energy when the data demand and the transmission time is fixed. As an exemplary application of the proposed model, we investigate the minimum throughput maximization problem, which aims at achieving high data rates but also ensures fairness among UEs. Furthermore, we derive the optimal time allocation for information transmission and energy harvesting, and derive a local optimal solution that satisfies the KKT conditions for the transmit power of UEs to the non-convex and NP-hard sum rate problem. Numerical results are presented to illustrate the theoretical findings and to show the advantage of our proposed schemes compared to previous protocols. Beamforming schemes to simultaneously transmit data securely to multiple information receivers while transferring power wirelessly to multiple energy-harvesting receivers. Taking into account the imperfection of the instantaneous channel state information (CSI), we introduce a chance-constrained optimization problem to minimize the total transmit power while guaranteeing data transmission reliability, data transmission security, and power transfer reliability. As the proposed optimization problem is non-convex due to the chance constraints, we propose two robust reformulations of the original problem based on safe-convex-approximation techniques. Subsequently, applying semidefinite programming relaxation (SDR), the derived robust reformulations can be effectively solved by standard convex optimization packages. We show that the adopted SDR is tight and thus the globally optimal solutions of the reformulated problems can be recovered. Simulation results confirm the superiority of the

proposed methods in guaranteeing transmission security compared to a baseline scheme. Furthermore, the performance of proposed methods can closely follow that of a benchmark scheme where perfect CSI is available for resource allocation.

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## **Wireless Covert Communications Aided by Resource Management With Dynamic Network Slice Selection**

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Covert communications between a pair of legitimate transmitter-receiver against a watchful warden over slow fading channels. There coexist multiple friendly helper nodes who are willing to protect the covert communication from being detected by the warden. Network slicing is a promising approach for enabling low latency computation offloading in edge computing systems. In this paper, we consider an edge computing system under network slicing in which the wireless devices generate latency sensitive computational tasks. We address the problem of joint dynamic assignment of computational tasks to slices, management of radio resources across slices and management of radio and computing resources within slices. We formulate the Joint Slice Selection and Edge Resource Management (JSS-ERM) problem as a mixed-integer problem with the objective to minimize the completion time of computational tasks. We show that the JSS-ERM problem is NP-hard and develop an approximation algorithm with bounded approximation ratio based on a game theoretic treatment of the problem. We use extensive simulations to provide insight into the performance of the proposed solution from the perspective of the whole system and from the perspective of individual slices. Our results show that the proposed slicing policy can achieve significant gains compared to the equal slicing policy, and that the computational complexity of the proposed task placement algorithm is approximately linear in the number of devices.

**COOPERATIVE RELAYING SCHEME TECHNIQUES FOR  
DEVICE-TO-DEVICE DISCOVERY IN OUT-OF-COVERAGE  
NETWORKS**

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As green communication becomes an inevitable trend for future 5G wireless networks, how to maximize the energy efficiency (EE) of device-to-device (D2D) communication has drawn extensive attention recently. However, most of existing works only optimize the EE in the single-cell scenario, while little attention is paid to maximizing the EE of the whole cellular network underlaid with D2D communication with randomly distributed users on multiple bands. In this paper, we first consider the whole cellular network underlaid with D2D communication on multiple bands and derive the exact expressions of the successful transmission probabilities, the average sum rate (ASR) and the EE based on stochastic geometry theory. Then, we formulate the optimization problem of maximizing the EE subject to four constraints regarding to transmission power and outage probabilities, and the non-convexity of this problem is also verified. After that, by exploiting the objective function property of being the sum of several functions, we propose a derivative based algorithm to solve this non-convex optimization problem. Our theoretical analysis shows that the computational complexity of the proposed algorithm is significantly lower than that of the conventional branch and bound (BB) algorithm. Finally, simulation results demonstrate that the proposed algorithm can achieve the near-optimal EE with much better performance than the conventional algorithm.



## Dynamic Super Round-Based Distributed Task Scheduling for UAV Networks

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Networks of Unmanned Aerial Vehicles (UAVs) are emerging in many application domains, e.g., military surveillance. To perform collaborative tasks, the involved UAVs exchange several types of information, e.g., sensor data and commands. The major question here is how to schedule the tasks under dynamic traffic flows to provide network services. Existing solutions use the Round-Robin Strategy (RRS), where the tasks are scheduled statistically by dividing the time into fixed-length rounds. However, the RRS wastes significant network and device resources due to task scheduling in each round. This paper proposes DROVE – a novel clustering approach that allows the UAVs for dynamic task scheduling. However, determining the task scheduling is crucial, as it significantly affects several network parameters, e.g., throughput. Therefore, we devise the problem of distributed task scheduling under dynamic traffic flow scenarios to optimize the throughput. We propose a clustering task scheduling algorithm to serve dynamic traffic flows. Particularly, we integrate the dynamic traffic flows into the Lyapunov drift analysis framework, and determine the throughput optimality of our proposed scheduling algorithm. We perform extensive simulations to validate the effectiveness of DROVE. The results show that DROVE outperforms the state-of-the-art solutions in terms of energy consumption, clustering overhead, throughput, end-to-end delay, flow success rate and packet drop rate.

**Index Terms**— Clustering, data traffic-level dynamics, energy-efficiency, scheduling design, UAV networks.



## **Sequential Integrity Checking in Linux Embedded Systems**

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Integrity protection encompasses security measures that safeguard system resources, programs, and data against unauthorized manipulation. The main challenge is to guarantee data integrity, bring the system into a safe mode, and stop the execution of all functions as soon as an attack has been detected. The integrity of embedded systems can be ensured by using cryptographic methods in a clearly defined process and relying on a secure hardware device for key management and state storage. This paper describes methods to affirm software integrity check in Linux Embedded systems. Cryptography is a mechanism in which information is encrypted or transformed into some unreadable format called cipher text. Only the authorized user having the secret code can decrypt or decipher the received message. A number of encryption techniques are available in literature. Currently, different research is being progressed for integrity verification of mobile OS. This solution is a multi-directional security solution based on device hardware that can prevent falsification through Linux kernel and Android OS. The integrity verification technique suggests integrity verifications of OS and block level. In particular, it is important to look closer at the integrity verification technique for OS in the boot level that consists of Secure Boot and Trusted Boot. As for Trusted Boot, all boot loaders and encrypted fingerprints of OS kernel are stored using ARM technology, and integrity verification is performed using this information. Digital signatures serve the purpose of authentication and verification of documents and files. This is crucial to prevent tampering during official papers' transmission and prevent digital manipulation or forgery. The integrity verification technique suggested by this paper intends to secure independent security memory area where verification data is loaded and produce the interface accessible to relevant security memory area as the kernel module. This module shall be loaded to kernel while booting the OS at the boot loader, and the relevant data can be accessed via the integrity verification application that uses this module.

## Automated Birds Species Identification Using Audio Signal Processing and Neural Networks

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Now a day's bird population is changing drastically because lots of reasons such as human intervention, climate change, global warming, forest fires or deforestation, etc., with the help of automatic bird species detection using machine learning algorithms, it is now possible to keep a watch on the population of birds as well as their behavior. Because manual identification of different bird species takes a lot of time and effort, an automatic bird identification system that does not require physical intervention is developed in this work. To achieve this objective, Convolutional Neural Network is used as compared to traditionally used classifiers such as SVM, Random Forest, SMACPY. The foremost goal is to identify the bird species using the dataset including vocals of the different birds. The input dataset will be pre-processed, which will comprise framing, silence removal, reconstruction, and then a spectrogram will be constructed, which will be sent to a convolutional neural network as an input, followed by CNN modification, testing, and classification. The result is compared with pre-trained data and output is generated and birds are classified according to their features (size, color, species, etc.)

**Keywords-** bird species recognition,multiplebird species,machine learning,artificial neural network.

## An Automatic Detection Of Breast Cancer Based On Machine Learning Using Ensemble Of Classifiers

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Cancer is a major public health issue worldwide. Breast cancer has become a major public health concern in recent years. This project proposes an automatic detection of breast cancer diagnosis and prognosis based on machine learning using ensemble of classifiers. The input image is pre-processed by Adaptive filter. The image to be tested is segmented by FCM segmentation algorithm, for active partition of image. The segmented features are extracted by Gray Level Co-occurrence Matrix Method, in which all the essential features are extracted for enhanced classification. By using LSTM Classifier, accurate classification results are obtained. This project is implemented with MATLAB simulation software and the output reveals the classification accuracy.

**Keywords**— Healthcare system, machine learning, breast cancer, ensemble learning, cancer diagnoses.

## **A Secure And Private Data Aggregation For Energy Consumption Scheduling In Smart Grids**

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The recent proposed solutions for demand side energy management leverage the two-way communication infrastructure provided by modern smart-meters and sharing the usage information with the other users. First highlight the privacy and security issues involved in the distributed demand management protocols. Propose a novel protocol to share required information among users providing privacy, confidentiality, and integrity. Also propose a new clustering-based, distributed multi-party computation (MPC) protocol. Through simulation experiments demonstrate the efficiency of our proposed solution. The existing solutions typically usually thwart selfish and malicious behavior of consumers by deploying billing mechanisms based on total consumption during a few time slots. However, the billing is typically based on the total usage in each time slot in smart grids. In the second part, formally prove that under the per-slot based charging policy, users have incentive to deviate from the proposed protocols. Also propose a protocol to identify untruthful users in these networks. Finally, considering a repeated interaction among honest and dishonest users, derive the conditions under which the smart grid can enforce cooperation among users and prevents dishonest declaration of consumption.

**Keywords-** Multi-party computation (MPC), Dishonest, Smart grid, Networks, Privacy.

## **A Real Time Tracking And Controlling Of Indoor Robot**

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This research work states that mobile robot control system with wireless communication. With the development of humancivilization and technologies, human life has changed a lot in the past few decades. One of the technologies that has progressed is robot systems. Intelligent robots are now used in daily life for entertainment, medical care, home security, and services in other fields. Intelligent robots integrate electronics, mechanics, control, automation, and communication technologies. Different types of robots have been developed in recent years to meet a variety of needs. The development of robot systems combines the theoretical expertise of many professionals. Related studies and applications are extensive, including obstacles avoidance, path planning, and visual image processing. How to improve the accuracy of a robot's performance is one of the main foci in the field of intelligent robotic control. The suspicious object is detected with a sensor. The movement of the mobile robot can be monitored by GUI from the monitoring station. The result shows the mobile robot can be operated in multi-area tracks such as tiled track, soil track, asphalt track, and a paved track. The reliability check of various trajectories has not been done by previous studies. Moreover, the mobile robot is capable of great variations of movement, such as forward, backward, right turn, left turn, right oblique 45 and 135 degrees, as well as left oblique 45 and 135 degrees. The zigbee receiver and transmitter of the mobile robot can be removed in the maximum distance area of 150 meters. The performance of the camera in detecting a suspicious object at 10 degrees of horizontal and vertical are 10 to 200 degree and 0 to 100 degree, respectively.

## Convolutional Neural Network Based Method For Predicting Brain Tumor Using Mri Images

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Brain tumors are the main cause of cancer deaths worldwide. A brain tumor can affect people at any age. The early detection and cure of brain tumors are considered pivotal. There is a good deal of similarity in appearance between normal tissue and brain tumor cells, so segmentation of tumor regions becomes a difficult task to do. A very accurate automatic tumor detection approach is therefore absolutely necessary. This project proposes a method for detecting brain tumors in Magnetic Resonance imaging (MRI) images using the Convolutional Neural Network (CNN). The image is pre-processed using the Gaussian filter. A Gaussian filter performs spatial processing to reduce noise in an image. Fuzzy C Means (FCM) algorithm is used for tumor segmentation, and morphological operations are used to accurately determine the size and shape of the tumor. The method of feature extraction is implemented by Gray Level Co Occurrence Matrix (GLCM). The GLCM is extracting the dissimilarity, homogeneity, contrast, energy, ASM. CNN is used to classify the images of brain with tumor and no tumor.

## Light Field Based Road Segmentation For Improved Lane Detection

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Robust lane detection is imperative for the realization of intelligent transportation. Recently, vision-based systems that employ deep convolution neural networks(CNNs) for lane detection have made considerable progress. However, for better generalization under various road conditions learning-based methods require excessive training data, which becomes non-trivial in challenging conditions such as illumination variation, shadows, false lane lines, and worn lane markings, etc. In this paper, we propose a light field (LF) based lane detection method that utilizes the additional angular information for improved prediction and increased robustness. Two different LF representations are investigated to study the possibility of maximum performance improvement and minimal additional computation cost and data labeling efforts. Experimental results successfully demonstrate that the proposed approach improves the prediction of the lane line point coordinates and is significantly robust against the aforementioned adverse conditions

## Design of Compact Wearable Antenna To Detect The Patient In Vital Parameters

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Antenna sensors are electronic devices with dual functionality for communicating and sensing and they can be implemented by minimizing the number of components. In order to provide good electrical performance as well as stability for the flexible devices, it is necessary to choose quality materials during manufacturing. The substrate selection for antenna sensor requires a low loss material so as to have better chances of increased antenna sensor efficiency when placed on the body. This is one of the important considerations for wearable electronics design. Several flexible wearable antenna sensors are implemented on different types of materials such as papers, fabrics, and plastics. The main objective is to design a microstrip patch antenna operating at 2.4GHz ISM band using HFSS (High Frequency Structure Simulator) software. The antenna acts as temperature sensor and can be used in human health monitoring applications. In this project, a wearable antenna which can be used to monitor the temperature of the patient is proposed. The proposed antenna sensor operating at 2.4 GHz ISM (Industrial, Scientific and Medical) band is fabricated on FR4 (Flame Retardant) epoxy resin substrate.



## Image Net Based Fully Convolutional Neural Network For Covid-19 Detection

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Segmentation of pneumonia lesions from CT scans of COVID-19 patients is important for accurate diagnosis and follow-up. Deep learning has a potential to automate this task but requires a large set of high-quality annotations that are difficult to collect. Learning from noisy training labels that are easier to obtain has a potential to alleviate this problem. However, segmenting infected regions from CT slices faces several challenges, including high variation in infection characteristics, and low intensity contrast between infections and normal tissues. Further, collecting a large amount of data is impractical within a short time period, inhibiting the training of a deep model. To address these challenges a ImageNet convolutional neural network framework was developed for COVID-19 classification and lesions localization. Proposed system is an automated system to detect and classify COVID-19 detection by using ImageNet model to achieve higher accuracy. The COVID-19 lesions are localized by combining the activation regions in the classification network and the unsupervised connected components

**Keywords-** COVID-19, CT scan, Deep learning, ImageNet, Machine Learning

## IoT Based Marine Environment And Ocean Cleaning

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Sea cleaning is difficult these days, thus humans developed a technology to clean the sea or any other bodies of water naturally using smart technology with the help of microcontroller and IOT stage. This project proposes a low cost easy ocean waste cleaning, weather monitoring and border alert system is designed which separately uses both tracking unit and monitoring unit. To gather and modify sensor data, an Arduino Uno (microcontroller) with the ATmega328p microchip is utilized. The sensors used in the microcontroller are IR sensor, DHT11 sensor. The location of boat is determined using a NEO-6M GPS receiver module and Bluetooth module. Using wi-fi module, the obtained GPS location is uploaded to IoT cloud. The microcontroller used in the system provides instruction to buzzer. It also employs a message transmitter to communicate with the base station, which keeps track of the boats at sea. Both the fishermen and coast guards are alerted by the proposed system.

## A Night Vision Detector Enhancement Algorithm Based On Degan And Faster R-Cnn

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Adaptive Dark Channel Prior is one of the significant dehazing methods based upon the observation of the key features of the haze-free images. But it has disadvantages; high computational complexity Enhancement in the sky region, flickering artefacts in video processing and poor dehazing. Using ADCP algorithm to improve low light image to enhanced image. Low-light images typically suffer from two problems. they have low visibility (small pixel values). Second, noise becomes significant and disrupts the image content, due to low signal-to-noise ratio. To overcome the drawbacks of current method, this project propose Deep Convolution Generative Adversarial Networks for image enhancement.

## An Automatic Waste Segregating Trashcan

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Segregation at the source is the key in solidwaste management, especially when we have limited economical resources. We divide solid waste into plastic and metallicwaste. Here, by using conveyer belt the waste is identified and segregated. The metal, plastic, wet and dry wastes are segregated and the type of waste is displayed in the LCD display. Metaldetector is used to identify the metal waste. Whereas, the plastic waste is identified byheating the waste using the heating element and it is sensed using MQ7 sensor. The need for segregation of plastic waste isessential for the environment and it is thenrecycled. The aim of the project is to segregate the waste and keep the environment clean.

**Online Product Review-Sentiment Analysis Using Machine Learning**

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The world today is becoming more digitalized. In this digitalized world e-commerce is taking the ascendancy by making products available within the reach of customers where the customer doesn't have to go out of their house. As now a day's people are relying on online products so the importance of a review is going higher. Sentiment analysis assists in determining the emotions. This project proposes an online product review-sentiment analysis using machine learning. The main intention is to implement machine learning classification algorithms to predict the class of rating using textual review. For this sentiment analysis (or opinion mining) technique is used. It is a natural language processing (NLP) technique used to determine whether data is positive, negative or neutral. By using Count Vectorizer and Tf-idf Vectorizer the text data is converted into vector form for extracting the features. The extracted features utilized for analyzing the review are classified using Logistic Regression and Naive Bayes. The predicted sentiments were evaluated by precision, f1 score, recall, accuracy, and confusion matrix.

**IoT And Google Assistant Based Wireless Notice Board**

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Information dissemination using digital noticeboard plays an imperative role in this digital world. This work is primarily aimed at developing a wireless information board for displaying and broadcasting the announcements and notices that the user sends from the Internet using the IOT technology. By providing a sufficient power supply, the Arduino Uno, node MCU and LED display work properly and the display is controlled by the android application. The application can be used by connecting it to the internet and this enables the admin to send the information from wherever in the planet and could be visualized in a matter of seconds. The admin uses the app by setting the correct username and password for WIFI. For sending information, PC or mobile phone are utilized and at recipient end, Arduino is connected to the Web. The admin can send the data in the form of text or voice, which in turn would be displayed on the distant noticeboard. The LED display is to display the text/voice that the user has sent and the speaker is to announce the received text message. The displaying text would be scrolling in the display. By using the text to speech software, announcement the text that is scrolling on the LED screen becomes possible. Earlier the Wi-Fi notification board had been used and thereby experiencing a limit on coverage. In this proposed method, the Internet is used as a means of communication and no coverage problem exists.

**Keywords-** Wireless, information, IOT technology, Arduino Uno, node MCU, tensor flow, text to speech, no coverage problem.

## **Brain State Inference While Under Anesthesia Using Cnn-Based Deep Learning Models**

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Anesthesia is a crucial procedure for surgeons because it allows them to operate on patients who are unconscious and pain-free. This project proposes brain state inference while under anesthesia using Convolution neural networks (CNN) based deep learning models. Neuroscience research and clinical situations can both be helpful in determining how deeply unconscious a patient is during anesthesia. An electroencephalogram (EEG) is a recording of brain activity. During this painless test, small sensors are attached to the scalp to pick up the electrical signals produced by the brain. These signals are recorded by a machine and are looked at by a doctor. The adaptive median filter is used to pre-process the signal. The median filter is a filtering method for removing noise from signals. Wavelet decomposition is applied to perform the feature extraction process, which allows for perfect signal reconstruction. This project employs a CNN based technique to classify anesthetized brain states. This CNN is a well-ordered technique in the field of medical signal processing. This project is implemented using MATLAB software.

**Iot Based Sun Tracker Solar Panel Monitoring And Solar Power  
Management System**

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Solar photovoltaic energy is the emerging and enticing clean technologies with zero carbon emission in today's world. To harness the solar power generation, it is indeed necessary to pay serious attention to its maintenance as well as application. This project proposes an Arduino based solar tracker using LDR & servo motor. In order to maximize the amount of light that the solar panel receives and hence increase power efficiency, the Solar Panel Tracker is made to move with the sun. A dual-axis solar tracking system is designed. In this system, the whole solar panel moves from east to west in a day to point in the direction of the sun. The use of a solar tracker circuit in the field of energy production will increase its efficiency power generation. The main advantage of the system is to determine optimal performance for better maintenance of solar PV (photovoltaic).



## **Walk And Charge**

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This venture is intended to guarantee that our mobile phones never show out of juice to allowing us to charge it while we are on our everyday walk and getting some activity and consequently finishing two positions simultaneously. The basic idea is about converting a part of the bio-mechanical energy spent in our day-to-day lives (while walking) into a usable form and storing it to charge low-power battery-operated device

**Multi Scale Context Aggregation For Strawberry fruit recognition and disease phenotyping**

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In today's time fruits and vegetables are available bulk straight from the farm generally to be sold within the market. Before these fruits go out on market, it's necessary to sort the ripe one's first for selling as they are mature and generally decay. Hence, ripen one enough to be sold first before the unripe ones. Agro and Food Processing industries have seen tremendous growth in a short period. These industries daily process the bulk of farm produce to make a variety of products. This paper aims to propose technology for automating the process of fruits based on the ripeness using Machine Learning and Computer Vision technology. The system will also be able to log the data of the fruits in processing using which the output of the product can be estimated. The system uses a CNN algorithm to classify the fruits and ripeness.

## Finger Print Collection Point Localization Based Infrared Finger Vein Image Segmentation

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One of the main issues of the present is security. In many facets of modern life, identity verification has grown in importance. It has been demonstrated that hand-based bio-metric features are simple to obtain during data collecting. An increasingly reliable approach of automated personal identification is finger vein biometrics. Due to the physical traits and properties of the vein patterns in the human finger, which are very impossible to forge, finger vein is a special physiological biometric for identifying individuals. Even though the deep neural networks have strong feature representation capability and high recognition accuracy in finger vein recognition, the deep models are computationally intensive and poor in timeliness. To address these issues, this article proposes a lightweight algorithm for finger vein image recognition and matching. The proposed algorithm uses a lightweight convolutional model in the backbone network and employs a triplet loss function to train the model, which not only improves the matching accuracy, but also satisfies the realtime matching requirements. In addition, the Mini-region of interest (RoI) and finger vein pattern feature extraction also effectively solve the problems of large amounts of calculation and background noise. Moreover, the present model recognizes new categories based on the feature vector space constructed by the finger vein recognition system, so that new categories can be recognized without retraining the model.

The results show that the finger vein recognition and matching algorithm proposed in this article achieves 99.3% and 99.6% in recognition accuracy and 14.2 and 16.5 ms in matching time. Compared with the state-of-the-art finger vein recognition algorithm, the proposed algorithm improves 1.45% in recognition accuracy while saving 45.7% in recognition time.

**Keywords-** Deep learning, finger vein recognition, lightweight convolution network, Mini-region of interest (RoI) extraction, triplet loss.

**Implantable Antenna For Monitoring Pathological Changes Of Human Tissues**

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This paper proposes a novel flexible antenna design operating at very high frequency (VHF) band for on-body applications such as human body communication (HBC). The antenna consists of back-to-back E-shaped fractal and complimentary structures designed over a thin flexible substrate. The overall design working on the principle of fractal geometries and capacitive coupling is highly beneficial to achieve better antenna characteristics even at low frequencies around 35 MHz–45 MHz that are being used for HBC application. The proposed antenna obtained a large bandwidth of around 10.0 MHz in air and a bandwidth of around 8.0 MHz during on-body operation. The antenna has been tested in three different scenarios viz. air, on-body single antenna and on-body communication using two antennas. The insertion loss is reduced to a minimum in all three scenarios, which is quite beneficial for better signal transmission. The size miniaturization with high flexibility in such low frequencies has also been achieved in the paper that makes the proposed design suitable for human body communication application

**KeyWords:** Antenna; Very High Frequency (VHF); Human Body Communication (HBC); Bandwidth; Loss; Flexible

**PAPER ID : ICAICC23/49**

**Anomaly Detection Of Trajectories For Maritime Ship Targets Using Sar Images**

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This paper proposes a ship target detection algorithm based on the improved YOLO algorithm. First, as the detection head of the YOLOv4 degrades the performance this study decouples the classification and regression tasks. Second, since the channel attention mechanism ignores the spatial information, coordinate attention is used to obtain long-range dependencies and accurate position information in the spatial domain. The effects of coordinate attention mechanism in different hierarchical YOLOv4 structures are analysed

**PAPER ID : ICAICC23/50**

**Smart Gas Booking System And Leakage Detection Using IoT**

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Liquefied Petroleum Gas (LPG) has been widely used as a cooking fuel in homes , hotels and industries. LPG leakage poses a serious threat to the users and the society, if it is not detected early. This project proposes a flexible and reliable way of detecting the leakage of LPG, monitoring the amount of LPG available in the cylinder. It provides the ability to book a cylinder by automatically sending the booking request via SMS to the distributor as required. After booking, message is sent to the user.

**PAPER ID : ICAICC23/51**

**Industrial Hazardous Situation Using Internet Of Things**

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Addition safety scenes was created in order to verify the technique used in this method. This technique is designed to protect a human. This technique reveals harmful impacts of thermally dangerous areas and humans. Human efforts are reduced using automation system which monitors and indicates any fault in the system. It is a network of physical object or things embedded with electronics, software, sensors, and network connectivity which use this object to collect and exchange data. In this system is developed which will automatically monitor the industrial parameter such as temperature, gas, fire, humidity and generates alerts and alarms and take intelligent decisions with the help of IOT concept. Here automaton system will be used in industry for monitoring various parameters such as temperature, humidity, gas and fire.

**Keywords**— Healthcare system, machine learning, breast cancer, ensemble learning, cancer diagnoses.

## **Detection Of Worm Hole Attack Using Intrusion Detection System**

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A wireless ad-hoc network is a decentralized network with a dynamic network with a dynamic topology that allows for end-to-end communication via multi-hop route operation with several nodes cooperating themselves, when the source and destination nodes are not in coverage. Because of its wireless nature, it has lot of security concerns than infrastructure network. Wormhole attacks are one of the most serious security vulnerabilities in the network layer. Signatures are the sole thing that preventive measures rely on. Intrusion detection system (IDS) and other reactive measures detect all types of threats. One issue is calculating large set of layered features from an ad-hoc network. This work implements genetic algorithm (GA)-based feature reduction intrusion detection approaches to reduce the number of wireless feature sets required to identify worm hole attacks. For attack detection, the reduced feature set was put to fuzzy logic system (FLS). The performance of proposed model was compared with principal component analysis (PCA) and statistical parameteric mapping (SMP). Network performance analysis like delay, packet dropping ratio, normalized overhead, packet delivery ratio, average energy consumption, throughput, and control overhead are evaluated and IDS performance parameters like detection ratio, accuracy, and false alarm rate are evaluated for validation of the proposed model.

**KeyWords:** Intrusion detection system, worm hole attack, genetic algorithm, fuzzy logic, wireless ad-hoc network.



**A Smart Child Safety Wearable Device Using Internet Of Things**

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This paper discusses the perception of a tidy wearable device for little children. The major gain of this wearable over other wearable is that it can be used in any cell phone and doesn't necessarily require an expensive smart phone and not a very tech savvy individual to operate. The intention of this device is to help parents locate their children with ease. There are many wearable devices in the market which is used to track the daily activity of children and also help to find the child using Wi-Fi and Bluetooth services current on the device. But Wi-Fi and Bluetooth appear to be an undependable medium of communication between the parent and child. Therefore, the focus of this paper is to have an SMS text enabled communication medium between the child's wearable and the parent as the environment for GSM mobile communication is approximately present universally.

**Keywords**—Wearable device, children location, GSM mobile communication.

**PAPER ID : ICAICC23/54**

## **Analysis Of Diabetic Retinopathy Using Machine Learning**

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This project proposes machine learning methods for detecting diabetic retinopathy by using CNN. The image is pre-processed using the contrast limited adaptive histogram equalization (CLAHE) filter. CLAHE is used to improve the visibility level of blurry images. The FCM is used to generate a proper threshold value for data. The method of feature extraction is implemented by GLCM. This project provides excellent specificity and sensitivity for classifying images as with or without diabetic retinopathy. This project is implemented using MATLAB software.

**Keywords**— Diabetic Retinopathy , lesion , exudates , Classification , diabetes mellitus .

**Drowsiness Fatigue Detection To Increase Road Safety**

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The main aim of this project is to construct an smart vehicle system with minimizing the limitations of existing methods and also enhancing the security of vehicles and human beings and also reduces the accidental injuries. Smart vehicle system will entail a speed and other parameters of vehicle sensing mechanism which automatically messages to traffic police . An IOT-based system for the detection of drowsiness in automotive drivers. Initially give buzzer alert in the system. The Alcohol analyser senses the amount of alcohol present in the breath of a person and reports if it is beyond the legal limit. Vehicle can't start and health conditions monitor using sensors. and message will be sent to the cloud -based platform, concurrently. The framework provides 93.33% drowsiness state classification as compared to a single stage which gives 86.66%.

**Slic Segmentation Based Corn Leaf Diseases Diagnosis**

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Plant diseases lead to severe losses in crop yield worldwide. The conventional approach for diagnosing diseases relies on manual scouting. In recent years, advances in convolutional neural networks have motivated the use of deep learning-based computer vision for automatically identifying plant diseases. Although image classification techniques are commonly used for analyzing agricultural data, their use for accurately identifying diseased regions corresponding to different disease types on individual plant leaves is limited. In this study, Simple Linear Iterative Clustering (SLIC) segmentation was used on corn leaf images from the Plant Village and CD&S datasets to create super-pixels, a cluster of pixels representing a region of interest on a corn leaf. The VGG16 deep learning models is utilized to identify diseased regions corresponding to five super-pixel classes (healthy, gray leaf spot (GLS), common rust, and blight) for the Plant Village dataset. The results suggest that SLIC segmentation on corn leaf images helps accurately identify diseased regions. This research demonstrates the potential of image-based scouting as an efficient alternative to manual scouting for disease monitoring.

**Keyword**—Corn leaf disease diagnosis, Deep learning, Simple linear iterative clustering.

**Automatically Identify Fruit Ripeness And Disease Detection using Fuzzy Mask R-Cnn Model**

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Manual inspection and harvesting of ripening fruits is time consuming and labor intensive. Smart agriculture can emphasize the use of digital horticultural resources for farming and can increase farm sustainability; to that end, we proposed a fuzzy Mask RCNN model to automatically identify the ripeness of fruits and detection of disease. First, to annotate the images automatically, a fuzzy c-means model was used to maintain the spatial information of various foreground and background elements of the image. Then, a Hough transform method was applied to locate the specific geometric edge positions of the fruits. Second, annotated images were trained with Mask R-CNN to identify each fruits precisely. Finally, to prevent pre harvest abscission of fruit, a hue-saturation-value color model and fuzzy inference rules were used to predict the ripeness of the fruits.

**A Novel Method For SAR Ship Detection In Complex Environment**

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Ship detection using Synthetic Aperture Radar (SAR) technology has become crucial for maritime surveillance and security. However, the detection of ships in complex environments, characterized by challenging backgrounds and adverse weather conditions, remains a significant challenge. In this paper, we propose a novel method for SAR ship detection that addresses these complexities and achieves improved performance.

Our method leverages advanced image processing techniques and machine learning algorithms to enhance ship detection accuracy in complex SAR images. Firstly, we employ a multi-scale analysis approach to capture both global and local image features, enabling the detection of ships at different scales and orientations. This allows for a robust identification of ships amidst cluttered backgrounds.

Furthermore, we integrate adaptive filtering techniques to mitigate the influence of speckle noise, which is a common issue in SAR imagery. By effectively reducing speckle noise, we enhance the contrast between ships and their surroundings, thereby improving the detection performance. To train our ship detection model, we utilize a large dataset comprising SAR images with diverse environmental conditions. The dataset is carefully annotated with ship locations, enabling the development of a reliable and accurate ship detection algorithm. We employ deep learning techniques, such as convolutional neural networks (CNNs), to extract discriminative features from the SAR images and classify them as ship or non-ship regions.

**Dual Access Control For Cloud Based Data Storage And Sharing**

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Cloud-based data storage and sharing have become increasingly prevalent in various domains, including enterprises, academia, and personal usage. However, ensuring the security and privacy of the data stored in the cloud remains a critical concern. Existing access control mechanisms often rely solely on the cloud service provider's access control policies, which may not align with the users' specific requirements. In this paper, we propose a novel approach called Dual Access Control (DAC) that allows users to enforce their own access control policies while leveraging the cloud's storage and sharing capabilities. The DAC framework incorporates both cloud-based access control and user-centric access control, providing a comprehensive solution to enhance data security and privacy in cloud-based environments.

**Keywords:** Dual Access Control, cloud computing, data storage, data sharing, access control policies, security, privacy.

**IOT based Home Automation**

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The Internet of Things (IoT) has revolutionized various aspects of daily life, including home automation. IoT-based home automation systems enable the integration and control of various household devices and appliances, offering enhanced convenience, energy efficiency, and security. This paper presents an overview of IoT-based home automation, highlighting its key components, functionalities, and benefits. We discuss the architecture, communication protocols, and sensor technologies utilized in such systems. Additionally, we explore the challenges and potential solutions associated with IoT-based home automation, including interoperability, privacy, and security concerns. By understanding the potential of IoT-based home automation, individuals and industries can harness its capabilities to create smarter, more efficient and secure living spaces.

**Keywords:** Internet of Things (IoT), home automation, smart home, sensor networks, communication protocols, energy efficiency, convenience, security, privacy, interoperability.



## **Fuel Efficient Electric Vehicle**

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With the increasing concern for environmental sustainability and the rising cost of conventional fuels, the development of fuel-efficient electric vehicles (EVs) has become a significant area of research and innovation. This paper focuses on the design and optimization of fuel-efficient EVs, aiming to maximize energy efficiency, extend driving range, and minimize carbon emissions. Various aspects, such as powertrain design, battery technologies, regenerative braking systems, aerodynamics, and vehicle weight reduction strategies, are explored to enhance the overall fuel efficiency of EVs. Additionally, advanced control algorithms and intelligent energy management systems are discussed, which optimize the power distribution and utilization within the vehicle to further improve fuel efficiency. The paper also addresses the challenges and opportunities in the widespread adoption of fuel-efficient EVs, including charging infrastructure, battery life, and consumer acceptance. By emphasizing fuel efficiency in EV design and operation, we can accelerate the transition towards sustainable transportation and reduce the environmental impact of the automotive sector.

**Keywords:** fuel-efficient electric vehicle, energy efficiency, driving range, carbon emissions, powertrain design, battery technologies, regenerative braking, aerodynamics, vehicle weight reduction, energy management, charging infrastructure, battery life, consumer acceptance, sustainable transportation.

**Sign to Speech Conversion Using Android for Dumb People**

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Sign language serves as a primary means of communication for individuals with speech and hearing disabilities. However, the ability to understand sign language can be limited for those who are not familiar with it. This paper proposes a Sign-to-Speech Conversion system using Android technology to bridge this communication gap. The system utilizes image processing techniques and machine learning algorithms to recognize and interpret sign language gestures captured by the device's camera. The recognized gestures are then converted into speech output, allowing real-time communication between individuals who are deaf or have difficulty speaking and those who do not understand sign language. The Android platform offers a portable and accessible solution, enabling widespread adoption of the Sign-to-Speech Conversion system. The feasibility and effectiveness of the proposed system are demonstrated through experimental evaluations, showing promising results in accurately converting sign language into speech, thus empowering individuals with speech disabilities to communicate effectively in diverse social contexts.

**Keywords:** Sign-to-Speech Conversion, Android, image processing, machine learning, sign language recognition, speech output, communication, speech disabilities, accessibility, assistive technology.

**Detection Of Alive Human Being In War Field Using Arduino UNO For Soldiers**

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Detecting the presence of alive human beings in war fields is of critical importance for soldiers' safety and rescue operations. This paper presents a method for detecting alive human beings using Arduino UNO, a popular microcontroller board. The system utilizes various sensors and algorithms to detect vital signs and movements associated with living beings. Sensors such as heartbeat sensors, infrared motion sensors, and temperature sensors are integrated with the Arduino UNO to capture physiological and physical indicators of human life. The collected data is processed and analyzed in real-time to determine the presence of alive human beings in the war field. The Arduino UNO provides a compact, portable, and cost-effective solution that can be easily deployed by soldiers in the field. Experimental evaluations and field tests demonstrate the effectiveness and reliability of the proposed system in detecting alive human beings in challenging war field environments, facilitating prompt response and potentially saving lives.

**Keywords:** Detection of alive human beings, war field, Arduino UNO, sensors, vital signs, motion detection, t/ emperature sensors, soldiers, rescue operations, real-time analysis.

## AGRICULTURE PROTECTION FROM ANIMALS BY SMART IOT

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Irrespective of usage, Technology plays a major role in everyone's life. whether it is at home, hospitals, schools, public places, farm lands etc., from exploring planets which are far away from earth to finding what's inside of an atom, technology plays a crucial role in helping mankind to make things easier and in many other ways. To develop a country, G.D.P( gross domestic product) plays a key role. Every countries Agriculture G.D.P plays a major role in the growth of the nation. Especially in india , agriculture is the backbone of economy. But, because of animal interference in agricultural lands, there was a huge loss of crops around 30% every year. Elephants, Wild Pigs and other animals coming in to contact with humans, impact negatively in various means such as by depredation of crops, damaging grain stores, water supplies, houses and other assets, injuring and death of humans. This problem causes the farmers leave their areas desolate, which was caused by such a frequent animal attacks. This paper gives a proper solution in keeping away such wild animals from the farmlands as well as provides surveillance functionality. Although, the existing methods like electric fencing and other techniques are not completely efficient in Way out for man animal especially for protection of agriculture crops from wild animals.

**Key Words:** Human – wild animals conflict, attack, ultrasonic sensor, artificial intelligence, frequency.

## Encryption Algorithm for Autonomous Vehicle Surveillance System

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In digital electronics, an FSM (Finite State Machine) plays a crucial role in designing and controlling digital systems. Some key roles of FSMs in digital electronics are Control and Sequential Logic, State Encoding, System Design and Specification, Digital Circuit Design, Synthesis and Optimization, Error Detection and Correction. A finite state machine (FSM) fault can have various effects on digital electronics, depending on the specific nature of the fault and the design of the system in which the FSM is implemented. Here are some potential impacts of FSM faults: Incorrect Behaviour, Unpredictable State Transitions, Timing Issues, System Hang or Deadlock, Increased Power Consumption, Vulnerability to External Attacks. While finite state machines (FSMs) have many advantages, such as simplicity, clarity, and ease of implementation, they also have certain disadvantages when it comes to mitigation and redundancy. Some of these disadvantages include Limited scalability, Lack of flexibility, Increased complexity with complex behaviour, Limited fault tolerance and error handling, Lack of modularity, Difficulty in managing concurrent or parallel behaviour. A self-healing finite state machine (FSM) is an advanced form of FSM that is designed to recover from faults or errors automatically without external intervention. Self-healing FSMs have built-in mechanisms to detect and recover from such issues on their own. Here's a general overview of how a self-healing FSM works: Fault Detection, Fault Analysis, Recovery Strategy, State Restoration, Resumption of Operation. Evolvable Hardware (EH) is a methodology that involves the use of evolutionary algorithms to design and optimize electronic circuits and systems. It is inspired by the process of biological evolution and aims to automatically generate hardware configurations that exhibit desired behaviours or fulfil specific tasks. One of the techniques used within Evolvable Hardware is the Virtual Reconfigurable Circuit (VRC) technique. The aim of this work is to propose an encryption algorithm that is suitable for use in vehicle surveillance systems. To achieve this, a new key scheduling algorithm based on finite state machine (FSM) is proposed, which is able to provide a high level of security and encrypt images of any size. The round keys generated using the FSM method are dependent on a secret key with a flexible key space and exhibit a high level of randomness

and sensitivity to small changes. Images of any size or type are processed as FSM bases to resist various attacks and eliminate correlation.

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## **Electronic voting machine using fingerprint sensor**

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This Project examines policy regarding the electronics approaches and developments towards electronic data storage and transmission. Finger Print devices for Voting Machines and Other existing identity documents are discussed and implemented in this project. Elections are conducted at various levels to choose their representatives by the People of the nation. The elections should be conducted in a right manner to ensure that the term "Democracy" should not lose its value. It is observed that there are so many problems. associated with the conduction of election in the country. In order to overcome this kind of problems, it is proposed to use AADHAR Card and Biometric means to conduct elections in India. The main idea is to introduce the biometric voting system with the linkage of UID. Nowadays UID become inevitable and all the data of the people. Like finger prints and iris are already collected at the time of enrollment. We can introduce this voting system at the booth level to ensure the Transparency in the polling process. The voter can utilize their vote in the country for their respective constituency. The user has to show his voter ID card whenever he goes to the polling booth to poll his vote. This is a time. consuming process as the person has to check the voter ID card with the list he has, confirm it as an authorized card and then allow the person to poll his vote. Thus, to avoid this kind of problems, we have designed a finger print based voting machine where the person no need to carry his ID which contains his. entire details. The person at the polling booth has to show his Finger. This Fingerprint reader reads the details from the tag. This data is passed to the controlling unit for the verification. The controller reads the data from the reader and compares this data with the already existing data. If the data matches with the already stored information, the person is allowed to poll his vote. If not, a message is displayed on LCD and the person is not allowed to poll his vote. The polling mechanism carries out manually using the switches. LCD is used to display the related messages. The software application and the hardware implementation help the microcontroller read the data from the Fingerprint verify the data with the already stored data and take the next action. The system is totally designed using Finger print module and embedded systems technology. The Controlling unit has an application program to allow the

microcontroller interface with the Finger print module. The reader reads the data from the tag, passes the data to the microcontroller and the controller verifies this data with the already existing data in the controller's memory and then implement the commands directed by the controller section. The performance of the design is maintained by controlling unit.

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### **Fault Mitigation – Missile Management System**

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A useful formalism for designing more complex digital circuits is that of the finite state machine (FSM). Here, the circuit's function is broken down into a collection of states and rules which determine when the system moves from one state to another state. This concept can be committed to paper by drawing what is called a state diagram. The state diagram consists of nodes that represent the states and arrows (sometimes called edges) which give the possible transitions between states. The states usually are named something which indicates the function of that state. It will be seen that the state is held in flip flops, therefore there must be some mapping made between the states and their representation in the FFs. The arrows should be labelled with some condition that must be satisfied for that state transition to take place. Typically, the transitions are taken in response to external stimuli. Finally, the state machine must produce some desired configuration of outputs. State transitions and the output configuration are mediated by combinational logic acting on the inputs to the circuit and the circuit's internal state.

**FAULT MITIGATION IN UNMANNED AERIAL VEHICLE FSM  
(DRONE)**

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A Finite State Machine (FSM) is a mathematical model used to describe the behaviour of a system with discrete states. In the context of digital electronics, FSMs are commonly used to design and control the sequencing and operation of digital circuits. Faults in finite state machines (FSMs) can have significant impacts on digital electronics systems. An FSM fault can cause the system to deviate from its intended behaviour. This can result in functional errors, incorrect data processing, or failure to perform specific tasks. A fault in an FSM can also disrupt the correct sequencing of states, leading to unpredictable state transitions. As a result, the system's outputs and behaviour may become erratic or unpredictable. To mitigate the impact of FSM faults, various techniques are employed, such as fault detection, redundancy, error correction codes, and fault-tolerant design strategies. Some of the strategies are: 1. Time Redundancy: which is a fault-tolerant form that is executed multiple times in parallel, and the outputs of each execution are compared to identify discrepancies or faults. Although this technique had few advantages, we are switching to another efficient technique called Triple Modular Redundancy (TMR).

2. Triple Modular Redundancy (TMR): It is a fault-tolerant technique used in electronic systems to enhance reliability and minimize the impact of hardware failures. In TMR, three identical modules, also known as replicas or voters are used to perform the same computation or task simultaneously. The output of the three modules is then fed into a voting mechanism, which compares the results and selects the output that is consistent among the three modules. This redundancy and voting process help to identify and correct



errors introduced by faulty modules. But Faults in Finite State Machines (FSMs) can lead to several disadvantages. FSM can cause the machine to exhibit incorrect or unexpected behaviour. This can result in the system not functioning as intended, leading to errors, malfunctions, or incorrect outputs and also increase the complexity of the system, making it harder to understand, analyse, and maintain. Faulty FSMs may require additional debugging efforts, testing methods. So the FSM has the self-healing property called evolvable hardware technology which is the Virtual reconfigurable circuit (VRC).The VRC technique is a specific approach within Evolvable Hardware that focuses on the reconfiguration of electronic circuits. It involves the use of field- programmable devices, such as Field-Programmable Gate Arrays (FPGAs), which can be dynamically reconfigured to implement different circuit configurations. The aim of this work is to propose an encryption algorithm that is suitable for use in drone surveillance systems .Based on the above proposed methodology, we have built the virtual reconfigurable circuit (VRC) for the behavior of UAV (drone FSM). The application utilizes the above-proposed methods to execute its functionality. Drone technology is constantly growing, so future drone technology is currently undergoing groundbreaking progressive development. According to air drone craze, an Amazon Services LLC affiliate advertising program website, drone technology has seven potential generations, and the majority of current technology sits in the fifth and sixth generations

**POWER TRANSMISSION LINE INSPECTION AND FAULT DETECTION  
BASED ON AERIAL IMAGES**

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In order to thoroughly identify the flaws in power transmission lines, high-voltage towers, and insulators, a system for inspecting power transmission lines and fault detection based on unmanned aerial vehicles (UAVs) has been proposed. Equipments like visible light cameras, thermal infrared imagers, and ultraviolet imagers are used in this system. The images taken by aerial vehicle is processed using deep learning neural network for inspection of operating conditions of components and fault detection. YOLO v5 is proposed as the most suited algorithm to detect the exact location of components in aerial images and can easily locate the faults in components. Yolo detects components with high accuracy and response time. A thorough study of literatures shows that the suggested approach circumvents a number of technological barriers and highlights many key factors for monitoring overhung transmission lines in outdoor settings.

**SMART METERS IN ENERGY DEMAND PREDICTION**

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Forecasting energy consumption is a useful tool for decision-making since it can make future demand more predictable for energy providers. In the planning and administration of power generation systems, the use of smart metres for energy consumption monitoring is becoming crucial. This research focuses on the application of sophisticated machine learning algorithms to forecast behaviour patterns from readings from smart metres. Utility companies can also develop incentives for users on behaviour modifications that can be taken to lower their usage by learning about these behavioural tendencies.

**RAIN REMOVAL USING HIERARCHICAL APPROACH**

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Rain removal from an image is a challenging problem because most outdoor vision system can be influenced by rainy weather conditions. It is well known that rain or snow affects severely the quality of the captured images which consequently degrades the performance of many images processing such as object detection, tracking, recognition and surveillance. In this project, a Hierarchical approach is used for extracting non-dynamic components by applying smoothing filters by decomposing the input image into low frequency part and high frequency part. In the high frequency the image is decomposed into rain component and non-rain component by using dictionary learning and sparse coding techniques finally the resultant rain removed image is obtained by summing the low frequency part with non-rainy part. The image metrics such as PSNR (Peak signal to noise ratio) and SSIM(structural similarity index) were examined.

## Design and Analysis of Electronically Reconfigurable Planar Monopole Antenna for Wireless Applications

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A design of a planar antenna with a compact size of 40mm x 16mm x 1.6mm is proposed with a reconfigurable frequency to work both in the Ultra-wide Bandwidth range of 3.1GHz – 10.6 GHz and 3.9 GHz for the Wi-Max application is proposed. The antenna consists of a substrate made out of FR-4 lossy material. The radiator and ground are constructed out of Perfect Electric Conductor (PEC) material having a thickness of 0.035mm. PIN Diode is utilized between the radiators for electronic reconfiguration. Reconfiguration of the antenna is considered a cost-effective approach to designing any communication system. This reconfigurable antenna efficiently increases the performance of the antenna in a changing scenario of dynamic frequencies. By reconfiguration, a single antenna supports various engineering standards with the functionality of multiple antennas. A small rectangular slit of size 5mm x 3mm x 0.035mm is induced on the ground plane to achieve desired frequency accurately. The partial ground is used to increase the gain of the antenna. When the PIN Diode is in the off state, only the lower part of the antenna conducts and generates a frequency in an Ultra-wide Bandwidth range 3.1GHz to 10.6GHz. When the PIN diode is in on state, the whole antenna conducts and generates a frequency of 3.9 GHz making it suitable for the Wi-Max application

**Keywords**— reconfigurable, monopole, Wi-Max, ultra-wide band

## **Bidirectional GRU model for Cuffless Blood Pressure monitoring form PPG signal**

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Blood pressure (BP) is a direct indicator for hypertension therefore, continuous, non-invasive BP monitoring is essential for reducing future health complications. Hypertension is a serious issue for many of the disease like heart attack, stroke, epileptic seizure etc. Most non-invasive blood pressure monitors use the oscillometric technique, which is cumbersome and impractical. PPG signal which is extracted from the body is useful for monitoring Blood Pressure. The existing conventional cuffless non-invasive BP measurement uses the principle of Pulse transit time, Pulse arrival time, Pulse wave velocity, Pulse wave analysis. These method have disadvantages of using double sensor for signal measurement. Both these sensors are prone to motion artifacts which are to be removed by appropriate signal processing techniques in addition it requires calibration for each individual. Hybrid method requires two synchronized measurement sensors with different sampling rates. These are to be placed in fixed positions on the body which is hard and inconvenient for patients to maintain during measurements. Furthermore, PPG and ECG sensors are very sensitive to motion artifacts due to movements during the recording which in turn require rigorous signal processing. To rectify the above limitations the researches have focused on using machine learning algorithms to estimate the blood pressure from PPG signal. In Linear Regression model, the computational complexity is more. This model is prone to noise and overfitting which leads to ineffective for realtime predictions and poor performance for long term estimation. Non-linear regression models, such as feedforward networks and support vector machines (SVM), are not well-suited for time domain tasks due to their lack of feedback links and the absence of incorporation of temporal dependencies. LSTM models typically require a large amount of training data. However, when dealing with small datasets, LSTMs may overfit if not properly regularized. In the case of BP estimation, to address these limitations, we are opting for GRU (Gated Recurrent Unit) units. The proposed work is Deep learning models for cuffless blood pressure monitoring from PPG signals and the work contributes on introducing bidirectional recurrent structures using Gated Recurrent Unit (GRU). The recurrent structures have long term, continuous possibility, while GRU structure have the ability to model the variation of the extracted features with respect to temporal variations. The input signal which is PPG signal that can be acquired from MIMIC

II database is fed to the preprocessing steps Savitzky-Golay filter, moving average filter synchronization and normalization. The preprocessed PPG signal is segmented into 7 second window. The segmented output is fed to the input for the feature extraction. The extracted features are fed to the Bi-GRU structure to obtain Blood Pressure. The proposed models were designed to overcome the drawbacks of classical machine learning models, feedforward neural network, LSTM as well as improving on conventional GRU using a very small set of features extracted from the PPG waveform contour without its derivatives. As PPG is a non-invasive optical technique, our approach enables cuffless and non-invasive BP estimation

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## Breast Cancer Detection Using ResNet 50

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The early detection of breast cancer is a vital factor when it comes to improving cure and recovery rates in patients. A survey conducted by World Health Organization (WHO) in 2004 states that about 13% of the human death is caused due to cancer and also estimates the same to be crossing over 13 million by the year 2030. Among such early detection factors, one finds thermography, an imaging technique that demonstrates good potential as an early detection method. Convolutional neural networks (CNNs) are widely used in image classification tasks, but finding good hyper parameters and architectures for these is not a simple task. CNN has three layers in which convolution layer is used for feature extraction. Pooling layer is used, which crops the particular part of the image containing the object and then resize it, because classification requires fixed size of an image. In this study ResNet-50 to determine hyper parameters and architectures for the fully connected layers for the detection and classification with 97.8 accuracy.

**Keywords**—resnet50, convolutional neural network, mammographic image

## Blood Glucose Measurement from PPG signal using CNN

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Diabetes Mellitus has become as a common disorder in the past few years. The minimal usage of the energy in the body results in Diabetes. Normally, the glucose that we consume will get converted as energy by the action of the enzyme called insulin. If there occurs any abnormality in the body, which reduces the production or action of insulin will results in this type of disorder. The increase in blood glucose level results in hyperglycemia. When this hyperglycemic condition is not treated regularly it may results in the organ damage, dysfunction and failure of heart, kidney, blood vessels and nervous system. This increases the need for monitoring the Blood Glucose Level (BGL) regularly. Mainly there are three methods for the Glucose Measurement. They are invasive, minimally invasive and non-invasive methods. Traditional method for the BGL measurement is mostly of invasive type, which is painful and require large amount of blood sample. The risk of blood loss, also the pain and damages occur in the tissue pay the way to find the non- invasive method for the BGL measurement. Even though there are many pain-free non-invasive methods, the commercialization of it is less due to the cost and its efficiency. Also, the extraction of the data from the non-invasive method is difficult and is complicated while using the photoplethysmography (PPG) signal. To make it less complicated the machine learning methods will be used for this. This method has Convolutional Neural Network (CNN) that has the ability to extract the features from the given input signals and can predict the output with higher accuracy. The PPG signal is been pre-processed by the Butterworth filter to remove the motion artifacts. The dataset for this is been obtained from the MIMIC II database in Physionet Repository which is the data that is been acquired from critically ill patients during the hospital care at BIDMS.

**Keywords**—Blood Glucose level, diabetes mellitus, PPG signal, Convolution Neural Network



## **A Comprehensive Investigation on Intrusion Detection Using Data Mining**

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An intrusion detection system (IDS) is a piece of hardware or applications that scans a show's operations for infractions of access rules or malicious activity and produces reports for the management system. Nowadays, a billion individuals use the internet globally. A new generation of security technology called intrusion prevention monitors systems for malicious activity. This paper discusses various IDS methods which make use of various data mining methodologies to allow the system to work in real time. For the purpose of supporting intrusion detection in cyber data analysis, data mining methods are suggested. In order to encourage more in-depth investigation into intrusion sensing technologies, it is important to weigh the benefits and drawbacks of various types of IDS and discuss some potential future advancements. In this paper work comparative analysis is carried out between different intrusion detection techniques.

## DESIGN AND IMPLEMENTATION OF IOT BASED GARBAGE MONITORING AND GAS ALERT SYSTEM

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One of the principal concerns with our environment has been waste management which affects the health and environment of our society. The management and detection of waste are one of the primary problems of the current era. The traditional way of manually monitoring the wastes in waste bins is a cumbersome process. It utilizes more human effort, cost, and time which can easily be prevented with our existing technologies. A random and illegal discharge of waste, an absence of waste disposal and management systems, and inefficient waste management policies have caused serious environmental problems and have incurred considerable costs for waste disposal. The detection, monitoring and management of wastes is one of the primary problems of the present era. This is our solution, a method in which waste management is automated. This is our IoT Garbage Monitoring system, an innovative way that will help to keep the cities clean and healthy. In this project, we designed the real-time waste management system which is the biggest problem of our city or country. The ultrasonic sensor is used for measuring the level of waste in the garbage. The gas sensor is used to detect the harmful gas present in the garbage. Regularly, measured data and sensor information are transmitted to the Blynk app via the network. By introducing smart waste management solutions, cities have taken a key step towards becoming smart cities. The targeted waste collection saves time, money, and fuel while decreasing gas emissions and noise levels for citizens.

**Keywords:** Gas sensor, Ultrasonic sensor, ESP32 MCU

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## IMMUNITY BUILDING IN MIMO SYSTEM USING MAAD IN ELLIPTICAL SHAPE

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The goal of this project is to connect the antenna in array to achieve good gain and beam forming capabilities. The size of the array should be compact to meet the requirement of present communication technology, due to the size of the array the crosstalk and the mutual coupling between the radiating element occurs. As a result the performance, gain and efficiency of the MIMO antenna system gets degraded. In order to build a immunity system against the electromagnetic interference, the two radiating elements are constructed from elliptically shaped curve and meta-surface decoupling mechanism are used. The wave propagation in decoupling structure is further avoided by negative permeability metasurface material. This project producing good gain and isolation. Its proposed to applicable for wideband highly decoupled MIMO antenna for communication system.

**Keywords:** MIMO, Metasurface antenna array decoupling (MAAD), Elliptical decoupler.

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**Energy-Efficient Cluster Head Selection in Wireless Sensor  
Networks Using Hybrid Optimization Algorithm**

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Cluster head selection is a critical task in wireless sensor networks (WSNs) as it affects the overall network performance. In recent years, several optimization techniques have been proposed to improve the cluster head selection process. In this we propose a novel approach that combines sunflower optimization and particle swarm intelligence to select the best cluster heads in WSNs. The proposed method aims to improve the network lifetime and reduce energy consumption.

***Index Terms***—Cluster head selection, Particle swarm intelligence, Sunflower Optimization algorithm, Network lifetime.

**ENHANCEMENT OF ELECTRONIC VOTING MACHINE PERFORMANCE  
USING FINGER PRINT, FACE  
RECOGNITION AND RFID.**

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In democratic countries, the EVM plays a vital role in the election process. Even though it has more benefits; still the malpractices are continued due to manual verification of electoral documents for all elections in democratic countries. This system presents the enhancement of Electronic Voting Machine (EVM) performance using fingerprint and face recognition and verify the voter through RFID module if both authentication process failed. The people at the polling booth need to put the finger in the fingerprint equipment and face to be captured by the web camera provided to recognize them. The controller fetches the data from the input devices and compares it with the database to enable the polling device to cast their votes. In practice, due to some technical issue either in the input devices or from the voter side the election process will be continued by document verification by the officer. Instead of an officer verifying a voter ID, the RFID tag and reader is used. For example the Adhaar card can be used as a RFID tag by having a code in it.

**NEURAL NETWORK BASED MEDICAL SELF-DIAGNOSTIC SYSTEM  
USING ARTIFICIAL INTELLIGENCE**

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Diseases such as disorders in health condition among the people can be identified and diagnosed with the help of Artificial Intelligence techniques. Accurate predictions in the field of medical diagnosis in diversified fields are required by application of accurate algorithms. Earlier conventional practices of diagnosis were practiced manually which are prone to errors. Compared with human expertise practice utilization of predictive techniques of Artificial Intelligence (AI) supports auto diagnosis and it reduces the error rate. In this paper an analysis is made on various artificial intelligence techniques that are used presently such as Support Vector Machine (SVM), K-means algorithm, Fuzzy logic, neural network are considered and a optimized fuzzy logic based neural network method is designed. Observing the working model of current practices a new technique is developed for obtaining accurate results by considering different parameters. Finally, future developments on research work are explained with the help of Artificial Intelligence based diagnosis system on the challenges faced in today's medical self-diagnostic system. **KEYWORDS:** Machine Learning, fuzzy logic, Artificial Intelligence, clustering, medical diagnosis, Clustering.

**IOT BASED REAL-TIME WASHING MACHINE  
OUTLET WATER RECOVERY SYSTEM**

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Water scarcity is the major problem that is faced across the world. The aim of the theory is to examine an inexpensive system to conserve water. Using an IoT (Internet of Things) based model for water level indicating and quality monitoring. Whereas the traditional water purifier is connected to the internet, which uses devices equipped with sensors and software to track the water quality consumption in real time and provide safe water all the time. For quality monitoring and checking were used pH sensor, water level indicator, alum dispenser and arduino uno as a major component. After quality checking, the water will be purified with the help of alum powder. Then the water to be collected and stored in our convenient place. The theory mainly focuses on the purification of washing machine outlet water. The overall system is user based and eco-friendly.

Keywords—Arduino Uno, pH Sensor, Alum Dispenser, Water level Indicator

**DESIGN OF MULTIPOINT SURVEILLANCE SYSTEM BASED ON  
NRF24L01 AND IOT**

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Cloud computing has become the leading solution to improve the cost and power performance of various systems, especially automated solutions. In this setup, the communication system becomes a crucial part of the control algorithms, as the surveillance of the object is done on the cloud system. When the system increases in number of integrated devices, the growing topology of networks should be developed. The concept of autonomous tracking, which is designed to deplete the complexity of delivery and surveillance by informing the user about the object's status (human beings, cattle, etc.) and current presence, is traced in this project. An analysis of the system design of the autonomous surveillance system, the functionality of the base station, and the communication system architecture using the NRF24L01 communication topology is discussed herein. In this paper, a surveillance system is proposed in which we can monitor the number of individual physical objects (the costliest things) or human beings (students, employees) in a closed area (education centers, farms, etc.) by passing the presence of individuals to the sensor network with the help of an Arduino Nano microcontroller, a NRF24L01 transceiver, and IoT. Each individual is provided with a transmitting band that continuously transmits unique details of the individual to the receiver station. The receiver receives this unique data and updates it to the server with the help of IoT. This data of availability is visualized over a web screen. The data is categorized into different logic states, which include unique items that are: 1. presently available inside the surveillance area or not; 2. out of surveillance; 3. Time of last presence, etc.



## BIO SIGNAL CONTROLL ROBOTIC ARM

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Robot control systems via human bio-potentials, such as electroencephalography (EEG). Research and development of the technology essential for estimating and identifying the usable biological signals through sensors and signal processing techniques, as well as their conversion into control scheme has been carried out in the recent past. The need for bio-signal control is heightened by elderly and disabled people who through myriad of happenstances have lost control of the environment. To promote quality of life and self-reliance, biotechnology joined with Man-Machine interfaces are a promising undertaking. In this research, we utilize EEG to control a robot in 3D environment

**STUDENTS ATTENDENCE USING FACIAL RECOGNITION**

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This paper presents a system for student attendance management using facial recognition technology. Traditional methods of attendance taking, such as manual roll calls or barcode scanning, can be time-consuming and prone to errors. Leveraging the advancements in facial recognition algorithms, this system offers an efficient and accurate solution for tracking student attendance. The proposed system captures the facial features of students upon entry and matches them with the pre-registered database. The attendance is automatically recorded, eliminating the need for manual intervention. The system provides real-time monitoring and generates comprehensive reports, enabling educators and administrators to effectively manage attendance records. This technology holds the potential to streamline attendance tracking, enhance efficiency, and improve overall education management.

**Keywords:** Facial recognition, student attendance, biometrics, attendance management system, real-time monitoring, automation, efficiency, education management, facial features, database.