CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY

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Department of Electronics and Communication Engineering

Welcomes all the participants for

1ST INTERNATIONAL CONFERENCE ON

EMERGING TECHNOLOGIES IN ELECTRONICS AND COMMUNICATION ENGINEERING

(ICETE-2024)

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12.12.2024

Principal Message

I am delighted to announce that our institution is organizing the International Conference on Emerging Trends in Electronics and Communication (ICETE – 2024). This event serves as a platform to showcase cutting-edge research, foster collaboration among academia and industry, and explore the transformative potential of electronics and communication technologies in shaping the future. I invite all participants to engage actively and contribute to this enriching experience. Together, let us drive innovation and excellence in this exciting field.

Yours truly,

Prof. C.V. Narasimhulu,

Principal, CBIT

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12.12.2024

Director R&D Message

Welcome to the International Conference on Emerging Trends in Electronics and Communication (ICETE – 2024). This conference represents our commitment to advancing research and development in electronics and communication technologies. It brings together brilliant minds to share insights, ideas, and solutions to the challenges of the modern technological landscape. I encourage all attendees to collaborate, network, and leverage this opportunity to inspire innovation and progress.

Yours truly,

Prof. D. Krishna Reddy,

Director R&D, CBIT

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12.12.2024

HoD - ECE Message

It is with great enthusiasm that I welcome you to the International Conference on Emerging Trends in Electronics and Communication (ICETE – 2024). Our department is proud to host this prestigious event, which promises to highlight groundbreaking advancements and foster interdisciplinary collaboration. I extend my heartfelt gratitude to the speakers, participants, and organizers for their invaluable contributions. Let us make this conference a memorable and impactful gathering for all.

Yours truly,
Dr. K. Vasanth,
HoD - ECE, CBIT

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12.12.2024

Organizer's Message

Dear Delegates,

It is a pleasure to welcome you all to the International Conference on Emerging Technologies in Electronics and Communication Engineering (ICETE-2024). I am proud of the diverse lineup of speakers and sessions we have curetted as convener. This conference will be a platform for sharing innovative ideas and fostering connections across disciplines. Let us embrace the spirit of inquiry and collaboration as we enter discussions that will shape the future of our field.

Have a great conference!

Yours sincerely

Yours truly,

Prof. Vivek Singh Kushwah,

Dr. S. Radha,

Dr. S. Siva Priyanka

Organizers - ECE Dept, CBIT

ABSTRACTS
ICETE - 2024

Drowsiness Alert System using OpenCV

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Abstract: Today, more and more professions require long-term focus. Drivers must carefully monitor the road so that they can react immediately to unexpected events. Driver fatigue is often the direct cause of many traffic accidents. So, it's necessary to develop a system that detects and notify the driver of a bad psychophysical state, which can significantly reduce the number of traffic accidents due to fatigue. However, the development of such systems involves many difficulties in relation to an fast and relevant identification of drivers weariness. One of the technical prospect for implementing driver weariness detection is to use a vision-based approach. Several studies have shown that drowsiness and fatigue are the significant causes of traffic accidents. In order to improve transportation safety by decreasing the amount of accidents brought on by drivers who are too tired, an Advanced Driver Assistance System module is suggested in this. This technology uses machine learning and visual data to automatically recognize whether a driver is tired. As a scientifically validated indicator of tiredness associated with sluggish eye closure, we suggest an algorithm to find, track, and evaluate the driver's face and eyes.

The Design of Sierpinski Carpet Fractal Antenna with Gain and Radiation-Pattern Measurement

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Abstract: Antenna performance is critical in wireless applications. It performs both transmitting and receiving electromagnetic waves. Electromagnetic waves from wireless antennas will reflect off of items as they come into touch with them. An antenna that can produce several frequencies operating in the 1 GHz - 8 GHz range, including the operating range of C-band and S-band applications, is suggested in many research works. S_{11} < 10 dB return loss is the specification for the antenna. The design of the antenna makes use of a rectangular microstrip patch and a fractal Sierpinski carpet technique. With a thickness of 0.06 mm and a relative permittivity of ε_r = 4.4, for the Epoxy FR-4 substrate are the parameters used in the actual antenna design and implemented for a second iteration. Four operating frequencies are available for the second iteration of the Fractal carpet antenna, according to the test results: 2.76 GHz, 3.4 GHz, 5.04 GHz, and 7 GHz. Based on gain plots, the results show that the constructed antenna meets the necessary requirements to be employed in numerous wireless applications.

AI-ASSISTED DIAGNOSTIC APPROACHES FOR EARLY DETECTION OF PANCREATIC DUCTAL ADENOCARCINOMA

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ABSTRACT: Pancreatic Ductal Adenocarcinoma (PDAC) is a highly aggressive and often late-diagnosed cancer with poor prognosis and limited treatment options. One major problem is the variability in imaging data quality, which can impact the performance of AI models. Inconsistent or suboptimal imaging can lead to inaccurate feature extraction and reduced diagnostic accuracy. The objective of this study is to evaluate the effectiveness of AI-assisted diagnostic approaches for the early detection of Pancreatic Ductal Adenocarcinoma (PDAC). Deep learning-based imaging analysis represents a significant advancement in the detection of pancreatic cancer, leveraging artificial intelligence (AI) to enhance early detection techniques through MRI and CT imaging. By integrating AI with imaging modalities, this approach aims to improve diagnostic precision by analysing complex imaging data more effectively than traditional methods. Furthermore, the integration of molecular biomarkers with AI enhances this diagnostic capability, providing a comprehensive evaluation that combines imaging insights with biochemical profiles. This synergistic approach seeks to advance early detection, offering a more accurate and timely diagnosis of pancreatic cancer, and ultimately improving patient outcomes through earlier intervention. Future developments in AI-assisted diagnostic approaches for early detection of Pancreatic Ductal Adenocarcinoma (PDAC) include refining AI algorithms for improved accuracy and sensitivity, integrating multi-modal data from advanced imaging and molecular biomarkers, and implementing real-time diagnostic tools in clinical settings.

DEEP LEARNING FOR HANDWRITING RECOGNITION

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ABSTRACT: Recognizing handwritten characters and numbers automatically presents significant challenges. Developing an optical character recognition (OCR) system capable of meeting these demands is notoriously complex. The advent of deep learning has revolutionized machine learning, drawing considerable interest from researchers. Among the various techniques, convolutional neural networks (CNNs) have emerged as highly effective for tackling handwriting recognition tasks due to their adeptness at capturing the intricate structures of handwritten characters and facilitating automatic feature extraction. In our proposed method, we explore diverse CNN design options for recognizing handwritten digits. These include variations in layer count, stride size, receptive field, kernel size, padding, and dilation. Our goal is to evaluate the performance of different stochastic gradient descent (SGD) optimization techniques specifically tailored for handwritten digit recognition. Using the Adam optimizer, we achieve an impressive accuracy rate of 99.89%. Additionally, employing ensemble techniques further enhances accuracy.

Design, Analysis and Optimization of Horn antenna using Artificial intelligence

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Abstract: Systems that rely on wireless technology have rapidly expanded over the past 20 years, from the expansion of the mobile phone market to smart home gadgets and the onward push to autonomous vehicles with their smart sensing technologies. An antenna is a crucial component of RF front end of a communication system. The performance and efficiency of any communication system depends on the design of antenna system. A well-designed antenna may offer best transmission and reception capacity which in turn lead to improve the performance of communication system. In this paper an artificial intelligence-based design of antenna is discussed and its performance is analyzed.

MACHINE LEARNING BASED APPROACHES FOR PREDICTING CHILD MORTALITY

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ABSTRACT: HISTORICALLY, THE RATE OF CHILD MORTALITY HAS SERVED AS A GAUGE OF A COUNTRY'S OVERALL LEVEL OF DEVELOPMENT. THE INTERNATIONAL COMMUNITY HAS BEEN SETTING PERIODIC TARGETS TO LOWER CHILD MORTALITY OVER THE PAST 20 YEARS. IN RARE CASES, CHILDREN LESS THAN FIVE ARE DEEMED MORTAL. WE USE SVM, RANDOM FOREST, AND DECISION TREE AS MACHINE LEARNING ALGORITHMS TO PREDICT OUTPUT IN ORDER TO EXPLORE MACHINE LEARNING-BASED METHODS FOR IDENTIFYING THE MORTALITY FETAL WELL-BEING ARRANGEMENT THAT OFFERS THE BEST PROGNOSIS. THE STUDY'S FINDINGS HAVE BEEN USED TO CREATE A COMPREHENSIVE METHOD FOR DOING SENSITIVITY ANALYSES ON MODEL PARAMETERS THAT INFLUENCE THE CLASSIFICATION OF FETAL HEALTH. THIS PAPER PROPOSES A MACHINE LEARNING-BASED METHOD FOR FORECASTING CHILD MORTALITY AFTER ANALYZING VARIOUS MACHINE LEARNING APPROACHES USING THE PROVIDED DATASET. THE OBJECTIVE IS TO DEVELOP A MODEL CAPABLE OF PREDICTING DEATH RATES. IT IS CONCEIVABLE THAT ANOMALIES COULD RESULT FROM MISSING PROPERTIES IN THE ACQUIRED DATA. PRE-PROCESSING DATA CAN INCREASE THE PRODUCTIVITY OF THE CALCULATION AND PRODUCE BETTER OUTCOMES. BOTH THE REMOVAL OF EXEMPTIONS AND THE IMPLEMENTATION OF FACTOR MODIFICATIONS ARE NECESSARY. THE INFORMATIVE INDEX, WHICH ANTICIPATES PROVIDED INFORMATION, CONSISTS OF TWO COMPONENTS. FOR TRAINING AND ASSESSMENT SETS, THE MOST POPULAR RATIO IS 7:3.A DATA MODEL BASED ON ML IS EMPLOYED WITH THE TRAINING SET TO ASSESS THE PRECISION OF THE TEST RESULTS.

Deep Learning-Based Animal Species Classification Using Convolutional Neural Networks: A Comparative Study

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Abstract: This paper proposes a work on deep learning-based methodology in animal species classification where convolutional neural networks are used. The parallels between the continual growth in deep learning innovation and accessible big image datasets have created new doors for automatic species identification that assists in protection and research for ecology. In our work, we invest on using relevant deep learning formula e.g. TensorFlow, Keras etc., and image processing libraries like OpenCV for efficient and accurate classification. We first form a mixed data set of images from a variety of animal species collected from public galleries and collections. To reduce variability within the data, the dataset is then normalized and resized to the desired size and standardized to improve the model divergency. We discuss how several CNNs structures work, including the transferred VGG, ResNet, and Inception, and then fine-tune them for the precise classification exercise. To train this model, one performs the training on a subset of the Dataset while monitoring the performance by an evaluation of accuracy, precision as well as recall. Thus, after a number of experiments, searching on the Web, and data analysis, we assess the efficiency of various model architectures, their hyperparameters, and training approaches. Relative benchmarking is also performed to compare the current techniques with the proposed models. Furthermore, we assess the effect of dataset size, an unequal distribution of classes, and transfer learning on classification. The experimental evaluations conducted in the experiments prove a high accuracy and performance of deep learning-based approaches for identifying different animal species. The potential use of line transect samples coincides with wildlife monitoring, controlling of biological diversity, and the management of the environment We provide further suggestions for future work in the field of spatial monitoring in this chapter.

Torrenting vs Traditional Content Distribution Efficiency

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Abstract: This paper explores the efficiency of torrenting, a peer-to-peer (P2P) content distribution method, in comparison to traditional content distribution models, such as client-server systems and content delivery networks (CDNs). By analyzing key metrics including bandwidth usage, scalability, cost, speed, and reliability, we provide a comprehensive evaluation of the advantages and limitations of each approach. Torrenting's decentralized nature allows for distributed bandwidth consumption and organic scalability, making it cost-effective and highly efficient for large-scale content distribution. However, challenges like content availability, legal issues, and inconsistent download speeds arise. In contrast, traditional methods offer reliability, control, and consistent performance but often come with higher operational costs and scalability concerns. Through a combination of theoretical analysis and practical case studies, this paper presents a detailed comparison, highlighting the trade-offs and potential for hybrid models that combine the strengths of both systems.

FutureGuard : Leveraging CNNs For Advanced Pandemic Diseases Diagnosis

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Abstract: The COVID-19 pandemic has significantly impacted global health, businesses, and society. One major challenge in managing the spread of the disease is ensuring the rapid and accurate detection of COVID-19 cases. Traditional diagnostic methods, such as laboratory tests, often have limitations in terms of cost, time, and accessibility. This project proposes a deep learning approach for detecting COVID-19 using convolutional neural networks (CNNs) and chest X-ray images. A large dataset of chest X-rays, including samples from COVID-19, pneumonia, and flu patients, was compiled from publicly available sources. To enhance image quality and reduce noise, the dataset underwent preprocessing. Data augmentation techniques, such as rotation, translation, and scaling, were applied to increase dataset diversity and improve the model's generalization. A CNN-based model was developed using transfer learning with the pre-trained Inception V3 architecture. The model was fine-tuned on the dataset and evaluated using metrics such as accuracy, sensitivity, specificity, and F1 score. The performance of the model was also compared with other advanced deep learning architectures, including ResNet-50 and DenseNet-121. The proposed model achieved an accuracy of 96.89%, sensitivity of 96.72%, and specificity of 97.14% for COVID-19 detection. The F1 score of 0.97 highlights the model's high precision and recall. When compared with ResNet-50 and DenseNet-121, the proposed model demonstrated superior accuracy and reliability. Additionally, a sensitivity analysis was conducted to test the robustness of the model against variations in datasets and hyperparameters. The model was evaluated on datasets with different distributions of COVID-19 and non-COVID-19 cases, as well as under varying noise levels in the images. Hyperparameters such as learning rate, batch size, and number of epochs were also adjusted during testing. The findings highlight that the model performs consistently well under diverse conditions, making it a reliable tool for COVID-19 detection.

MindAssist: AI-Driven Mental Health Solutions Through Chatbots

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Abstract: Artificial intelligence (AI) is unexpectedly transforming mental fitness care, offering new gear to resource mental wellbeing. This paper explores the combination of AI into intellectual health offerings, specializing in its ability to supply customized care, improve get proper of entry to and offer actual-international emotional guide for AI- . Powered structures, in conjunction with chatbots and virtual therapists, that could now fast diagnose, music highbrow fitness development and facilitate interventions, make mental fitness care greater proactive and affected person-centered. Despite the functionality, many demanding situations stay. Concerns about statistics privateness, the moral use of AI, and the accuracy of AI systems in statistics complicated human feelings have to be addressed Furthermore, there may be restricted human interplay with care wherein AI increases questions about the depth of empathy and connection offered with the aid of the use of digital structures Challenges are highlighted, and moral concerns Future opportunities for AI-enabled highbrow health interventions are discussed even as the balance of technological development.

AI-Powered Sign Language to Speech Synthesis with Robotic Avatars

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Abstract - The integration of artificial intelligence(AI) with sign language recognition and speech conflation has opened new avenues for enhancing communication between the deaf community and the hail population. This paper reviews the current advancements in AI- powered systems that convert sign language into speech using robotic incorporations. These systems use computer vision and deep literacy for gesture recognition, natural language processing(NLP) for textbook generation, and textbook- to- speech(TTS) models for verbal affair. Robotic incorporations serve as interposers, physically or nearly mimicking mortal gestures in real- time. Despite significant progress, challenges similar as data failure, indigenous sign language variations, and real- time performance backups remain. This paper also discusses unborn directions, including multimodal approaches and substantiated incorporations, to ameliorate availability and inclusivity for the deaf community.

Sign Sense: A Deep Learning Approach to Sign Language Translation for Inclusive Communication

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Abstract: This research presents an AI system that can interpret sign language, designed to transform communication between hearing and deaf people. Using cutting-edge machine learning technology, the system will automatically recognize hand gestures and translate them into speech and vice versa. A large collection of sign languages would be used to help interpreters grasp the complexities of different languages, including regional and cultural differences. This innovative technology holds the potential to enhance accessibility and foster greater inclusion for the deaf community, improve relationships and social participation. Through communication connectivity, this AI-powered interpreter can help deaf people participate in society and contribute to a more inclusive world.

CU Shop: Enabling Seamless Access to LocalGoods for Chandigarh University Students through an Integrated E-Commerce Application

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Abstract: This research project presents "CU Shop," a sophisticated and locally tailored e-commerce application, in response to the changing demands of the Chandigarh University (CU) student population. CU Shop uses PHP,MySql, CSS, and Android Development to enable students to have a customized online buying experience while improvingaccessibility to local items. The main aim of CU Shop is to optimize the process of identifying and acquiring goods that are nearby CU, so augmenting the convenience and welfare of the student body. The programme has an intuitive interface that is intended to promote effective navigation, guaranteeingthat students can easily peruse and choose from a wide varietyof options. CU Shop's extensive product offering, which includes a broad range of items pertinent to CU students' everyday lives and tastes, is one of its most notable aspects. By developing a feeling of community participation and supporting local companies, this localized emphasis seeks to close the gap between students and adjacent business. Beyond its technological capabilities, CU Shop is significant because it has the ability to completely change the way CU students shop. In addition to enhancing convenience, CU Shop helps the local economy flourish by giving local companies access toa centralized platform and a smooth delivery system. This document describes CU Shop's development process, illuminating the approaches used and the difficulties encountered.

Enhanced Driver Safety with Support Vector Machine Drowsiness Detection Techniques

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Abstract: In response to the escalating threat of road accidents caused by driver drowsiness, this project introduces a multifaceted solution leveraging image processing techniques. With an alarming rise in road fatalities, particularly in densely populated regions, our study underscores the critical need for an automated drowsiness detection system that surpasses existing methodologies regarding efficiency, accuracy, cost-effectiveness, and responsiveness. The eyes tracking and yawning detection, which are accomplished by Sobel edge detection and K means clustering, are integrated into the suggested technique. Our approach exhibits superior performance by employing advanced driver movement tracking systems and spatio-temporal interest points. To categorize the subsequent frames into tiredness and non-fatigue states and sound an alert for the former, the feature vectors from each of the previous findings are concatenated and fed into a binary linear support vector machine classifier. The outcomes affirm the efficacy of our system in accurately predicting driver drowsiness under varying circumstances, offering a substantial contribution to road safety. The proposed system can be implemented in real-time applications. This system performed well throughout testing in a variety of circumstances. Our accuracy in identifying sleepiness in drivers is 92.91%.

Automated Detection and Classification of Rice Diseases Using Deep Learning

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Abstract: The role of rice income to feed the vast population of India through the farming cannot be passionately downplayed. However, challenges such as diseases: Bacterial Leaf Blight, Brown Spot, and, Smut affect rice production. There is the need to come up with automated systems because of the enormous time required to check for the diseases manually. In this study, the disease detection and classification using machine learning approaches of these prevalent rice diseases has been addressed by developing a Deep Learning model. The dataset consists of 119 images encompassing the three disease classes: These are Bacterial Leaf Blight, Brown Spot, and Leaf Smut. In an attempt to understand the distribution and the nature of the images, we performed exploratory data analysis. After that, to design the classification model, we used Convolutional Neural Network (CNN) architecture. Here, we present the proposed model architecture: Basic Functional Components Convolutional layers and pooling layers Dense layers Classification Convolutional layers take spatial features of images, and pooling layers down sample them. There are numerous procedures that we used in the current study to augment the model's ability to classify unseen data efficiently including image augmentation. This model has been built and tested on the partitioned training, validation and test dataset. From the experiments, the performance of the proposed approach achieves high accurate classification of rice diseases with a focus on high accuracy, and low loss. The study therefore helps to establish automated early diagnosing and maturity of rice diseases which would assist in protection of possible yield and food security in the country.

Securing Tomorrow's Communication: Quantum Cryptography as a Key Enabler

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Abstract: Information and computation of quantum processing significant attention has been attracted in the field of computer science because of the potential that they have in order to revolutionize the field by accelerating computations for specific algorithms. Given the potential of powerful quantum computers to become more prevalent, the development of fresh cryptographic techniques which are protected from attacks by quantum. Adopting quantum cryptography represents a strategic move towards achieving unparalleled levels of security in communication. The unbreakable security offered by this technology can safeguard sensitive information that is critical to these sectors. Quantum cryptography revolutionizes communication security through the principles of quantum mechanics. Particularly, quantum entanglement enables secure communication over long distances, which is challenging for classical methods. This paper comes up with a run-through of the theory of the cryptography regarding quantum, highlighting their potential relevance and the ways in which it benefits the castle approach for complete source key distribution. This paper emphasizes on the demonstration of the upcoming improvement of quantum cryptography, along with its components, key dispensation protocols, and networks in quantum.

Machine Learning Models for Crop Management and Disease Detection

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Abstract: Machine learning (ML) algorithms, coupled with the collection of big data, are revolutionizing our understanding of interactions between agroecosystems. Predictive modelling, image analysis, and decision support systems are all component of crop treatments. Among its various applications in the agriculture sector, machine learning, a subset of data science, is instrumental in farming management and the detection of plant diseases. Thanks to the continuous input from a range of sensors, satellites or weather stations, structured and unstructured datasets allow farmers to efficiently gather insights into their crops, soil, and environment. The most important aspect of using machine learning models in agricultural management is the optimization of resource allocation and yield forecasting for crops. Receiving, soil moisture, nutrients, and meteorological variables are monitored in order to provide insights for irrigation and treatment practice. Farmers can achieve maximum productivity and reduce waste with the help of machine learning models. Generally, machine learning algorithms require large volumes of high-quality data to support crop management. Tagged data collection for training machine learning models is expensive and time-consuming. Two approaches to efficiently collecting and labelling agricultural data are crowdsourcing and automatic data organization systems. Machine learning models can be used to accurately and quickly detect crop diseases as well. Machine learning models can identify patterns of diseases in images of crops. Through the minute inspection of the photographs, the monitoring systems can identify the diseases and spread of them with extreme speed, spurring the system to detect and prevent their spread. Moreover, machine learning systems enable farmers to avoid the use of expensive, hazardous chemical substances. As useful as crop management and disease detection machine learning systems have shown potential, they remain in numerous transformational stages. For instance, data quality and quantity, model interpretability, generalization across diverse settings, scalability, discussions on ethics and privacy, technology incorporation and more remain difficulties worth investigating. As a result, it will be critical for researchers, farmers, lawmakers and stakeholders in the agro-ecosystem to collaborate in order to come up with a host of viable and sustainable solutions.

HARNESSING ESP32 FOR INTELLIGENT HOME AUTOMATION

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Abstract: The ESP32 microcontroller was used in the development of the home automation system. To improve user comfort, energy efficiency, and home security, the system incorporates a variety of IoT devices. The system makes use of the ESP32's dual-core design to analyze data in real time and facilitate connectivity via Bluetooth and Wi-Fi protocols. Automated lighting, temperature, humidity, and air quality sensors, as well as remote management of home appliances, are some of the key features. With the help of a mobile application, users may remotely modify settings, control devices, and receive alerts—all thanks to the user interface's accessibility features. By identifying trends in user behavior, machine learning techniques are implemented to further optimize energy usage. Furthermore, user data confidentiality is guaranteed by security measures including encrypted communication. The system shows significant enhancements in user comfort and energy savings through real-world testing. The findings open the door for further advancements in automation technology by highlighting the potential of ESP32-based solutions in the expanding field of smart homes. This project helps to spread the use of IoT in daily life by acting as a prototype for scalable and customized home automation systems.

REAL-TIME EVALUATION OF RELATIVE POSITIONING WITH GPS-ONLY, NAVIC-ONLY AND COMBINATION OF GPS AND NAVIC MEASUREMENTS IN A ZERO-BASELINE CONFIGURATION

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Abstract: This paper explores the estimation and assessment of relative positioning accuracy using carrier phase measurements from GPS, NavIC, and an integrated GPS/NavIC setup. A zero-baseline approach is utilized to conduct both single-constellation processing and combined GPS/NavIC processing. By applying the double-difference method, significant reduction of tropospheric and ionospheric delays is achieved, although multipath signals persist as a main source of error in various GNSS baseline applications. In the zero-baseline setup, a splitter links two GPS/NavIC receivers to a single antenna, effectively cancelling out all errors and delays except for the random noise associated with double-difference processing. Analysis of baseline error time series reveals that both GPS and NavIC systems can reach centimeter-level accuracy, with GPS showing better performance than NavIC. Additionally, a comparison of combined GPS/NavIC processing to individual GPS and NavIC systems indicates that integration substantially improves positioning precision.

Joint Symbol Spreading and Exponential Transform for PAPR Reduction in OTFS Signals

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Abstract: This paper proposes a joint symbol spreading and normalized exponential transform to study the peak-to-average power ratio (PAPR) reduction performance of a new two-dimensional orthogonal time frequency space (OTFS) modulation. The symbol spreading operation spreads each symbol's information onto all other symbols, thereby reducing the PAPR.To further reduce the PAPR, we employ a normalized exponential transform in the time domain, which reduces the PAPR through the compression and expansion of large and small amplitudes of the time-domain signal. Simulation results are conducted to evaluate both PAPR and bit error rate (BER) performances of the proposed technique. The results are also compared with existing methods, including the normalized A-law, normalized exponential companding transform, and symbol interferometry. The results indicate that the proposed technique significantly reduces PAPR.

Heart Rate Monitoring with Electrocardiogram Visualization through IOT

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ABSTRACT - The Heart Rate Monitoring System utilizes IOT technology to continuously monitor cardiac health by detecting and tracing a patient's heartbeat in real time. This system integrates an ECG module like AD8232, Bluetooth communication, and an Android application for easy remote monitoring within the range of 15 to 20 meters. In the setup, there are also the heart rate sensor, Arduino UNO microcontroller, a Bluetooth module, and the application. The sensor captures the pulse of the patient when their finger is applied to it; it wirelessly sends information to a computer or Android device. Data is continuously monitored and presented in the application, providing an easily used interface for patients and healthcare professionals alike. The system provides an effective response to health monitoring when doctors cannot make visitations in person, including during pandemics. This project further emphasizes the scope of IoT in healthcare as it may help detect irregular heartbeats in time, coupled with proper management of cardiac health.

Intelligent Monitoring of Underground Cable Faults: An IoT-GPS-GSM Solution for Urban Infrastructure

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ABSTRACT: Underground cable faults cause extreme hazards to human life through electrical fires or explosions and lead to energy loss through power outages. These disturbances affect not only homes and businesses but also include financial losses for utility companies. Underground cabling is becoming more popular day by day in urban areas, so faults will need to be detected and fixed, but the location of the fault has to be known while it is generally difficult. In response to these problems, we therefore suggest a modern solution. In the current project, the intelligent approach involves IoT, GSM, and GPS technologies. Arduino UNO is used as the core technology with a Google database for real-time identification of faults. Each microcontroller unit is connected to a transformer through a communication hotspot that can monitor in real-time from the database. It is more precise and efficient as compared with the traditional methods.

Comparative Performance Analysis of Machine Learning Algorithms for Detecting Specific Pollutants in Air

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Abstract: Air Pollution refers to the contamination of atmosphere by the harmful substances like CO2, SO2, NO2, particulate matter etc. The main cause of Air Pollution is due to the smoke emission from automobiles, industrial emissions, and burning of fossil fuels. It has hazardous effects on health of humans and other living beings, leading to cardiovascular diseases, respiratory issues, and other serious health problems. To address these, certain technologies such as Machine Learning (ML) models, and Internet of Things (IoT) are being used. This project mainly focuses on developing a portable Air Quality prediction system using ML models, IoT, Arduino microcontroller and various sensors that measures different pollutants that are mentioned above. The sensors continuously monitor the air quality and the presence of various pollutants and feed the data into the ML models like Random Forest and Linear Regression to analyse the pollutant levels. The aim of developing this portable Air Quality predictor is to provide a efficient, flexible, economical and real – time Air quality management solutions. Machine Learning models helps in analysing the large datasets to provide accurate predictions. Integrating IoT and ML makes the prediction system more effective for monitoring the pollutants and addressing various challenges**.**

Smart Farming with an Intelligent Pesticide and Fertilizer Recommendation System Based on TPF-CNN

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Abstract: These days, sensor technology and artificial intelligence are essential to the agricultural industry. Human health is at danger when excessive amounts of fertilizer and pesticides are used in farming. They must be managed in order to guarantee a healthy crop yield. Numerous methods are employed to determine the pest's identity, recommend treatments, and conduct independent soil nutrient analyses. This study processes the pest's image both continuously and discretely in order to apply the suggested insecticide. It does this by using the dual operators, Transition Probability Function (TPF) and Convolution Neural Network (CNN). This study derives the mathematical model with the objective function. The suggested solution uses CNN and machine vision to combine two important aspects of farming: pest identification and insecticide recommendation. Second, a soil NPK is used in the soil nutrient analysis.

Comparative Analysis of Machine Learning Algorithm's Performance for Food Adulteration Detection for Dairy Products

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Abstract: Design food adulteration detection system based on artificial intelligence, machine learning, and IoT technologies that would ensure the legality of milk, ghee, and other edible items. The sensors and other IoT-based devices collect different physical and chemical attributes as like pH, temperature, moisture, spectral signatures, etc. The main focus of machine learning algorithms is to analyze these data inputs for the identification of patterns and anomalies in the decision-making process of adulteration. Techniques like near-infrared spectroscopy and E-Nose technology allow for the recognition of very subtle alternatives in the molecular composition of final product. This system also comes with AI-driven models, like CNNs and SVMs, for sample classification into legal and adulterated classes with high accuracy. Thus, it guarantees real-time alerts, traceability, and automated reporting, allowing corrective suitable action against contamination. This will give a solution that ensures consumer safety, avoids economic losses, and guarantees a safe food supply chain.

AI-POWERED SUICIDAL IDEATION DETECTION FROM SOCIAL MEDIA CONTENT :A COMPARATIVE MODEL ANALYSIS

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Abstract: The exponential growth of social media platforms has given rise to novel prospects and obstacles in the field of mental health surveillance, namely in the identification of tendencies toward suicide. Considering the magnitude of social media material and its possible influence on public health, Artificial Intelligence (AI) has become an effective instrument for examining and identifying first indications of suicide ideation using textual data, photos, and other forms of content. This work presents a comparative appraisal of several artificial intelligence (AI) detection methods used to identify suicidal thoughts from social media material. A comparative analysis is conducted to evaluate and assess the performance metrics of predictive classifiers against contemporary deep learning techniques. These metrics include accuracy, precision, recall, and F1-score. Our results indicate that whereas deep learning models, such as Recurrent Neural Networks (RNNs) and transformer-based designs like BERT, attain a high level of accuracy in detecting signals, conventional machine learning approaches provide benefits in terms of interpretability and resource efficiency. Furthermore, we underscore the ethical implications and difficulties of implementing such models in practical scenarios, highlighting the importance of adopting responsible AI methodologies.

EVALUATING REAL-TIME OBJECT DETECTION PERFORMANCE ON MIXED FRAMES AND VIDEOS USING YOLOv8 WITH DEEP LEARNING

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Abstract: In the growing field of image processing, object identification corresponds to identifying, detecting, and naming objects in particular pictures and videos. More particularly in real-world applications like driverless cars, surveillance, etc., factors like precision, speed, and the ability to locate objects of small size in the frame are indispensable. YOLO (You only look once) is one such algorithm that is renowned for its accuracy and speed. In this research, an expanded version for real-time object detection utilizing Yolov8, the most recent edition of the Yolo algorithm, is presented. Its backbone architecture, which caters for faster and more accurate feature extraction, anchor free detection, which does away with the need for complex anchor tuning, and improved neck architecture with FPN&PAN network, which is in charge of accurately detecting both small and large objects, are some of the key features that set it apart from previous Yolo versions. We gave a thorough explanation of the new Yolov8 algorithm architecture because the official publication has not yet been published in accordance to our experimental findings, our finished model performed tremendously well at figuring out small objects without jeopardizing accuracy or speed.,

Engineering Molecular Solutions for ImmuneDysregulation: A Systematic Literature Review

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Abstract: Autoimmune diseases are marked by the immune system's aberrant attack on the body's own tissues, leading to chronic inflammation and tissue damage. Traditional treatments often fall short due to their lack of specificity. This project focuses on designing innovative drugs by understanding the distinct molecular alterations in autoimmune disease patients. By analyzing changes in DNA, RNA, and proteins, we aim to create targeted therapeutic agents that address the root causes of autoimmunity. The approach involves engineering drugs with precise molecular structures to modulate immune responses effectively. This project seeks to enhance treatment efficacy and precision, potentially offering new avenues for managing and curing autoimmune disorders. Our goal is to bridge the gap between molecular insights and therapeutic development, paving the way for advanced, personalized treatments that target the specific molecular dysfunctions in autoimmune conditions.

Design and Implementation of Gradient-Based Optimization Technique for VCO in 90nm Technology

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Abstract: In this work, an innovative ring oscillator with a charge pump as a standard cell was demonstrated. An innovative oscillator with a five-stage ring oscillator with two alternative stages replaced by charge pump, which we presented, leads to a decline in phase noise and average power consumption of the oscillator under statistical process variations. The circuit was designed and implemented on Cadence virtuoso tool in 90nm Technology. The Power Consumption of the Designed VCO is 3.26mW and the delay of the oscillator is 48.7nsec. The Designed Charge pump consumes the power of 637.2mWatts of power. The charge pump designed is a power gated charge pump so that it can generate high voltage from a lower voltage source. One of the critical factors affecting the performance of ring VCOs is noise and power consumption. Ring VCOs are particularly popular within IC designs due to their simple construction and wide tuning range and low noise, which, however, makes it difficult to derive a design that provides low phase noise with low power consumption. The first stage begins with a theoretical framework and definitions of design parameters needed for the VCO design. The design procedure involves the schematic, layout, and simulation of the defined performance metrics. Significant challenges include the design of the trade-off between tuning range and phase noise, which is resolved through circuit novelties and proper transistor dimensions and bias points.

Evaluating the Impact of Machine Learning on Employment Rates and Economic Growth – A Review

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Abstract. Increase CSR investments in livelihood projects and enhance funding for education and skill development to improve literacy rates and reduce unemployment. The goal is to identify areas for improvement across all aspects of program design and implementation using machine learning, while also providing an assessment framework to effectively capture impacts. Economic growth driven by the services sector depends on a well-developed labor market that supports the mobility of workers and ensures fair wage setting. In the absence of these systems, the services industry could become inflexible, stalling growth and adversely impacting the working class. This essay explores key elements of India's current job market in relation to the expanding importance of the services sector, with an emphasis on the influence of technology. By employing machine learning, the visual representation effectively highlights states that require more intensive literacy programs, offering a data-driven foundation for resource allocation in national policies (GDP).

Real-time Embedded Systems and Advanced Machine Learning Analysis for Soldier security

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Abstract: In modern military operations, safeguarding soldier health and enabling real-time situational awareness are essential to mission success and national security. This paper presents an IoT-enabled system that integrates Wireless Body Area Sensor Networks (WBASN), wireless communication modules, and machine learning algorithms for real-time health monitoring. The system tracks vital signs, such as heart rate and body temperature, and environmental factors like ambient temperature, humidity, and air quality. Data is transmitted over low-power, long-range networks, ensuring reliable communication even in remote or hostile areas with limited cellular connectivity.

A key innovation of this system lies in its comparative evaluation of machine learning algorithms like K-Means Clustering, Random Forest, and Decision Tree to interpret health and environmental data, enabling early detection of critical conditions and timely interventions. Leveraging ThingSpeak for data collection and visualization allows the system to process and analyze real-time data efficiently. A comparative analysis is performed with machine learning algorithms and results show that Random Forest is best suitable algorithm for adaptive solution for soldier safety and battlefield readiness.

A Review of Impact of Using Different Activation Functions in Artificial Neural Networks for Multiscript Vehicle Number Plate Recognition

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Abstract: A crucial aspect of an intelligent transportation system is the multiscript vehicle number plate recognition to help automatically identify vehicles and to handle traffic. Improving the accuracy and efficiency of VNPR systems requires the incorporation of ANNs. One important parameter is the selection of the activation functions used in the hidden layers of the ANNs that affects the performance of ANNs. This review paper systematically examines the influence of different activation functions on the performance of ANNs in multiscript VNPR tasks. The paper reviews recent studies and experimental results on how different activation functions affect accuracy, convergence speed, robustness to diverse scripts, and computational efficiency. The findings prove very helpful for the researchers and practitioners in making suitable choices of activation functions to optimise VNPR systems and especially in environments requiring support for more than one script and language.

Cloud based Integrated air and water qaulity monitoring system

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Abstract: An in-depth examination of an Integrated Air and Water Quality Monitoring System (IAWQMS), created to handle the environmental issues brought on by industrial operations, is presented in this paper. The system combines cutting-edge sensor technologies to continuously monitor air pollutants and water contaminants in industrial settings, with an emphasis on real-time monitoring and data analytics. In order to ensure regulatory compliance and promote an environmentally conscious culture, the goal is to empower industries to proactively identify, assess, and mitigate environmental hazards. The suggested system improves public health and protects ecosystems in addition to enhancing industrial sustainability. The article highlights the IAWQMS's function in encouraging environmentally friendly industrial practices while discussing the system's creation, application, and possible advantages.

A REVIEW ON OCT-BASED RETINAL FLUID SEGMENTATION USING DEEP LEARNING TECHNIQUES

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Abstract: Numerous conditions affecting the retina can be associated with the accumulation of fluids within the retina, which can threaten vision. A non-invasive technique known as optical coherence tomography (OCT) enables acquisition of high resolution cross-section views of the retina, thus allowing easier assessment for the presence of degenerative changes in the retina. However, it takes a lot of effort and specialized knowledge to analyze the OCT images in a manual way. In this study, we employ OCT images for the detection and segmentation of retinal cysts whilst previous studies have largely focused on the automated analysis of fundus images. Transfer learning approaches using OCT images of the retina provide considerable hope for earlier and better management of treatment for diseases of the retina by identifying and segmenting retinal cysts of patients.

The conditions causing retinal cysts are pivotal due to their direct influence on vision preservation and the person's quality of life. Many such conditions are capable of causing complete blindness if not managed properly hence the need for quick and appropriate intervention. Moreover, as retinal cysts usually are associated with systemic conditions such as diabetes or hypertension, treating them does not only relieve eye symptoms but also invites more inclusive treatment of the patient and enhances health care delivery. Proper treatment will also help cut down the health care expenditures incurred as there will be no need of carrying out more serious and expensive procedures.

An Explanatory Study of Geo-location Information for Accommodation

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Abstract: Through an explanatory analysis using the K-means clustering method, this research effort aims to clarify key insights into human behavior by examining the abundance of chances presented by the growth of geo-location data. With the help of relevant contextual data and a variety of geo-location data sources, including GPS traces, check-ins, and geotagged social media posts, the study aims to reveal hidden spatial patterns and distinguish unique groupings within the data. In order to uncover groups with similar location-based traits and gain a better grasp of the dataset's underlying structure, the research will divide the data into clusters based on spatial proximity

DYNAMIC NOISE SCALE ADJUSTMENT IN PRIVACY-PRESERVING FEDERATED LEARNING USING THE GAUSSIAN MECHANISM FOR ENHANCED PRIVACY-UTILITY TRADE-OFF

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Abstract: Privacy-preserving federated learning (PPFL) is a type of federated learning that lets clients train the models collaboratively without sharing sensitive data but ensuring privacy through traditional differential privacy methods, such as the Gaussian mechanism, can be quite challenging. Generally, differential privacy methods use fixed noise scale, which is either too much to affect model accuracy or too little to maintain the privacy of the participants. To conquer this, introduce a Dynamic Noise Scale Adjustment (DNSA) mechanism, which is based on each client's local training loss, aligning privacy needs with the sensitivity of each update. This adaptive approach allows for minimal noise on lower-sensitivity updates to preserve accuracy, while higher-sensitivity updates gain added privacy. The method has been tested on the MNIST dataset and the results prove that DNSA performs best on the MNIST dataset compared to static noise methods, balances the trade-off between privacy and utility, and offers a scalable solution for large federated networks.

A Particle Swarm Optimization based Secure Routing using MQQ Algorithm in Wireless Sensor Networks

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Abstract: The wirelessly connected sensors struggle to keep their batteries charged and safely transmit data from the transmitter to the receiving end. As a result, the sensor nodes' lifetime is reduced and their competence is shown to be very low. Likelihood of data's loss during data transmission is likewise significant. So, this paper focuses on techniques used to reduce sensor node energy consumption, transport data securely from the sender to the receiver, efficient boost. In the proposed method, Low Energy Adaptive Clustering Hierarchy (LEACH), Bio-inspired Particle Swarm Optimization (PSO), and Multivariate Quadratic Quasigroup (MQQ) are combined to choose the cluster head (CH) in a wireless sensor networks(WSN) and to provide security with less energy consumption.

Enhanced Lung Cancer Detection using Random Forest and XGBoost and Hybrid Model

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Abstract: The machine learning techniques Random Forest and XGBoost are used in this research to provide an improved method for lung cancer identification. In order to increase diagnostic accuracy, the study investigates how well ensemble learning works. Training and testing the models is done using a data set that contains features related to lung cancer diagnosis. By obtaining excellent accuracy and sensitivity in lung cancer detection, the results show how well the ensemble model performs when compared to individual methods. Based on the results, it appears that combining Random Forest and XGBoost can improve lung cancer detection systems' effectiveness and possibly lead to better patient outcomes by detecting the disease early.

A Novel Quad-Valued Logic Cell for Multibit Storage Efficiency and Density Using QLC Advanced Flash memory Technology

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Abstract: The semiconductor market has shown continuous growth over the years, with NOR Flash and NAND Flash being the industry standard for code and data storage segments, respectively. Flash memories have gained significant popularity due to their speed and efficiency in code and data storage. This work, present new approach to further enhance flash memory technologies by utilizing a Quad-Valued Logic Cell (QLC) for multibit storage. When comparing to the existing method, the proposed QLC design increases accuracy and reduces interconnects by representing information in fewer bits, leading to improved memory efficiency and density. We evaluated the functional behavior of the QLC using Mentor graphics software and observed that the implementation of quaternary logic reduces propagation delay, making it suitable for high-speed applications. The performance of the QLC is evaluated using various performance metrics, such as propagation delay, power dissipation, and silicon area utilization. These metrics are assessed to determine the efficiency and effectiveness of the QLC design in comparison to existing methods. The evaluation results provide insights into the potential benefits of using the QLC for advanced flash memory technologies. Furthermore, the MVL logic-based circuits in the QLC design require fewer transistors, resulting in low power dissipation and efficient use of silicon area. This approach overcomes the limitations of conventional flash memories, where power constraints have become a bottleneck for further design advancements. Our proposed QLC design offers a promising solution to enhance flash memory technologies, enabling advanced applications with improved performance and reduced costs.

DOPPLER COLLISION PREDICTION USING ML TECHNIQUES FOR NAVIC SYSTEM

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Abstract: Satellite navigation is a system that delivers real-time positioning and timing services. There are many navigation systems of which NaVIC is an Indian Satellite navigation system. The services cover the entire landmass of India. Navigation with the Indian Constellation (NavIC) comprises seven satellites, these include 3 Geo-stationary (GEO) and 4 Geosynchronous satellites. Doppler collision is a phenomenon that hinders the performance of geostationary satellites. This study analyzes the applications of machine learning (ML) algorithms and their deployment to web interfaces to predict Doppler collision events. Doppler collision (DC) refers to the potential interference caused by the Relative Doppler effect, which can occur when the line of sight velocities are small. This condition can be commonly noticed in GEO satellites. DC occurs when the relative Doppler frequency of satellites is less than the code tracking loop bandwidth. It occurs between geostationary satellite combinations IRNSS 1C-1G, 1C-1F, and 1F-1G [2]. The duration of DC events for the IRNSS Geostationary satellite pairs 1C-1F was calculated. This paper investigates the ML algorithms and their metrics for the 1C-1F pair. Exploratory Data Analysis (EDA) and Feature Engineering were performed to process the data acquired from the IRNSS-GPS-SBAS (IGS) receiver. Various supervised Machine learning algorithms were applied to the processed data. The best model with the best predictions was then deployed onto a Python-based web interface built using Flask.

A NOVEL CNN ARCHITECTURE FOR COVID-19 PREDICTION USING CHEST X-RAY IMAGING

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Abstract: The global community is presently undergoing a pandemic, specifically the COVID-19 pandemic, which has emerged as a corollary of the identification of a novel coronavirus diseasein Wuhan, China in 2019. Consequently, a considerable number of over 200 countries and dependent territories have witnessed an approximate total of 768 million infections, leading to a significant loss of 69.5 million lives. As a result, the global economy, daily life, and individuals' health will experience adverse consequences. Hence, the timely detection of COVID-19 isimperative to mitigate its transmission among individuals and reduce the associated fatality rate. The efficiency and timeliness of COVID-19 case detection can be enhanced through the utilizationof computer-aided diagnosis (CAD) techniques in medical imaging, particularly using chest X-rays. This is owing to the advantageous characteristic of low radiation exposure offered by CAD, as compared to computed tomography (CT) methods. The present study involves the development of an automated diagnostic methodology utilizing a convolutional neural network (CNN) to forecast the presence of COVID-19. Our contribution is comprised of three key elements: Initially, the X-ray images undergo data pre-processing techniques, such as image resizing, to adequately prepare them for further analysis. Subsequently,a CNN model is utilized to generate predictions using the aforementioned pre-processed images, striking a balance between the intricacy of the model and computational efficiency. Finally, the efficiency of the model is assessed by employing established evaluation metrics and comparing with state-of-the-art methodologies.

A Review on Signature Verification Techniques

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Abstract: Signature verification remains an essential technique in identity authentication, contributing t secure transactions and fraud prevention. This survey examines a range of established methodologi developed for offline and online signature verification, including statistical models, machine learnir classifiers, and neural network architectures. Traditional approaches such as Dynamic Time Warping (DTW and Depth sensors and 3D Hand pose detection have been widely used for their ability to capture tempor and spatial variations in signature patterns. In recent years, Support Vector Machines (SVM), K-Neare Neighbours (KNN), and ensemble learning techniques have gained traction due to their adaptability t complex signature datasets and robustness against forgery attempts. Furthermore, deep learning approache particularly Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs), have show significant promise by automatically learning distinctive signature features. This survey reviews the methodologies, comparing their strengths and limitations in handling signature variability and discussing tl challenges and potential future directions for advancing signature verification technology. The findin emphasize the importance of balancing accuracy with computational efficiency to ensure practic applications in security-sensitive environments.

DESIGN OF A SLOTTED CIRCULAR-SHAPED 2 X 2 MIMO PATCH ANTENNAE FOR 5G COMMUNICATION

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Abstract: A slotted circular-shaped radiating patch 2×2 Multiple Input and Multiple Output (MIMO) antenna system designed for 5G applications is discussed in this paper. Two identical radiating structures are placed opposite to each other to have enhanced isolation between antenna elements. The antenna has been designed on a 0.8 mm thickness dielectric material FR4 substrate with an overall dimension of 60 x 60 mm^2. The radiating frequency of the designed antenna is between 3.2 GHz and 3.9 GHz. The parametric analysis is done between the full ground and the partial ground. The step design analysis is enacted to have the imperative reflection and isolation characteristics. The envelope correlation coefficient for the suggested slotted circular-shaped patch antenna results below 0.01. The diversity gain results are approximately 10 dB. This antenna design results in reduced isolation with higher bandwidth performance.

SURVEY: APPLICATIONS OF QUADCOPTER DRONE IN HEALTHCARE

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Abstract: Natural disasters will leave the crucial availability of healthcare abruptly hampered due to damage in infrastructure, blockage of roads due to debris and rubble, and impassibility in remote areas. Given this scenario, this paper attempts to explore the possibility of quadcopter drones as a new means of delivering essential medicines during disasters. Adopting the latest technological developments made so far on drones, quadcopters have surfaced as a speed, cost-effective, and reliable mode of delivering medicinal drugs to almost the most hostile regions or unfavorable environments. This paper undertakes a general review of the important technical aspects: payload capacity, range, battery efficiency, among other control aspects for the safe deployment of drones in emergency cases. The other discussions include regulatory, logistical, and ethical aspects of integrating drones into disaster response frameworks. This paper synthesizes the existing research and practical perspectives to assess whether, indeed, drones are a revolutionary instrument to make logistics in disaster medicine and emergency response feasible.

A Survey of Methods for Telugu Speech-to-Indian Sign Language Conversion Using NLP

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Abstract: Effective communication is one of the primary ways to foster human relationships, but people in India who are hearing and speech-impaired face enormous challenges, especially in communicating with people who are not familiar with the sign language. Their native form of communication is the ISL, but the absence of sign language in- terpreters for local languages like Telugu shuts the doors of education, healthcare, and public service for them.This paper would delve into current evolutions of translitera- tion from Telugu into ISL, with special interest in Natural Language Processing (NLP),Long Short-Term Memory (LSTM) networks, Convolutional Neural Networks (CNNs), and Rule-Based Machine Translation (RBMT). The models are great at capturing ges-tures, handling sequential flow, and allowing modifications in Telugu grammar to fit ISL, thereby yielding a much more fluid translation experience. We delve deeper into the 3D avatar animations and transformer models that upgrade users' interaction po- tential by providing more vibrant visual clarity and engagement.Nevertheless, most of the current researches and models mainly aim at translating English into ISL and justa few on Telugu, based on limited datasets. This literature review stresses that thereis a strong need to improve and much larger well-annotated datasets for Telugu and more efficient processing models. Presenting pros and cons of existing approaches withthis paper and making way forward for better effective Telugu-to-ISL translation sys-tems would allow access to communication facilities among deaf and hard-of-hearing Telugu-speaking people.

Enhancing Sentiment Analysis in Multilingual Movie Reviews: A Study of KNN with and without SVD

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Abstract: With the rapid growth in global digital platforms, sentiment analysis is very important to capture audience opinions across diverse languages and cultures. Different linguistic structures pose a challenge for varied multilingual movie reviews, making them challenging for sentiment analysis. This work enhances the accuracy of sentiment classification by testing the K-Nearest Neighbors algorithm with and without SVD dimensionality reduction. This research makes use of word embeddings in order to better capture nuances in multilingual datasets. Thorough metrics for performance were accuracy, precision, recall, and F1-score. Results show that the application of SVD enhances the classification performance of KNN as well as its computing efficiency. This research becomes a valuable contribution toward enhancing KNN in multilingual sentiment analysis, adding importantly and enhancing both natural language processing and applications across linguistics.

Generative Medical Visual Question Answering System for Radiology Images

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Abstract: Medical Visual Question Answering (Med-VQA) systems are transformative tools in radiology, providing clinicians with precise, context-aware responses to complex image-based queries. This review explores the existing Med-VQA methodologies, approaches and the potential of advanced generative models, specifically CLIP for image feature extraction and BART for domain specific language generation. Emphasis is placed on advanced techniques like cross-attention, adaptive question conditioning, and Grad-CAM, which improve response relevance, interpretability, and diagnostic accuracy. Based on our analysis, we propose a multi-modal Med-VQA framework that effectively aligns visual and textual modalities through question-type conditioning, allowing adaptive response strategies for different question formats. Extensive training and adversarial techniques are proposed to enhance model robustness and real time clinical usability, addressing limitations in existing Med-VQA systems. By integrating interpretability features like Grad-CAM, this methodology supports reliable healthcare applications and lays a strong foundation for further advancements in Med-VQA for radiology images.

SECURED EMERGENCY HEALTHCARE MONITORING SYSTEM USING LI-FI

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Abstract: Health care is one such area where Wi-Fi is still not widely used due to electromagnetic waves that can affect patients with conditions like neurological disorders and cancers. Hospitals traditionally rely on Bluetooth and Wi-Fi for patient health monitoring. Bluetooth can be limited by range and data transfer rates, while Wi-Fi poses concerns over electromagnetic interference and potential security vulnerabilities. Li-Fi, using visible light for communication, offers faster data transmission, higher security, and eliminates electromagnetic interference, making it a superior alternative for safe and efficient patient monitoring.
We are going to improve the existing work patient health monitoring system developed by using Li-Fi over Wi-Fi is mandated the confidentiality and privacy of critical mission information of the system and sensitive patient data. For the purpose of adding confidentiality to the data, the model in this paper deploys RSA and AES algorithms for providing strong security. RSA is used as an asymmetric encryption method with two keys and makes it easier protect against unauthorized access and provides strong symmetric encryption. The integration of RSA and utilizing AES in the Li-Fi framework proves to be a secure and efficient solution, helping transfer data flow securely and quality of Health Care Surveillance Systems Using Arduino IDE

A Comprehensive Bidirectional LSTM Framework for precise Malware Detection andIdentification

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ABSTRACT—IN IOT, LARGE-SCALE CYBER ATTACKS ARE PROLIFERATED THROUGH MALWARE-COMPROMISED DEVICES. THUS, SAFEGUARDING SUCH SYSTEMS AND MAKING EFFECTIVE PLANS TO CUR MALWARE GROWTH IN THE IOT IS CRITICAL FOR THE INTERNET. IN THIS WORK, THE DL APPROACH BASED ON AN LSTM MODEL HAS BEEN CONSIDERED FOR FAST AND EFFICIENT DETECTION AND CLASSIFICATION OF MALWARE. THE MODEL IS TRAINED ON A LARGE DATASET ACROSS VARIOUS IOT DEVICES AND SUBSEQUENTLY ANALYZES THE TRAFFIC FLOW TO DISTINGUISH BENIGN AND MALICIOUS ACTIVITY. THIS MAKES IT POSSIBLE TO EXTRACT KEY FEATURES FROM TRAFFIC FLOW, FLAGS, AND PAYLOAD IN PACKETS AND THUS EFFECTIVELY IDENTIFIES MALWARES SOPHISTICATED ENOUGH, THUS PROVIDING STRONG PROTECTION. TO BETTER ENHANCE MALWARE DETECTION, THIS PROJECT INCORPORATES CNNS TO EXTRACT FEATURES AND ASSOCIATE THEM WITH BIDIRECTIONAL LSTM FOR THE ANALYSIS OF TIME-SERIES SITUATIONS SO THAT THE SYSTEM WOULD EFFECTIVELY TRACK BOTH SPATIAL AND TEMPORAL MALWARE PATTERNS. THIS CNN-BASED ARCHITECTURE MAKES USE OF MULTIPLE CONVOLUTIONAL LAYERS WITH POOLING AND FULLY CONNECTED LAYERS. IT RELIES ON LABELED MALWARE AND BENIGN SAMPLES TO ENHANCE THE ACCURACY OF THE DATASET CLASSIFICATIONS. AS SUCH, THIS HYBRID MODEL IS CAPABLE OF PRODUCING A MUCH MORE ADAPTABLE AS WELL AS ACCURATE RESULT, AND THUS MAY BE USED AS A RELIABLE SOLUTION FOR MALWARE DETECTION AND PREVENTION.

A Review on Air Quality Prediction using Graph Neural Networks

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Abstract
Predicting air quality is essential for urban environmental management and public health, especially in cities wi complex pollution dynamics. While traditional models, such as autoregressive integrated moving average (ARIMA along with machine learning techniques and random forests (RF), are commonly used but they often struggle to captu the intricate spatial and time-based dependencies in air quality data. This review examines various air quality forecastir methods, including both conventional approaches and modern techniques, with a particular focus on Madrid as a ca study. The potential study of advanced models, such as Graph Neural Networks (GNNs), Long Short-Term Memo (LSTM) networks, Gated Recurrent Units (GRUs), and hybrid models, is evaluated for their ability to model compl and dynamic air quality patterns. A comparative analysis is conducted to assess the adaptability, scalability, ar performance of these models across different datasets and urban contexts. This review highlights the late advancements, practical applications, and challenges in using these models for real-time monitoring and informir environmental policy.

AI-Driven Content Generation for Text to Video

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Abstract: AI-driven content generation for text-to-video synthesis leverages latent video diffusion techniques to produce high-quality videos directly from text prompts. VideoCrafter, a prominent framework in this domain, draws from vast datasets—comprising 600 million images and 10 million videos—to improve performance and generalisation. This framework incorporates motion estimation, text-to-video synthesis, and diffusion models, achieving efficient processing and high visual fidelity in generated videos. Previous work, such as Controllable Video Generation with Text-Based Instructions (CVGI), enabled nuanced manipulation of human-object interactions within videos by conditioning the generation process on textual instructions. CVGI excelled in estimating control signals and generating specific actions, employing adversarial training with multiple discriminators to discern authentic frames, objects, and backgrounds from synthetic ones. By contrast, models like Retrospective CycleGAN faced challenges in maintaining coherent frame sequences for complex scenes. CVGI addressed this with continuous control signals and utilized public datasets, including EPIC-Kitchens-55, to enhance accuracy and contextual understanding.

A Review on Enhancing Camouflaged Object Detection with Adaptability and Context

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Abstract: Camouflaged Object Detection is a niche area under the computer vision domain focused on the detection of hidden objects in complex scenes; the application of such domains could be highly relevant, including military surveillance, wildlife monitoring, and medical imaging. Some of the very recent advances in COD involve zero-shot learning, domain adaptation, graph learning, and frequency-aware feature extraction. Those techniques are designed to deal with issues of limited labeled data, variations in environmental conditions, and computational requirements that are expensive to compute, eventually providing significant improvements in detection accuracy and ef- ficiency. Although such challenges are still outstanding, especially for new category adaptation and scaling up with a wide variety of conditions, this review will briefly outline the present techniques regarding COD, summarizing advantages and disadvan-tages in the various methods and points for improvement to increase generalization and robustness for different scenarios.

Design and Analysis of a 4x4 Planar Array Antenna for 5G Wireless communication

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Abstract: The design and analysis of a 4x4 array of square patch antennas with a resonance frequency of 3.6 GHz is presented in this study. The antennas can be used in 5G and other contemporary wireless communication systems. The antenna array's small shape allows it to improve gain, directivity, and radiation efficiency. With a focus on impedance matching optimization to reduce reflection losses, each patch element is made to resonate at 3.6 GHz. With a small beamwidth and increased gain appropriate for focused beam applications, the array arrangement enhances overall performance. Key parameters like gain, radiation pattern, VSWR, and return loss are analyzed using simulation tools. The suggested array exhibits efficient radiation properties, which could be found in MIMO 6 systems, base station antennas, and others.

Vision Aid: A Web-Based Assistive System for Real-Time Scene Descriptions and Guidance Using Vision Transformers and LLMs

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ABSTRACT: THE VISUAL IMPAIRMENTS HAVE THOSE EVERYDAY DIFFICULTIES WHICH INTERFERE WITH AN INDIVIDUAL'S ABILITY TO BE INDEPENDENT, SAFE AND TO ACCESS VISUALS IN EVERYDAY LIFE. MOST OF THE PRIOR CONVENTIONAL ASSISTIVE TECHNOLOGIES INVOLVE STANDALONE SOLUTIONS MAINLY INCLUSIVE OF SIMPLE OBJECT RECOGNITION OR BLIND NAVIGATION SOLUTIONS, WHEREBY CONVENTIONAL AIDS COMPRISE DISJOINTED AND OFTEN DELAYED INFO ACCESS, RATHER THAN OFFERING CONTINUOUS REAL-TIME AID. NEWER TECHNOLOGIES OF COMPUTER VISION ALONG WITH THE EMERGENCE OF LARGE LANGUAGE MODELS OR LLMS HAVE MADE IT POSSIBLE TO BUILD MORE NATURALISTIC, CONTEXT SENSITIVE VISUAL ASSISTANCE APPLICATIONS. IN THIS PAPER, WE PRESENT A NEW WEB SYSTEM THAT USES COMPUTER VISION FOR REAL SCENE ANALYSIS WITH LLMS PRODUCING NATURAL CONTEXTUALLY-ADEQUATE DESCRIPTIONS AND PROVIDING 'ON-THE-FLY' ACTIONABLE ADVICE TO THE USER. IN THIS PAPER, WE REVIEW THE BENEFITS AND WEAKNESSES OF CONVENTIONAL ASSISTIVE APPLICATIONS AND POINT OUT THAT THE INTEGRATION OF COMPUTER VISION WITH LLMS IN A SCENE-ADAPTIVE MANNER CAN LEAD TO EXCEPTIONAL ADVANCEMENTS. THE INTENDED SYSTEM SHOULD IMPROVE ENVIRONMENTAL CONSCIOUSNESS, DECREASE THE DECISION-MAKING BURDEN BUT AT THE SAME TIME ENCOURAGE USERS' SELF-SUFFICIENCY WITH A MAJOR FOCUS ON PRIVACY SINCE USER'S DATA WOULD BE USED TO PROVIDE SELF-RECOGNITION TO THE USERS. FINALY, WE EXPLORE ISSUES ARISING FROM THIS RESEARCH AND PINPOINT DIRECTIONS LIKELY TO ENHANCE UTILIZATION OF ASSISTIVE TECHNOLOGIES FOR THE VISUALLY IMPAIRED AND ITS INTEGRATION IN APPROXIMATE DAILY SITUATIONS.

REVOLUTIONIZING DIGITAL IDENTITY: A COMPREHENSIVE REVIEW OF BLOCKCHAIN-BASED IDENTITY SYSTEMS

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Abstract: As digital interactions and online services expand globally, secure and reliable identity management has become a critical challenge. Traditional digital identity systems, often centralized and managed by governments or corporations, are vulnerable to privacy breaches, identity theft, and unauthorized data access, compromising user trust and safety. Blockchain technology, with its core principles of decentralization, immutability, and cryptographic security, offers a promising framework for reimagining digital identity management. Blockchain-based digital identity systems empower individuals with greater control over their personal data, enabling privacy-focused models such as self-sovereign identity (SSI) and the use of Decentralized Identifiers (DIDs) that promote interoperability and user autonomy. This review paper provides a comprehensive analysis of blockchain-based digital identity systems, examining key models, current applications, benefits, and the unique security enhancements they offer. It explores a variety of use cases across sectors, including government national IDs, financial services, and healthcare, where blockchain is transforming identity verification and data protection. Additionally, the paper discusses critical challenges facing blockchain-based digital identity, including scalability issues, transaction costs, regulatory compliance, and privacy concerns. By synthesizing current research and practical implementations, this review highlights the potential of blockchain to revolutionize digital identity while addressing the technical and regulatory obstacles that need to be overcome for widespread adoption. The paper concludes with insights into emerging research directions and the steps needed to unlock the full potential of blockchain for digital identity management.

Utilizing Quantum Machine Learning in Healthcare: Exploring the Integration of Quantum Computing for Enhanced Medical Applications

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Abstract. Diabetes mellitus (DM) remains a prevalent non-communicable ailment associated with elevated rates of illness and death. Among individuals hospitalized with DM, imbalances in electrolytes frequently emerge. However, there exists a scarcity of information regarding the extent of electrolyte irregularities within the diabetic population. Exploring the potential of quantum computing in the realm of machine learning presents a particularly thrilling avenue within the broader spectrum of quantum technology applications. However, it is worth noting that machine learning tasks, where data input plays a pivotal role, diverge significantly from the conventional computational challenges commonly examined. In this study, the authors illuminate the fact that certain problems traditionally considered computationally formidable can be quite effectively predicted by classical machines when equipped with data-driven learning algorithms. Their approach hinges on the establishment of rigorous prediction error boundaries, serving as a fundamental framework for assessing the potential quantum advantage in learning tasks. Importantly, these boundaries hold true both in asymptotic scenarios and through empirical validation across a diverse array of learning models. These findings elucidate numerical outcomes suggesting that, when armed with data, classical machine learning models can rival their quantum counterparts, even when those quantum models are tailored specifically for quantum-related problems. To enhance the landscape further, the authors introduce a projected quantum model that furnishes a straightforward and rigorously proven quantum acceleration for a learning challenge, particularly in the fault-tolerant domain. For immediate and practical implementations, the authors provide compelling evidence of a substantial predictive edge over certain classical models, as demonstrated on meticulously engineered datasets designed to showcase maximal quantum advantages.

A Review on Enhanced Breast Cancer Diagnosis throughImage Processing and Ensemble Machine Learning Techniques

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Abstract: It is unfortunate though breast cancer is still among the leading cause of death for womenin the world. Because stroke is fatal if not treated within the first few hours of its occurrence, early diagnose is critical for patient's recovery. In this paper, the authors develop a multi-modal framework for improving breast cancer diagnosis, based on different types of datasets. The numerous stages of the constructed methodology include data gathering and cleansing and imagemanipulation and enhancement; feature engines like the proposed CNN model. In the current study, several approaches to machine learning, including MLPs, are used to train the respective models. A stacking ensemble technique incorporates the results of the most accurate models to enhance live diagnostic efficiency. The last developed model is checked by means of accuracy, confusion matrix, AUC, and F1 score. This approach is concerned with the attempt to enhance diagnostic accuracy with a view to offering a sound instrument for early detection within clinical contexts.

This proposed framework also aims for scalability and flexibility across various types of clinical facilities to ensure that the latest research findings can be implemented in bona fide healthcare delivery. To introduce the specific features of each type of image, including ultrasound, mammograms, and histologic images, the model is configured to process data in parallel with a unified evaluation of the examined tissue. It also enhances the diagnostic capability of the model but also provides cross-checking between MRI and CT scans which have high chances of misclassification. In addition to that, the using of ensemble stacking makes it possible to integrate the learning from the different algorithms used in the ML into final prediction, so that the results are less likely to be influenced by error. Here, this frameworkbrings its significant validation metrics to the health-care domain; this can help improve the survival rates for the breast cancer patients, due to its ability to allow interventions to initiated ata more precise time and more accurate prognosis.

BETTER PATIENT OUTCOMES COULD RESULT FROM THIS NOVEL TECHNIQUE, WHICH HAS THE POTENTIAL TO GREATLY INCREASE THE EFFICIENCY AND ACCURACY OF BREAST CANCER DIAGNOSIS WHILE ALSO SUPPORTING CLINICIANS IN DETERMINING THE MOST EFFECTIVE TREATMENT PLANS.

Leveraging ML based Performance Analysis in V2V Communications using IEEE 802.11p

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Abstract: The growing demand for reliable and efficient vehicle-to-vehicle (V2V) communication systems in intelligent transportation networks has led to extensive research into optimizing wireless communication standards, particularly with the Wireless Access in Vehicular Environments (WAVE) based on the IEEE 802.11p standard. In this study, we explore the performance analysis of IEEE 802.11p wireless access in vehicular environments using advanced machine learning (ML) algorithms. Analytical models can represent an attractive and cost-effective approach for evaluation if they can adequately model all underlying effects that impact the performance of vehicular communications. In the performance analysis using an analytical model in IEEE 802.11p for V2V communication under varying T_x-R_x distances, CBR: 0.0698 and PDR: 0.06374 time required for obtaining PDR and CBR is 7.1004 seconds. It shows the PDR versus distance, indicating that the PDR decreases as the distance increases. In proposed work to overcome the limitations of time complexity by analytical model we have replaced it with ML models. Using proposed ML models for prediction of CBR and PDR, it is observed that Linear Regression and Support Vector Machine (SVM) have the lowest time complexity with less than 0.035 seconds and Random Forest has the highest time complexity and is not suitable if the goal is to minimize time.

A Study on Contactless Health Monitoring System Using Deep Learning Models

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ABSTRACT: This paper briefly reviews and compares various deep learning methods in order to extract rPPG signals from video data and determine the heart rate. For video frame processing, computer vision, and deep learning tools are employed for facial region detection and rPPG signal prediction for heart rates. Specifically, we use OpenCV and MediaPipe to handle frame extraction and face detection, then preprocess these images to a consistent size before running them through several deep learning models: CNN, U-net, Le-net, and Googl-net.

These models will be implemented using ensemble learning, which entails that the prediction of all the models will be combined for better overall accuracy. We evaluate how effectively each model works based on measures such as the Mean Absolute Error (MAE), the Mean Squared Error (MSE), the Root Mean Squared Error (RMSE), the Mean Absolute Percentage error (MAPE), and accuracy. Furthermore, we employ certain algorithms such as peak detection and interval analysis on the rPPG signals for estimating the heart rate in terms of BPM.

PERFORMANCE COMPARISON OF IMAGE TRANSMISSION USING DIFFERENT MODULATION TECHNIQUES

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Abstract: This paper discusses the transmission of digital images using QPSK and QAM techniques (64QAM and 256QAM). Modern Communication systems frequently use QAM because of its capacity to transmit high data rates by combining amplitude modulation. This paper implements a simulation model for image transmission using 64 QAM and 256 QAM in a noisy communication channel. The performance parameters such as noise, interference, and signal distortion which affect image quality have been discussed. This study aims to analyze how higher-order QAM schemes such as 256 QAM can achieve greater data rates at the cost of more power and better channel conditions. The 64-QAM and 256-QAM bit error rates and signal-to-noise ratio capabilities are compared in this article. The results of this project will highlight the trade-offs between complexity and image quality in modern communication systems, providing insights into the design of efficient image transmission systems for real-world applications.

A STUDY ON PYRAMIDAL HORN ANTENNAS: ACHIEVING BROADER BEAMWIDTH WHILE MAINTAINING GAIN IN SPACE ENVIRONMENTS

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Abstract: The study on antenna theory states that getting a broader beamwidth while maintaining the requisite gain usually requires a trade-off between beamwidth and gain. Balancing these two factors is critical for effective communication, sensing, and observation in the harsh environment of space. To overcome this issue, a pyramidal horn antenna with coaxial feed is presented, which achieves a broader beamwidth while maintaining a steady gain. These antennas are important in antenna design, particularly for space applications, because of their ability to provide wide bandwidth, low sidelobes, high gain, and small size. The pyramidal horn's coaxial feed mechanism contributes significantly to the greater beamwidth. The aperture dimensions, flare angle, and geometry of the coaxial feed are adjusted to achieve a broader beamwidth. The aperture dimensions, flare angle, and geometry of the coaxial feed are modified to create a broader beamwidth in the 2GHz to 6 GHz range while keeping the necessary gain. To optimize antenna design, a parametric research on pyramidal horn antenna is conducted by systematically adjusting these parameters and examining their impact on antenna performance. The proposed pyramidal horn antenna is simulated to ensure its performance.

Developments in IoT-Based Railway Track Fault and Obstacle Detection: A Comprehensive review

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Abstract: This literature review discusses the recent advancements that are currently being witnessed in railway safety and maintenance technologies, primarily IoT, machine learning, and automated inspection systems in providing drastic solutions to the severe challenges that currently face critical infrastructure. The methods used for monitoring the conditions of railways had remained traditional; this primarily because they were considered to rely much on human input and manual processes. These traditional approaches are now being transformed through innovative systems such as IoT-based track recording vehicles, visual inspection systems, and cost-effective frameworks for the detection of cracks. These systems integrate advanced sensor technologies, deep learning algorithms, and real-time data transmission, thereby allowing for accurate fault diagnosis, automated gate control, and instant warning in the event of risks like cracks, obstructions, and structural weaknesses. Certain technologies the detection of cracks based on infrared and GPS; acceleration sensors based on the axle; and similarity measurement modules have presented maximum optimizations in safety, efficiency, and maintenance costs. These innovations open the path to predictive maintenance, a smarter railway infrastructure that fosters resilience and allows passengers to have increased trust in the transportation system as countries set their sights on more sustainable solutions to railway safety. Index Terms—IoT-based Monitoring, Automated Inspection Systems, Crack Detection, Track Recording Vehicle (TRV), Visual Inspection System (VIS), Deep Learning in Railways, Predictive Maintenance, Sensor Integration

GESTURE-CONTROLLED SMART HOME INTERFACE WITH REAL-TIME HAND TRACKING

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Abstract- In an age where technology continues to shape and redefine every aspect of our lives, the emerging of smart homes stands as a remarkable testament to human ingenuity and innovation. The concept of gesture-controlled smart home interface may have once belonged to the realm of science fiction, but today, it has firmly planted its roots in every reality. With seamless connectivity and cutting-edge technology, these intelligent living space redefined the way we interact with the applications.

This prototype is designed to provide a contactless and intuitive method for controlling household devices. The primary main objective is to enhance the ease of interaction with smart home system by leveraging hand gesture poses as input commands. This journey into the world of smart home gesture based interaction systems, particularly is to enhance accessibility and convenience in smart homes for further development.

Case Study on Yield Prediction Using Machine Learning Techniques in Telangana Regions

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Abstract: The aim here is to improve agriculture concern with reference to management techniques by assessing various machine learning methods for yield forecasting which is very important in effective use of resources and crop management. Application of machine learning (ML) Systems in agriculture has changed the methods of managing crops, soils and in this context predicting the yield is greatly understood by using agricultural operations. This is a review of regression techniques to predict the outcomes with specific attention to predicting agricultural yields from the education system. The study considers the following K-Nearest Neighbors (KNN) Regression, Artificial Neural Networks (ANN), Ridge Regression, Polynomial Regression and Support Vector Regression (SVR) etc. Most KNN regression was the lowest in accuracy and hence, the least reliable of the models tested. Ridge Regression can correctly and optimally estimate the specified parameters and therefore provides the best model. Analysis of the data showed that the effectiveness of Ridge regression was related to its capability of estimating parameters in the presence of multicollinearity and still providing well-behaved models. Though the research is focused on the specific problem of agricultural productivity improvement, it offers quite useful ideas for understanding how machine learning algorithms can be used in agriculture which will be helpful to researchers and even practitioners in agricultural data science. This data collection's ambition is limited to two essential outliers: the rhetoric employed in publications and the linguistic appropriateness of the language utilized. The results and data are available at https://github.com/SudheerReddyBandi/Agriculture.

A Review on Deep Learning Techniques and Models to Predict Alzheimer's Disease

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ABSTRACT: THE MOST PREVALENT CAUSE OF DEMENTIA IS ALZHEIMER'S DISEASE. ITS EARLIER DISCOVERY WOULD ASSIST PATIENTS, AND TREATMENT INITIATION. OLD METHODS ARE MOSTLY HUMAN ANALYSIS, OR PARTLY AUTOMATIC IMAGING, AND THEY MIGHT BE BIASED OR TAKE MUCH MORE TIME TO DELIVER FINDINGS. IMPROVEMENTS IN DEEP LEARNING MAKE FULLY AUTOMATED DIAGNOSTIC MODELS FEASIBLE WHICH, ESPECIALLY APPLYING DIFFERENT KINDS OF IMAGING METHODS LIKE MRI, PET AND MIXED DATA, REVEAL HIGH ACCURACY. THE REVIEW ELABORATES ON RECENT DEEP LEARNING MODELS PROPOSED FOR AD PREDICTION, INCLUDING MACHINE LEARNING AND NEURAL NETWORK ARCHITECTURES, SUCH AS VGG16, RESNET, CNN-LSTM, AND ENSEMBLE METHODS. THE APPROACHES ARE ANALYZED USING SINGLE IMAGING MODALITIES AND MORE ADVANCED FUSION TECHNIQUES INTEGRATING MRI-PET DATA WITH CLINICAL AND GENETIC INFORMATION TO PROVIDE GREATER MODEL SENSITIVITY AND INTERPRETABILITY. THE EXPERIMENTAL RESULTS REVEAL THAT DEEP LEARNING CAN TRANSFORM HOW CLINICIANS ARE ABLE TO DIAGNOSE ALZHEIMER'S, THROUGH THE DEVELOPMENT OF RELIABLE, NON-INVASIVE TOOLS THAT COULD ACCURATELY PREDICT DISEASE PROGRESSION. FURTHER WORK IS REQUIRED TO IMPROVE THE MODELS ABOVE FOR REAL-TIME CLINICAL USE, WHICH SIGNIFICANTLY WILL CHANGE WAYS IN WHICH ALZHEIMER'S IS DETECTED.

IMPLEMENTATION OF A DEEP NEURAL NETWORK FOR CLASSIFYING IMAGES OF BRAIN TUMORS

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Abstract: Identification and categorization of brain tumors is a cyclical process in which tumor components are assessed and suggestions for therapy are made based on their classifications. Many imaging techniques are used for this work. Because Magnetic Resonance Imaging (MRI) provides better soft tissue than Computed Tomography (CT) and MRI does not involve radiation. The currently available manual method is inefficient and hence we provide an advanced method by using the deep learning concepts. This MRI creates detailed images of our body's organs and tissues by using a computer's radio wave and an attracting field. Deep Learning (DL), a subset of Machine Learning (ML), is helpful for the categorization and identification of issues. This project uses one Data set consisting of three categories (Meningioma, Glioma, Pituitary). In this work, the first stage is pre-processing concerning two datasets. Later involves detection by using a convolution neural network algorithm (CNN). The suggested CNN performs admirably, with the greatest overall accuracy for the datasets coming in at 97.8% and is 96.2%. The final results demonstrate the model's capability for brain tumor classification and detection problems. The proposed system helps to automatically differentiate between the types of Tumors from the normal brain image, in future it can be improved to analyze the brain tumor and classification, which will be more useful in the treatment. A few more sectors of artificial intelligence can also be incorporated along with the proposed system to increase the standard of the proposed system.

REVIEW ON MACHINE LEARNING AND DEEP LEARNING TECHNIQUES IN SKIN LESIONS IMAGE CLASSIFICATION

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Abstract: Classification of skin lesions is important in the medical field of dermatology for early detection and treatment. Recent innovations in deep learning and machine learning have provided a great opportunity to build advanced and highly accurate image classifies. In this study, several papers are been reviewed on skin disease classification using deep learning and machine learning algorithms. This survey covers various technologies for each of four stages: Image Pre-processing, Image-Segmentation, Feature-Extraction, and Classification. This survey covers Deep learning architectures: CNN, attention-based models for skin lesion segmentation and classification. Machine learning techniques: Hat Transformation, different filters for image preprocessing, for feature extraction GLCM, Wavelet transform, etc. For classification SVM, XG Boost, Random Forest algorithms, etc. This dataset contains Data Set Ham10000, ISIC2019, 18, etc. The results will be compared for Deep Learning and Machine Learning classifications on skin lesion images.

Design of a 1.8 Volts VDD Low-Power Two-Stage Operational Amplifier with programable Compensation in 0.18µm SCL Technology

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Abstract: This paper presents the design of a dynamically pro-grammable Compensation based two-stage operational amplifier (Op-Amp). The proposed Op-Amp designed for 1.8V VDD in ISRO's SCL 0.18µm technology. The proposed circuit addresses the challenges of stability and speed for closed-loop and open- loopapplications respectively contributing to the development of reusable Analog-IPs in SCL 0.18um technology. The proposed OP-Amp with programmable compensation technique achieves a power consumption of 106µW while delivering a gain of 45dB anda phase margin of 40 degrees, exhibiting good stability across all process corners. Pre-layout simulations ensure reliability under varying conditions. The Op-Amp boasts a Slew Rate of 18V/µs, facilitating rapid signal response. Customizable compensation enhances versatility, catering to specific application needs. This design offers a promising solution for energy-efficient, reusable analog IPs, particularly in space-constrained environments.

A REVIEW ON AI POWERED CHRONIC KIDNEY STONE AND TUMOR DETECTION USING IMAGE PROCESSING

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Abstract: Chronic kidney diseases resulting in kidney stones and tumors are common conditions brought about by the dietary conditions, dehydration, genetic influence, or environmental conditions. Such problems constitute a huge health problem in the contemporary world, as complications can lead to serious worst-case scenarios such as kidney failure, which requires extreme medical care for the affected person. The approaches used today in diagnosing kidney diseases rely mainly on traditional imaging techniques such as CT scans and MRIs, which are known to be time-consuming and prone to personal interpretation, sometimes leading to delayed or incorrect diagnoses. Despite this, kidney diseases remain to affect all communities, especially those with scarce access to modern medical care, hence the urge for better, effective, and automated diagnostic approaches. This paper uses a sequential model architecture of CNNs in improving the speed and accuracy with which kidney diseases are diagnosed. Through automation of analysis of images, this model is going to be an increase in patient diagnosis outcomes for patients being diagnosed with kidney stones and tumors while easing pressure on healthcare systems.

Two Stage Multisensor Fusion For Context Driven Object Detection

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Abstract— Object detection is usually carried out on high resolution remote sensing images due to the requirement of high spatial detail. Deep learning based CNN architectures like YOLO, SSD, Faster-RCNN and Resnet have shown good results for computer vision tasks like classification, segmentation and object detection. Object detection for large areas with high resolution data poses significant challenges due to high data acquisition cost, computational requirements and long response time. Medium resolution sensors like Sentinel are freely available, provide more spectral information as compared to high resolution panchromatic sensors but offer coarser spatial detail. This data often includes bands sensitive to specific features (e.g., vegetation, water, soil types) that can provide critical contextual information to support object detection. This paper proposes a fusion of both medium and high resolution sensors in a complementary way without compromising on spatial and spectral quality and with less computational requirements, which is ideal for monitoring large areas in near real-time. Multi-sensor fusion between images are mostly studied at pixel, feature and decision level. In pixel-level fusion, panchromatic and multispectral sensor data are fused at pixel level but this may disturb the spatial or spectral quality of the output. In decision level fusion, information is extracted from both sensors independently and then combined. To the best of my knowledge, there has been no study on how freely available spectrally rich medium resolution data of Sentinel-2 data can be used along with high resolution data for efficient object detection for large area monitoring. This paper proposes a methodology where contextual information derived from spectrally rich medium resolution sensors is used to constrain areas of corresponding high resolution images where object detection is to be run. Instead of running object detection on high resolution data of the whole area to be monitored, object detection is now run only on high resolution images of a subset of the area without compromising on the results. This helps in monitoring the large area of interest without the need for acquiring costly high resolution data for the whole area making it easier to adopt as it is cost effective. Also faster response time helps in near real-time applications.

Designing and Analysis of 2:1 Waveguide Power Combiner for Ku-Band Using MCMT Technique

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ABSTRACT: A simple effective power combining structure is proposed and analyzed in this paper. The power combining structure is analyzed using MCMT (multi cavity modeling technique) based on method of moment. The proposed power combiner has simulated on CST microwave studio and having good agreement with theoretical and simulated data. In the input of the waveguide a maximum of 0.5dB deviation from ideal value has been obtained over entire Ku-band.

Optimizing Photovoltaic Efficiency with Wireless Sensor Network Monitoring

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ABSTRACT. With the growing use of PV panels in renewable energy, effective monitoring is crucial for maximizing performance and ensuring reliability. This paper presents a detailed design for a wireless sensor network (WSN) aimed at monitoring PV panel performance. The innovative system utilizes multiple sensors to measure key parameters like voltage, current, temperature, and so-lar irradiance. It transmits data in real-time, allowing for immediate analysis and quick decision-making. This capability helps operators promptly address any performance issues, enhancing overall system reliability. The central coordinator acts as the communication hub for the WSN, aggregating data from individual sensors and managing its transmission to the cloud. With advanced routing algorithms, it optimizes energy use while ensuring reliable data transfer. The central coordinator also enables real-time alerts, allowing users to quickly respond to anomalies or maintenance needs. These features are essential for maximizing energy output and minimizing downtime. Once stored in the cloud, data undergoes processing and analysis, allowing users to access key performance indicators and generate reports from anywhere. This cloud-based system enables efficient management of multiple PV installations, optimizing output by monitoring factors like panel temperature and so-lar irradiance, with potential energy production reaching up to 400 kWh per day. This innovative approach enhances performance, reliability, and sustainability, supporting the broader goal of increasing renewable energy usage.

Optimizing Soil Moisture Prediction and Crop Yield Enhancement for Medicinal Plants Using Convolutional Neural Networks in Precision Agriculture

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Abstract: Precise prediction of soil moisture and crop yield, especially in the case of medicinal plants, is important and highly desired with regards to precision agriculture for sustainable farming. However, conventional methods are lacking in precision, especially considering the diverse conditions brought about by IoT data and climate change. This paper thus proposes a CNN-based approach for dealing with these challenges. The CNN model makes use of multispectral hyperspectral imaging data and captures intricate patterns that are used in the prediction of soil moisture levels to optimize crop yield. Also, the improvements in key metrics make this model adaptable with different environmental conditions. Compared with the traditional models, the proposed system including real-time IoT data reached an accuracy of 0.95, thus exploiting its potential for the advancement of sustainable agriculture. However, there is still some room for enhancement in yield prediction for extensive ranges of crops and environments via the exploitation of advanced learning techniques.

Integrating AI and Cobots: Bridging Human and Machine Collaboration in Industry 5.0

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Abstract: Industry 5.0 represents a significant evolution in industrial practices, prioritizing seamless collaboration between humans and advanced technologies like artificial intelligence (AI) and collaborative robots (cobots). Unlike Industry 4.0, which focused on automation, Industry 5.0 aims to amplify human creativity and productivity through cutting-edge technological support. This paper delves into how AI and cobots integrate to reshape industries such as manufacturing and healthcare. It provides an in-depth look at key aspects like cobot design, AI-powered adaptability, and frameworks for effective human-machine interaction. Challenges such as safety, workforce integration, and ethical concerns are also examined, alongside proposed solutions and future research avenues. Real-world case studies highlight the practical applications and impacts of AI-cobot collaboration, concluding with a vision for sustainable, human-focused progress in Industry 5.0. Key challenges like ensuring safety, adapting the workforce, and addressing ethical concerns are thoroughly examined, along with suggested solutions and areas for future research. Through real-world case studies, this paper showcases the practical applications and transformative effects of AI-cobot collaboration, concluding with valuable insights into fostering sustainable and human-centered growth in Industry 5.0.


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