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ST. JOSEPH
COLLEGE OF ENGINEERING
(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai
An ISO 9001;2015 Certified Institution)
(Run By MMI Fathers)
Sriperumbudur, Chennai-602117
Tamilnadu, India

PRINCIPAL MESSAGE

It gives me immense pleasure to welcome all the students, Staff and Reasearch Scholars from various colleges to our Fourth International Conference on Emerging Trends in Engineering and Technology , ICETET 2021 to our St. Joseph College of Engineering. This fest aim is to develop knowledge, awareness of social implications of their respective disciplines, communications and Researchskills.

I hope that this International Conference would be much informative and fruitful to all participants, since which give opportunities for students, Staff and Reasearch Scholars to develop their level of confidence to work in any kind of environment. This Conference will definitely enhance basic fundamentals of subject and latest developments in the technology of their subjects. I am also particularly happy to observe that organizers have taken care to invite judges for different section of broad theme of Conference. Undoubted, it will be a great benefit to the participants and will enhance and strengthen their skills. It needs to be ICETET 2021 said that will add feathers to the cap of our Institution.

I wish all grand success for ICETET 2021.

ADMINISTRATOR MESSAGE

In this competitive world it has become the utmost necessity for students to get acquainted with the recent innovations and acquire an extremely good skill set in addition to their academic excellence. ICETET 2021 is the perfect platform for the students, staff and Research scholars to prove their agility and bag their rewards. The main objective of this International Conference is to kindle the talents of the Engineering students, Research Scholars, Staff and to provide opportunities for them to know the technological developments in their field of specialization and share it with others.

Also, by organizing such Conference, students and scholars realize the worth of teamwork, which not only gives them a memorable experience but also will help them once they enter the corporate world. Hats off to the staff members and students, whose precious efforts have made ICETET 2021 a success story. ICETET 2021 will surely reveal new openings.

I wish all grand success for ICETET 2021

CONVENOR MESSAGE

I welcome the participants of ICETET 2021. The main goal of organizing this Conference is to share and enhance the knowledge of each and every participants. We have given a good opportunity for those who have a thirst in knowing the present technological developments and also share their ideas. Furthermore, this conference will also facilitate the participants to expose and share various novel ideas.

The International Conference aims to bridge the students and staff working in academia and other professionals through presentations in current technological trends. You will get opportunities to widen your knowledge and network.

I thank the conference committee for extending their valuable time in organizing the program and all the authors, reviewers, and other contributors for their sparkling efforts and their belief in the excellence of ICETET 2021

Title: Design And Implementation of a Wearable System for Non-Invasive Glucose Level Monitoring

Authors: Bhuvaneshwari. V, Priya. R, Shalini. R, Saranya. R

Affiliation: Department of Electronics & Communication Engineering, St. Joseph College of Engineering, Anna University, Chennai-602117, India

Abstract

Wearable body sensors play a vital role in biomedical engineering due to significant anthropogenic changes in the world. The wearable sensor system is designed to determine essential parameters of healthcare, including glucose level monitoring, blood pressure, heart rate, and blood flow analysis. Analyzing glucose levels, blood pressure, heart rate, and blood flow traditionally involves invasive methods, often causing panic among patients and contributing to psychological distress. These issues can lead to various syndromes that are entirely unnecessary. The solution lies in employing non-invasive methods such as Photo PlethysmoGraphy (PPG), Galvanic Skin Response (GSR), and similar sensors. Photoplethysmography (PPG) is a non-invasive optical technique for detecting microvascular blood volume changes in tissues. Galvanic Skin Response (GSR), also known as Electro Dermal Activity (EDA) and Skin Conductance (SC), measures the continuous variations in the electrical characteristics of the skin, such as conductance, caused by changes in human body sweating. By using sweat as an input and appropriate software correlated with temperature, blood glucose levels can be estimated. Traditional GSR analysis is based on the assumption that skin resistance varies with the state of sweat glands in the skin. Utilizing PPG and GSR, numerous parameters of the human body can be acquired non-invasively, greatly benefiting the field of medical engineering.

Keywords: blood glucose, non-invasive, Photoplethysmogram, galvanic skin response, Visual Basic, diabetics, multi-sensor

Developing assistive technology to support disabled and elderly individuals

Authors: Mr. S. Santhosh, Mrs. B. Abinaya, And Ms. Jency S

Affiliation: Department of Electronics & Communication Engineering, St. Joseph College of Engineering, Anna University, Chennai-602117, India

Abstract

Addressing the significant challenge of limited mobility for disabled and elderly individuals and its impact on their daily lives, the development of an assistive mobility device has emerged as a solution, offering opportunities for independent living. While previous devices have aimed at this objective, this paper introduces an innovative approach with the design and development of a smart wheelchair, uniquely operated through head movements and a user-friendly mobile application (APK). The wheelchair prototype, constructed on a simple toy car with three legs, integrates gesture control, health monitoring, and obstacle detection alongside the conventional joystick interface, enhancing user interaction. The paper highlights the added features based on user preferences and interaction results, providing a comprehensive and improved solution to address the mobility challenges faced by disabled and elderly individuals and contributing to their independence and well-being.

Title: Creating a microcontroller-based smartwatch specifically designed for elderly individuals.

Authors: Bhuvaneshwari. V, Priya. R, Shalini. R, Saranya. R

Affiliation: Department of Electronics & Communication Engineering, St. Joseph College of Engineering, Anna University, Chennai-602117, India

Abstract

This project explores the design and development of a specialized microcontroller-based smartwatch tailored for elderly individuals. In response to the unique needs of the aging population, the smartwatch integrates features and functionalities to enhance the overall well-being and safety of elderly users. The device incorporates health monitoring capabilities, emergency response systems, and user-friendly interfaces, providing a comprehensive solution to address the challenges faced by seniors. Through innovative design and technology, this smartwatch aims to improve the quality of life for the elderly by promoting independence, health awareness, and timely assistance in critical situations. The research encompasses the development process, technological considerations, usability assessments, and the potential impact on the elderly community, contributing to the broader field of assistive technology and wearable devices.

Title: IoT based health monitoring system

Authors: Ms. Jency S, Mr. Loganathan

Affiliation: Department of Electronics & Communication Engineering, St. Joseph College of Engineering, Anna University, Chennai-602117, India

Abstract

This project focuses on the development of an Internet of Things (IoT) based health monitoring system designed to enhance healthcare capabilities. The system leverages IoT technologies to collect real-time health data from wearable sensors and medical devices. Through wireless connectivity, the gathered data is transmitted to a centralized platform for analysis. The project aims to provide continuous monitoring of vital signs, such as heart rate, blood pressure, and body temperature, enabling timely detection of anomalies or emergencies. The system incorporates user-friendly interfaces for both healthcare providers and individuals, facilitating remote monitoring and healthcare management. The implementation of this IoT-based health monitoring system holds the potential to revolutionize healthcare practices by offering proactive, personalized, and efficient monitoring solutions. The project encompasses design considerations, IoT infrastructure development, data analytics, and user interface design, contributing to advancements in remote health monitoring and healthcare accessibility.

Title: Designing an Arduino-based Bluetooth car controlled by voice commands

Authors: Dinesh Kumar, Mr. Jagadeesh, Mr. Rethees

Affiliations: Department of Electronics & Communication Engineering, St. Joseph College of Engineering, Anna University, Chennai-602117, India

Abstract

This project entails the design and implementation of a voice-controlled Bluetooth car using Arduino technology. The system allows users to command the car's movements via voice instructions, enhancing user interaction and providing a hands-free control experience. Through Bluetooth connectivity, the Arduino microcontroller interprets voice commands received from a mobile device and translates them into corresponding actions for the car, such as forward, backward, left, and right movements. The project combines hardware and software components to create an innovative and user-friendly interface, demonstrating the integration of voice recognition technology in Arduino-based applications. The abstract encapsulates the project's scope, objectives, and technological contributions, presenting a comprehensive overview of the voice-controlled Bluetooth car system.

Title: IoT Smart Kitchen Automation & Monitoring with ESP8266

Authors: Ms. Manimegalai, Mr. Rethees, Mr. Savariappan

Affiliations: Department of Electronics & Communication Engineering, St. Joseph College of Engineering, Anna University, Chennai-602117, India

Abstract

This project focuses on the development of an Internet of Things (IoT) Smart Kitchen Automation and Monitoring system utilizing the ESP8266 microcontroller. The objective is to create an intelligent kitchen environment that enhances efficiency, safety, and user convenience. The system employs various sensors and actuators to monitor and automate kitchen appliances, such as refrigerators, ovens, and lights. Through the integration of IoT technology, users can remotely monitor and control their kitchen devices via a mobile application. The ESP8266 facilitates wireless communication and data exchange between devices, providing real-time updates and notifications. This project explores the intersection of IoT and smart home technology, contributing to advancements in home automation for enhanced kitchen management. The abstract encapsulates the project's goals, methodology, and technological contributions, providing a succinct overview of the IoT Smart Kitchen Automation and Monitoring system.

Title: Gas leakage detection and alerting system using Arduino

Authors: Mr. M. Vinoth, Mr. S. Santhosh, Mrs. B. Abinaya, Ms. Jency S

Affiliations: Department of Electronics & Communication Engineering, St. Joseph College of Engineering, Anna University, Chennai-602117, India

Abstract

This project entails the development of a Gas Leakage Detection and Alerting System utilizing Arduino technology. The primary goal is to enhance safety in indoor environments by detecting and responding to gas leaks promptly. The system incorporates gas sensors interfaced with an Arduino microcontroller to monitor air quality. Upon detecting a gas leak, the system activates an alarm and sends alerts via SMS or notifications to a designated user, ensuring timely response and preventive measures. The Arduino platform facilitates real-time data processing, enabling quick and accurate gas leakage detection. This project combines hardware and software components to create an effective and reliable system for gas leak monitoring, contributing to advancements in safety technologies for indoor spaces. The abstract succinctly outlines the project's objectives, methodology, and technological contributions in addressing gas leakage concerns.

Title: Predicting heart disease using machine learning techniques

Authors: Mr. Loganathan, Mr. Prabakar R

Affiliations: Department of Electronics & Communication Engineering, St. Joseph College of Engineering, Anna University, Chennai-602117, India

Abstract

This project focuses on leveraging machine learning techniques for the prediction of heart disease. By employing advanced algorithms on a comprehensive dataset of health parameters, the system aims to analyze and identify patterns associated with cardiovascular health. The project involves data preprocessing, feature selection, and model training, ultimately leading to the development of an accurate and reliable predictive model. The application of machine learning in heart disease prediction holds significant potential for early detection and proactive healthcare interventions. The abstract encapsulates the project's objectives, methodology, and potential impact on cardiovascular health management.

Title: Integrating Face Mask Detection and Temperature Measurement Using Raspberry Pi for Enhanced Public Safety

Authors: Mr. S. Santhosh, Mrs. Hymlin Rose S G, Ms. Manimegalai

Affiliations: Department of Electronics & Communication Engineering, St. Joseph College of Engineering, Anna University, Chennai-602117, India

Abstract:

This research endeavors to enhance public safety measures by integrating face mask detection and temperature measurement technologies using Raspberry Pi. The project leverages computer vision algorithms to identify individuals without face masks in real-time, promoting adherence to health protocols in public spaces. Additionally, the system incorporates infrared temperature sensors to measure body temperature accurately and efficiently. The Raspberry Pi platform, known for its versatility and accessibility, serves as the core of this integrated solution. Through the fusion of image processing techniques and thermal sensing, the system provides a comprehensive approach to safeguarding public health. The methodology involves the development of a robust image recognition model for face mask detection and the integration of temperature sensing devices with Raspberry Pi. The system aims to be cost-effective, scalable, and easily deployable in various environments, including entrances to public buildings, transportation hubs, and event venues. A user-friendly interface facilitates real-time monitoring and alerts relevant authorities in case of non-compliance or elevated body temperatures. The research findings are expected to have implications for public health and safety policies, particularly in the context of managing contagious diseases and ensuring the well-being of communities. This project aligns with the growing demand for innovative technological solutions to address contemporary public health challenges.

Title: Incorporating electronic equipment into a walking stick for visually impaired individuals to enhance navigation and safety

Authors: Dr. P. Chinniah, Mr. M. Vinoth, Mr. R. Dinesh Kumar

Affiliations: Department of Electronics & Communication Engineering, St. Joseph College of Engineering, Anna University, Chennai-602117, India

Abstract

The electronic components, including microcontrollers and haptic feedback systems, are strategically integrated into the walking stick to create a user-friendly and non-intrusive device. The system's versatility allows for customization based on individual user preferences and specific environmental conditions. Furthermore, the walking stick includes connectivity features, enabling data exchange with smartphones or other devices for extended functionality. The project's primary objectives include improving the overall mobility and independence of visually impaired individuals by providing an intelligent walking aid. The electronic enhancements offer a proactive approach to obstacle detection, ensuring a safer and more efficient navigation experience. The design emphasizes user comfort, ease of use, and accessibility, aligning with the principles of inclusive technology. Through user testing and feedback mechanisms, the project aims to refine and optimize the Smart Walking Stick for widespread adoption. The anticipated outcomes include a reliable and affordable assistive device that positively impacts the daily lives of visually impaired individuals, fostering increased autonomy and confidence in their navigation abilities. This project contributes to the field of assistive technology, addressing the specific needs of the visually impaired community and promoting a more inclusive and accessible society.

Title: Dynamic Hand Gesture Recognition System for Human-Computer Interaction

Authors: Mr. Loganathan, Mr. Prabakar R, Mr. Jagadeesh, Ms. Manimegalai

Affiliations: Department of Electronics & Communication Engineering, St. Joseph College of Engineering, Anna University, Chennai-602117, India

Abstract:

This project focuses on the development of a Dynamic Hand Gesture Recognition System aimed at enhancing human-computer interaction. Leveraging computer vision techniques and machine learning algorithms, the system interprets and recognizes dynamic hand gestures in real-time, providing an intuitive and non-contact method for users to interact with digital devices. The project employs a comprehensive dataset of hand gestures, encompassing a diverse range of dynamic movements, to train and optimize the recognition model. The system integrates advanced image processing and feature extraction methods to capture the nuances of hand gestures, allowing for precise and responsive recognition. By utilizing a camera or sensor array, the system tracks and analyzes the dynamic movements of the user's hand, enabling seamless control of digital interfaces. The project also explores the implementation of neural networks to enhance the accuracy and adaptability of the recognition system across varying lighting conditions and hand orientations. The objectives of this research include the design of a robust and real-time dynamic hand gesture recognition system capable of supporting a multitude of applications, including gaming, virtual reality, and smart home control. Through continuous testing and refinement, the project aims to achieve a high level of accuracy and user satisfaction. The system's versatility and adaptability make it suitable for integration into diverse technological environments, contributing to the evolution of natural and intuitive human-computer interfaces.

Title: Smart Greenhouse Automation System with Arduino Uno for Precision Agriculture (ECE)

Authors: Mr. Loganathan, Mr. Molaka Vijay

Affiliations: Department of Electronics & Communication Engineering, St. Joseph College of Engineering, Anna University, Chennai-602117, India

Abstract:

This project introduces a Smart Greenhouse Automation System utilizing Arduino Uno to revolutionize traditional greenhouse practices. The system integrates a range of sensors, actuators, and the Arduino Uno microcontroller to create an intelligent and automated environment for optimal plant growth. Sensors measure crucial parameters such as temperature, humidity, soil moisture, and light intensity, providing real-time data to the Arduino Uno. The microcontroller processes this information to make informed decisions regarding the control of actuators, including irrigation systems, ventilation, and shading mechanisms. The project aims to optimize resource usage and create an ideal microclimate within the greenhouse. By employing Arduino Uno's programmability, the system adapts to dynamic environmental conditions, ensuring precise and efficient control over various greenhouse parameters. Additionally, the project explores the integration of wireless communication modules, enabling remote monitoring and control through a user-friendly interface. Key objectives include enhancing crop yield, resource efficiency, and minimizing environmental impact. The Smart Greenhouse Automation System serves as a cost-effective solution for small to medium-scale agricultural setups. Through continuous testing and refinement, the project strives to achieve an intuitive and reliable automation system capable of promoting sustainable and precision agriculture practices. This research contributes to the growing field of smart farming technologies, aligning with the global trend towards more efficient and environmentally conscious agricultural methods.

Title: Subaquatic Communication via Li-Fi Technology

Authors: Mrs. Hymlin Rose S G, Mr. Savariappan

Affiliations: Department of Electronics & Communication Engineering, St. Joseph College of Engineering, Anna University, Chennai-602117, India

Abstract:

The "Subaquatic Communication via Li-Fi Technology" project explores the innovative application of Light Fidelity (Li-Fi) for underwater communication. Traditional wireless communication methods face challenges in underwater environments due to limited radio frequency penetration. In response, this project harnesses Li-Fi, a technology that utilizes visible light for data transmission. Employing modulated LED lights, the system achieves reliable and high-speed communication in underwater scenarios. The project aims to overcome the limitations of existing underwater communication technologies, offering a promising solution for applications such as underwater data transfer, remote sensing, and aquatic robotics. Through rigorous testing and optimization, this project contributes to the advancement of underwater communication capabilities, paving the way for enhanced connectivity in aquatic environments.

Title: Algorithmic Based Brain Tumor Detection & Classification

Authors: Raj Purkayastha, Sayan Guha, Sandeep Kumar Reddy, Dr. G Ramya (Professor)

Department: Department of Electronics and Communication Engineering, SRM Institute of Science and Technology, Ramapuram, Chennai 89

Abstract:

Automatic defect detection is a crucial feature in most diagnostic and therapeutic devices. The high quantity of data in MR images and blurred boundaries make tumor segmentation and classification a challenging task. This project introduces an automatic brain tumor detection method aimed at improving accuracy, efficiency, and reducing diagnosis time. The primary goal is to classify tissues into three categories: normal, benign, and malignant. In MR images, the number of features is too extensive for manual analysis. In recent years, brain tumor segmentation in MRI has gained prominence in medical studies. Accurately detecting the size and location of brain tumors is essential for diagnosis. The diagnostic process involves three steps: pre-processing of MR images, feature extraction, and classification. Following contrast adjustments using the image's histogram, features are extracted using Dual-Tree Complex Wavelet Transformation (DTCWT). In the final step, a Convolutional Neural Network (CNN) is utilized to classify normal and abnormal brain tissues. The project concludes with the proposal of an efficient algorithm for tumor detection based on the Spatial Fuzzy C-Means Clustering method.

Keywords: Brain tumor, MRI, image processing, feature extraction, classification, Convolutional Neural Network (CNN), medical imaging, tumor segmentation, diagnosis, pre-processing,

Title: Face Recognition Attendance System Using Machine Learning And Data Logging

Authors: Ms. Manimegalai, K. Veera Prasanna Kumar, S. Sujay Jafri, S. William James

Affiliation: Department of Electronic Communication and Engineering, St. Joseph College of Engineering, Sriperumbudur, Chennai-602 117

Abstract:

Automating attendance management in educational institutions, this project utilizes face recognition technology with a Raspberry Pi and OpenCV. It encompasses five key modules: Face Detection, Face Preprocessing, Face Training, Face Recognition, and Attendance Database. A student face database is created for recognition, with the system being initially trained with student faces. It offers a user-friendly interface for data collection and attendance tracking. The project's adaptability extends to various authentication applications. The Raspberry Pi minimizes costs and enhances usability by connecting to different devices. The modified algorithm employs Haar's Cascades for face detection and LBP histograms for face recognition. Database management utilizes SQLite and MySQL, automatically updating attendance records and notifying absentees and department heads.

Keywords: OpenCV, Raspberry Pi, Haar cascade, LBPH recognizer, Viola-Jones framework, attendance system, face recognition, student database, education technology, automated attendance, database management.

Title: Augmented Reality-Based E-Learning Application

Authors: Mariya Princy A, Rabin S, Sanjay Kumar D, Thanigachalam K, Yogeshvaran S

Department: Electronic Communication and Engineering, St. Joseph College of Engineering, Anna University, Chennai

Abstract:

In India, approximately ninety million people are affected by Learning Disabilities (LD), with an average of five students in a typical classroom facing these challenges. The identification, assessment, and support for LD individuals are hindered by unique socio-cultural factors, possibly indicating a more substantial prevalence than reported. To address this issue, this paper introduces an innovative solution – the Interactive Textbook. Unlike traditional materials, it doesn't require special markers or identifiers. It focuses on enhancing the comprehension of three-dimensional geometry concepts, known to be challenging in two dimensions. As students read, 3D images, audio, and videos are superimposed on the page, providing a more intuitive explanation. This approach greatly improves understanding and simplifies learning. The system also offers interactive videos to aid comprehension and quizzes for assessment. By employing markers, it integrates three-dimensional objects into real-world settings, offering an immersive and highly effective learning experience for students with LD.

Keywords: Augmented reality, E-learning, learning disabilities, interactive textbook, three-dimensional geometry, educational technology, India, socio-cultural factors, immersive learning, visual aids, assessment quizzes.

Title: Diabetic Retinopathy Detection

Authors: Mr. K. Michael Mahes, Saranya K., Saranya S., Seela Hemima Y., Suvarna A.

Department: Electronic Communication and Engineering, St. Joseph College of Engineering, Anna University, Chennai, India

Abstract:

In the domain of diabetic retinopathy (DR) detection, neural networks (NN) have emerged as a powerful tool, especially in weakly supervised learning scenarios. Unlike traditional supervised methods, NNs require only image-level annotations, allowing for the detection of DR images and lesions with greater flexibility and the utilization of graded and de-identified retinal images. However, the performance of prior studies employing this technique has been constrained by their reliance on manually crafted features. This study introduces a novel NN approach for DR detection, one that simultaneously learns features and classifiers directly from the data. The method demonstrates a significant enhancement in the detection of DR images and their internal lesions. It does so by leveraging a pre-trained convolutional neural network (CNN) for patch-level DR estimation, followed by global aggregation to classify DR images.

Keywords: Neural network, diabetic retinopathy, convolutional neural network, medical imaging, disease detection, image classification.

Title: Design of Microstrip Patch Antenna at Resonant Frequency 2.4GHz

Authors: Dr. P. Chinniah, Pavithra Sankari P, Reshma D, Srisha R, Swetha K.

Department: Electronics and Communication Engineering, St. Joseph College of Engineering, Sriperumbudur, Chennai-602117

Abstract:

Microstrip Patch Antennas are extensively used in modern communication devices, surpassing conventional antennas primarily due to their compact size. Their advantages, including low weight, a sleek profile, and cost-effectiveness, make them a preferred choice for communication system engineers. These antennas seamlessly integrate with microwave circuits, making them ideal for various applications, including cell devices, WLAN systems, navigation systems, and more. This paper presents the design of a rectangular microstrip patch antenna using CST software, with the aim of enhancing bandwidth and reducing return loss. The antenna's resonant frequency is set at 2.4GHz, making it suitable for Wireless Local Area Networks (WLAN). The antenna design is simulated using CST Studio Suite 3D software, a specialized tool for 3D electromagnetic simulation of high-frequency components. This software facilitates the fast and accurate analysis of high-frequency devices, including antennas, filters, couplers, planar structures, and electromagnetic compatibility effects. The simulation results provide essential parameters such as S-parameters, gain, directivity, VSWR, and return loss. The designed antenna exhibits versatility and can be utilized in various wireless applications across S, C, X frequency bands within the electromagnetic spectrum.

Keywords: Microstrip, Patch, CST software, Parameters, WLAN, Antenna Design, Resonant Frequency.

Title: Detection of DoS Jamming Attack in Wireless Sensor Network

Authors: Thilothi R., Rubiya Banu N., Sandhiya A., Sumithra B., S.G. Hymlin Rose,

Department: Electronics and Communication Engineering, St. Joseph College of Engineering, Chennai, Email: hymlinrose@gmail.com

Abstract:

In recent years, wireless sensor networks (WSNs) have emerged as one of the most promising network solutions, with a wide range of applications in agriculture, the environment, healthcare, and the military. Despite these promising applications, sensor nodes in WSNs are vulnerable to a variety of security attacks due to their deployment in hostile and unattended environments, as well as their resource constraints. For example, the DoS jamming attack disrupts and interferes with the normal functions of sensor nodes in a WSN by transmitting radio frequency signals that jam legitimate signals, resulting in a denial of service.This paper presents a step-by-step approach using a statistical process control technique to detect these attacks. We deploy an Improved Exponentially Weighted Moving Average (IEWMA) to detect anomalous changes in the intensity of a jamming attack event by using the packet Break Advent Time (BAT) feature of the received packets from the sensor nodes. The proposed solution can effectively and reliably detect jamming attacks in WSNs with little to no overhead, as shown by the results of a trace-driven simulation.

Keywords: Jamming attack, IEWMA algorithm, BAT, Energy.

Title: Face Mask Detection and Temperature Using Raspberry Pi

Authors: Mr. Vinoth, Vallarasu R., Rajesh S., Suryaprakash P.

Department: Electronics and Communication Engineering St. Joseph College Of Engineering, Near Toll Plaza, Sriperumbudur.

Abstract:

This paper introduces an innovative and cost-effective IoT-based solution with the aim of enhancing indoor safety during the COVID-19 pandemic. It encompasses three critical functionalities: contactless temperature sensing, mask detection, and social distancing checks. The contactless temperature sensing component employs an Arduino Uno equipped with an infrared sensor or thermal camera. Concurrently, mask detection and social distancing monitoring are executed using computer vision techniques on a Raspberry Pi equipped with a camera. In these unprecedented times, such technology can play a crucial role in ensuring public health and safety, particularly in indoor environments. By combining these functionalities into a single system, we provide a comprehensive approach to mitigate the spread of COVID-19 and enhance safety measures.

Keywords: Arduino, computer vision, coronavirus, COVID-19, Raspberry Pi, ontology.

Title: Designing An Electronic Equipment in Walking Stick For Visually Impaired People

Authors: Abinaya, Parvathi. P, Priya. R, Siva sathya and Ramya. k

Department: Electronics and Communication Engineering St. Joseph College Of Engineering, Near Toll Plaza, Sriperumbudur.

Abstract:

Globally, there are approximately 37 million individuals who are blind, many of whom encounter daily challenges due to their visual impairment. Blind people often rely on others for guidance, limiting their independence. This system addresses the need for an electronic device incorporated into a walking stick to assist visually impaired individuals. The device efficiently distinguishes between known and unknown individuals. Leveraging the capabilities of portable digital imaging devices, this technology complements traditional scanning methods for image acquisition. Our proposed solution is based on camera-based visual assistance, which detects the motion of people and converts this information into voice output to aid blind individuals. We introduce this system, capable of operating with a single camera-captured image or multiple frames, and discuss ongoing development efforts and potential future enhancements.

Keywords: Image acquisition, face detection, ultrasonic sensor, water sensor.

Title: Development of HL7 based Health Information System

Authors: Aaron Winston .R, Giridharan . S, A. Joshua Deva Rajan, Manojprabhu .S& Dr. P. Chinniah

Department: Electronics and Communication Engineering St. Joseph College Of Engineering, Near Toll Plaza, Sriperumbudur

Abstract:

Healthcare has emerged as one of the most critical services in today's world. Health Information Exchange (HIE) standards play a pivotal role in facilitating the electronic exchange of clinical data among various healthcare information systems. These standards aim to promote interoperability among healthcare systems across different providers, including hospitals, doctors, and healthcare centers. Consequently, substantial volumes of healthcare data, including patient information and lab reports, are exchanged daily. Implementing Health Level 7 (HL7) standards within the health information exchange framework has been instrumental in minimizing errors and reducing paperwork traditionally handled by patients.This paper introduces HL7 standards to streamline the exchange of healthcare information. HL7 ensures the secure transmission of data that can only be accessed by adhering to these standards. Patients can view their data through specific identification numbers assigned by their healthcare providers. Additionally, healthcare professionals can update patient records following each visit, enhancing data management and reducing the reliance on manual records. This method also enables international data exchange.

Keywords: HIE, HL7, Health, Health Information System.

Title: Face Mask Detection and Temperature Sensing Using Raspberry Pi

Authors: Mr. Vinoth, Vallarasu R, Rajesh. S, Suryaprakash. P

Department: Electronics and Communication Engineering St. Joseph College Of Engineering, Near Toll Plaza, Sriperumbudur

Abstract:

In this paper, we present an affordable IoT-based solution aimed at enhancing indoor COVID-19 safety by addressing multiple critical aspects: 1) contactless temperature sensing, 2) mask detection, and 3) social distancing monitoring. The contactless temperature sensing subsystem relies on an Arduino Uno equipped with an infrared sensor or thermal camera. Concurrently, mask detection and social distancing checks are accomplished through computer vision techniques deployed on a camera-equipped Raspberry Pi.

Keywords; Arduino, computer vision, coronavirus, COVID-19, Raspberry Pi, ontology.

Title: IoT Gesture-Based Home Automation

Authors: R. Reshma, V. E. Reenu, T. Rinisha, S. Santhosh

Department: Electronics and Communication Engineering St. Joseph College Of Engineering, Near Toll Plaza, Sriperumbudur

Abstract:

Home automation involves the remote or automated control of household appliances. Gesture recognition pertains to the identification of human movements, such as hand gestures. This paper introduces IoT-based gesture-controlled home automation, enabling the recognition of gestures. The system developed in this project demonstrates the control of appliances, specifically light bulbs. Users can select appliances for control through a local host server or by using gestures. Gestures like swiping enable users to switch appliances on/off by moving a finger in upward, downward, left, or right directions. For gesture recognition, the APDS-9960 gesture sensor is employed, which includes ambient light detection and an interface for communication. The project is built on the Raspberry Pi platform and features an IoT HTML page for the user interface, the APDS-9960 gesture sensor for user input, and a relay circuit for toggling appliances on and off.

Keywords: Automation, Home Appliance, Gesture-Based Automation, Internet of Things, Hand Gesture, Raspberry Pi, APDS9960 Gesture Sensor, Web Browser.

Title: Military Spying Sonar Radar System Using Arduino Ultrasonic Sensor

Authors: Dinesh Kumar T, Ashok Kumar K., Jeya Suriya J., S.G. Hymlin Rose

Department: Electronics and Communication Engineering, St. Joseph College of Engineering, Sriperumbudur.

Abstract:

Radio Detection and Ranging (RADAR) technology plays a vital role in various fields, including military operations and commercial applications. This research introduces an Arduino-based radar system designed for both military and civilian use. The system offers distinct advantages, such as reduced power consumption, compatibility with a wide range of Arduino programmers, and open-source code for flexibility. The radar system features a fundamental ultrasonic sensor mounted on a servo motor, enabling precise rotational control. The ultrasonic sensor is connected to Arduino's digital input and output pins, while the servo motor interfaces with digital pins. This setup allows for the detection and tracking of objects in real-time.

Keywords: RADAR, Sonar, Arduino, Ultrasonic Sensor, Military Surveillance, Object Detection, Servo Motor, Arduino Programmers, Open-Source Code.

Title: Implementation of Patrolling Robot for Surveillance

Authors: Santhosh S., Jenisha J., Malar Vizhi B., Marisha M., Nivethiga R., Kokila V.

Department: Electronics and Communication Engineering, St. Joseph College of Engineering, Chennai, Tamilnadu, India.

Abstract:

In this project, we present the development of a night patrolling robot designed for security and surveillance purposes. The robot is equipped to detect soundwaves in its surroundings and provide security patrol services. When the sound sensor senses any sound, the robot captures images at the location of the sound and sends them to a specified email address. Additionally, we have integrated an IR sensor to detect obstacles, and the robot captures images in the presence of obstacles. The patrolling robot can perform security patrols during the night, doubling as a guide during the day. Our design and implementation of this anthropomorphic security robot provide a user-friendly, easy-to-assemble solution for patrolling large indoor areas, offering information and functioning as a telepresence platform for human security guards. The robot enhances security measures for human well-being.

Keywords: Raspberry Pi, IR sensor, Sound sensor, Pi camera, Driver IC, Motor, IoT.

Title: Air Quality Predictor Using Machine Learning

Authors: Mrs. S. Bhavani, Mr. A. Arul Prakash, Mr. B. Ram Kumar, Mr. J. Sharath Kumar,

Affiliation: Department of Electronics and Communication Engineering, St. Joseph College of Engineering, Sriperumbudur, Chennai

Abstract:

Air pollution refers to the release of pollutants into the atmosphere, posing a significant threat to human health and the environment. It is one of the most pressing challenges facing humanity, causing harm to animals, crops, forests, and more. To address this issue, it is crucial to predict air quality based on pollutant levels using machine learning techniques, especially in the transportation sector. This research aims to explore machine learning-based techniques for forecasting air quality, striving for the highest accuracy in predictions. The analysis of the dataset will involve supervised machine learning techniques (SMLT) to perform various tasks, such as variable identification, univariate analysis, bivariate and multivariate analysis, handling missing values, data validation, data preparation, and data visualization on the provided dataset.

Keywords: Air quality, machine learning, pollution, forecasting, supervised machine learning, data analysis, data validation.

Title: Brain Tumor Detection Using Convolutional Neural Networks and Deep Learning

Authors: S. Bharathwaj, Rudrendu Mukherjee, Rohan Swarnakar, Dr. R. Arthi,

Department: Electronics and Communication Engineering, SRM University

Abstract:

Detecting brain tumors through medical image analysis is a complex and time-consuming task. Despite significant advancements, there is a growing need for a fast and efficient technique. In this research, we present a method for distinguishing between benign and malignant brain tumors, integrating image fusion, feature extraction, and classification techniques. Magnetic resonance (MR) images generate vast amounts of data that are impractical for manual interpretation and analysis. Precise tumor size detection is crucial in this context. Our diagnostic approach involves four key stages: MR image pre-processing, feature extraction, and classification. In the final stage, we employ Convolutional Neural Networks (CNN) to classify normal and abnormal brain conditions. We propose an efficient Deep Learning algorithm for tumor detection, based on Spatial Fuzzy C-Means Clustering. Our project leverages Deep Learning to identify the type of tumor present in the human brain. It amalgamates various data processing techniques, creating a pattern based on these methods, which is then used for decision-making by comparing it with pre-defined images already loaded.

Keywords: Brain tumor detection, Medical image analysis, Convolutional Neural Networks, Deep Learning, Magnetic Resonance Imaging, Spatial Fuzzy C-Means Clustering.

Title: Continuous Data Transmission in Smart Communication Systems Using Light Fidelity

Authors: Dinesh Kumar R., Jefri Kumar J., Krishna Kumar S., Mukesh Khanna M., Parthiban B.

Department: Electronics and Communication Engineering, St. Joseph College of Engineering, Anna University, Chennai, India

Abstract:

Wireless communication technologies like Wi-Fi and Bluetooth have become integral in our daily lives. However, the increasing number of wireless devices has resulted in a saturated frequency spectrum. This proposal explores Li-Fi communication, which utilizes light waves for data transmission between devices. Li-Fi offers a promising solution for transmitting data by using the entire visible and infrared light spectrums, making it viable for both day and night usage. Li-Fi enables indoor data communication with low latency, high-speed transmission, and robust security, making it difficult to intercept signals from outside the room. The system comprises two Arduino Uno microcontroller devices, one serving as the transmitter and the other as the receiver. A user interface developed in C++ controls data sending and receiving in the smart communication system. The data transmission is achieved by using infrared signals at the beginning and end of data transmission, effectively acting as binary on and off signals (0s and 1s). This approach facilitates efficient data transmission between devices using Light Fidelity (Li-Fi), making it an ideal choice for modern smart communication systems.

Keywords: Continuous data transmission, Smart communication, Li-Fi, Light Fidelity, Infrared signals, Arduino Uno, User interface.

Title: Analyzing Website Open Ports and Discovering Browser History Using an Automated Tool

Authors: M. Gokul Vishanth, B. Surya, J. Yogesh, Mr. S. Muthukumaran, M.E., Ph.D

Affiliation: Department of Information Technology, St. Joseph College of Engineering, Sriperumbudur, Chennai-602 117

Abstract:

Server hacking involves attempts to exploit computer systems or private networks. Google hacking is a computer hacking technique that leverages Google Search and other Google applications to identify security vulnerabilities in the configuration and code of websites. Web servers are often the target for successful online attacks. Understanding the nature of these risks is crucial for effectively safeguarding applications from malicious actors. This project focuses on assessing a wide range of risks in web server implementations and, more importantly, how to defend against potential compromises. The primary objective of this project is to determine the IP address of a website and discover other websites hosted on the same server. Users provide an example IP address or domain, and the application fetches and provides information about the start and end ports of that host. Additionally, the application offers details about the protocol's major and minor versions, server software, and server UTF encoding. This project introduces a modern method for tracking computer, browser, and network IP addresses. It can even check the user's IP address when the internet connection is unavailable. The application is designed to be user-friendly and is suitable for individuals with basic computer knowledge.

Keywords: Server hacking, Google hacking, web server security, IP address discovery, port scanning

Title: Preventing the Spread of Rumors in a Block System Using Specific Keywords

Authors: E. Preethi, B. Subhashini, S. Vanisha Preethi, Mrs. V. Kokilavani, M.E.

Department: Information Technology, St. Joseph College of Engineering, Sriperumbudur, Chennai - 602-117

Abstract:

The proliferation of false information and rumors on social media platforms has evolved into a pervasive global issue, posing significant challenges to the accuracy of information and public discourse. This study seeks to address this pressing concern through a comprehensive examination of the factors influencing the sharing of fake news and rumors within a block system. Our approach encompasses both qualitative and quantitative analyses to gain a holistic understanding of the complex dynamics underlying the dissemination of misinformation. We initiated our investigation by collecting qualitative data through 58 open-ended essays, in which individuals shared their thoughts and experiences related to the sharing of fake news on social media. The analysis of these narratives revealed six distinct behavioral manifestations associated with the dissemination of false information. Subsequently, we formulated a research model that hypothesizes the intricate associations between these observed behaviors. By elucidating these connections, we aim to shed light on the motives, intentions, and mechanisms that drive the propagation of rumors within digital spaces. In addition to the behavioral analysis, we will delve into technological solutions for rumor prevention and consider potential interventions to mitigate the impact of fake news on society.

Keywords: Fake news, rumors, misinformation, social media, block system, behavioral analysis, rumor prevention, information accuracy

Title: Crop Yield Prediction Using Machine Learning

Authors: M. Malathi, R. Sandhiya, M. Sangeetha, Mr. S. Karthi

Affiliation: Department of Information Technology, St. Joseph College of Engineering, Sriperumbudur, Chennai-602 117

Abstracts:

Agricultural productivity, particularly for winter wheat, is heavily influenced by several dynamic factors. These factors include weather conditions, financial obligations, family-related concerns, and crop selection based on soil characteristics. Additionally, complying with evolving government regulations and optimizing crop yield through the judicious application of fertilizers presents unique challenges. In light of these complexities, this project leverages machine learning techniques to predict crop yields accurately. It revolves around the core concept of assessing soil quality to make informed predictions.

Keywords: Crop yield prediction, machine learning, weather data

Title: Diabetic Retinopathy Detection

Authors: J. Franklin Raj, S. Mani, T. V. Yogeshwaaran, Ms. B. Elavarasi, M.E.

Affiliation: Department of Information Technology, St. Joseph College of Engineering, Sriperumbudur, Chennai-602 117

Abstract:

Diabetic retinopathy is a condition that affects the eyes, resulting from damage to the blood vessels in the sensitive tissues behind the eyes. Initially, diabetic retinopathy often exhibits no symptoms, but as it progresses, it can lead to mild vision problems and, in severe cases, even blindness. In India, the scarcity of medical professionals relative to the number of patients often results in delayed diagnoses of various diseases, including diabetic retinopathy. Unfortunately, delayed diagnosis can lead to irreversible eye damage and, in some cases, complete permanent blindness. While this disease is treatable, the damage is not always reversible. To address this critical issue, we propose an automated diagnosis system based on machine learning. The rising number of diabetes cases places significant strain on manual testing methods. Thus, new algorithms for assisted diagnosis are of paramount importance. Early detection of diabetes, especially diabetic retinopathy, can mitigate severe health consequences, including blindness. We employ the Support Vector Machine (SVM) algorithm for classification, utilizing a histogram binning scheme for feature representation.

Keywords: Diabetic retinopathy, machine learning, automated diagnosis, support vector machine (SVM)

Title: Bank Transaction Using Facial Identification

Authors: L. Lenus Antonyammal, N. Malini, S. Sangeetha, Mrs. K. Karthika, ME

Department: Information Technology, St. Joseph College of Engineering, Sriperumbudur, Chennai-602 117

Abstract:

This project aims to develop a robust automated algorithm for secure financial transactions with high recognition rates in various environments. Initially, a Haar cascade-based algorithm is employed for rapid and efficient face detection from the input image. The detected face image is then converted into grayscale. Subsequently, the iris, eyebrows, nose, and mouth features of the individuals are extracted from intensity valleys within the detected face. The cost of each iris candidate is calculated. Finally, the iris candidates are paired, and the cost of each possible pairing is computed using a combination of mathematical models. This approach ensures a higher level of security for financial transactions, with facial identification as a key component of the verification process.

Keywords: Bank transaction, facial identification, security, iris recognition, Haar cascade, financial transactions, biometric authentication.

Title: Detection of Face Expression Using Machine Learning

Authors: T. Isravel, V. Ramprasad, C. Monish, Mrs. K. Karthika, ME

Department: Information Technology, St. Joseph College of Engineering, Sriperumbudur, Chennai-602 117

Abstract:

Recent advancements in human-centered computing have driven significant interest in Facial Expression Recognition (FER) across various applications. Traditional approaches often involve either frontalizing non-frontal facial images or employing separate classifiers for different poses. In contrast, this paper introduces an end-to-end deep learning model that enables both facial image synthesis and pose-invariant facial expression recognition by leveraging the geometric shape of the face image. This model, built on generative adversarial networks (GANs), offers several advantages. First, it generates an identity-preserving face when provided with an input face and a target pose and expression, guided by designated facial landmarks. Second, it explicitly disentangles identity representation from variations in expression and pose through the shape geometry inferred from facial landmarks. Third, our model automatically generates face images with diverse expressions and poses, thereby expanding and enriching the training dataset for FER tasks. Our approach demonstrates robust performance, outperforming state-of-the-art algorithms on controlled and real-world benchmark datasets, including Multi-PIE, BU3DFE, and SFEW. Supplementary material includes the code for reference.

Keywords: Facial Expression Recognition, machine learning, generative adversarial network, facial landmarks, expression synthesis, pose-invariant recognition.

Title: Dynamic Hand Gesture Recognition

Authors: S. Muthukumaran, K. Kanmani Akshaya, S. Nandhini, R. Roshna

Department: Information Technology, St. Joseph College of Engineering, Sriperumbudur

Abstract:

Hand gesture recognition is of paramount importance for enhancing human-computer interaction. This research presents an innovative real-time approach for dynamic hand gesture recognition. In our methodology, we employ the background subtraction method to effectively extract the hand region from its background. Subsequently, we perform palm and finger segmentation to detect and identify individual fingers. To predict hand gesture labels, we utilize a rule-based classifier. Experiments conducted on a dataset comprising 1300 images illustrate the robust performance and high efficiency of our approach. Additionally, our method exhibits superior performance when compared to a state-of-the-art method on an alternative dataset of hand gestures.

Keywords: Hand gesture recognition, real-time method, background subtraction, palm and finger segmentation, rule-based classifier, human-computer interaction.

Title: Real-Time Heart Rate Monitoring Using Facial RGB Color

Authors: B. Divya and V. Sarunitha Mrs. S. Bhavani

Department: Information Technology, St. Joseph College of Engineering, Sriperumbudur, Chennai-602 117

Abstract:

A non-contact method of measuring heart rate can be highly beneficial, especially for sensitive populations. The ability to calculate heart rate using a simple webcam has potential applications in telemedicine. Previous research has demonstrated that heart rate can be accurately measured from the color video of a person's face. This paper discusses the reimplementation of such an approach that uses independent component analysis on mean pixel color values within a region of interest (ROI) around the face. We apply shape predictors and utilize datasets containing 68 facial landmarks. By applying algorithms like Hog+, we achieve high accuracy with very low execution time. The implementation is done using Python and tools provided by Jupyter. The incorporation of facial segmentation enhances the algorithm's robustness against bounding box noise.

Keywords: Heart rate monitoring, Facial RGB color, Independent Component Analysis, Shape predictor, Hog+, Non-contact measurement.

Title: Non-Destructive Analysis Using IRT, Ultrasonic, and Image Processing: A Critical Review and Analysis

Authors:P. Ramani, Dr. V. Subbiah Bharathi

Department: Electrical and Electronics Engineering, SRM Institute of Science and Technology, Ramapuram, Chennai, India

Abstract:

Cracks represent one of the most significant forms of damage to monuments, concrete structures, buildings, and roads. Manual inspection of these damages is both challenging and time-consuming. Measuring the irregularities of cracks requires a high level of expertise. To address these challenges, automatic crack detection methods have been developed using image processing techniques. This article critically analyzes various strategies for distinguishing crack length, width, and depth using different methods. It reviews 56 papers that describe crack detection and other decay measurement techniques. The review focuses on Non-Destructive Techniques, including Infrared Thermography (IRT), Ultrasonic Imaging, 3D Terrestrial Laser Scanning, and Image Processing. The primary objective of this paper is to provide a summary and comparison of the various strategies employed in Non-Destructive Testing. The article concludes by highlighting several areas that warrant further research and investigation.

Keywords: Ultrasonic Testing, Infrared Thermography, Morphological Operation, Degradation, Support Vector Machine (SVM), Accuracy.

Title: Single Axis Solar Tracker Using Arduino

Authors: S. Elamcheren , Srinivas R. Vinod Sudarsan M. Sivapragash C. Vinothkumar R.

Department: Electrical and Electronics Engineering, Sri Krishna College of Engineering and Technology, Coimbatore

Abstract:

The renewable energy market, with significant environmental and economic potential, is rapidly emerging as a key growth sector in many countries. Solar energy, particularly in rural areas, is a crucial primary energy source. This paper presents the development of a single-axis solar tracker using Light Dependent Resistors (LDR) and a servo motor interfaced with Arduino. The solar panel tracker is designed to track the sun's movement, ensuring that the solar panel consistently receives the optimal amount of energy to maximize its performance. Our system incorporates a single-axis solar tracking mechanism, allowing the solar panel to move from east to west throughout the day to continuously face the sun. The implementation of a solar tracker circuit in energy production promises improved performance.

Keywords: LDR Sensor, Solar Tracking, Arduino, Servo Motor.

Title: Implementing smart voice recognition for seamless control of a DC motor through intuitive voice commands

Authors: Mr. Selvamanikandan, Mrs. Kaleeswari, Mr.Marimuthu

Affiliations: Electrical and Electronics Engineering, St. Joseph College of Engineering, Sriperumbudur, Chennai-602 117

Abstract:

This project delves into advancements in automotive safety, particularly focusing on the pivotal role of headlights during night drives. Recognizing the need for adaptive headlight systems that dynamically adjust intensity based on environmental conditions, this research introduces a prototype utilizing Arduino, sensors, LEDs, and other components. The multi-featured headlight system not only enables manual control for turning headlights on and off but also incorporates automatic switching between low and high-intensity beams in adverse weather conditions. By eliminating the need for manual driver intervention, the model seamlessly integrates three essential features: automatic initiation of headlights in low-light conditions, continuous adjustment of light intensity relative to oncoming beams, and automatic activation during inclement weather. This innovation holds significant relevance in automotive applications, enhancing driver safety by providing an intelligent and responsive headlight system.

Title: Transformer Overload Alert System with Voice Announcement (EEE)

Authors: Mr. A. G. Karthikeyan, Mrs. A. Aswini

Affiliations: Electrical and Electronics Engineering, St. Joseph College of Engineering, Sriperumbudur, Chennai-602 117

Abstract:

Ensuring the uninterrupted operation of transformers, crucial components in power systems, demands robust protective measures. This project advocates the application of a sophisticated differential protection technique, incorporating a differential relay mechanism enhanced by a voice announcement circuit. Synchronized with an Arduino microcontroller, the voice circuit is triggered automatically when the load exceeds a certain threshold, issuing voice alerts through a dedicated module and initiating a trip through the relay. Leveraging the high-speed and cost-effective attributes of the Arduino microcontroller, this system offers a superior alternative to the 8051 microprocessor traditionally used in differential relay mechanisms. The efficiency and ease of programming in Arduino contribute to the enhanced protection of transformers, marking a notable advancement in transformer safeguarding technologies.

TITLE: Utilizing an Arduino Uno microcontroller to identify fault cable locations

Authors: Mr. J. Jayashree, Mr. P. Arokiya Prasad, Dr. P. Suresh

Affiliations: Electrical and Electronics Engineering, St. Joseph College of Engineering, Sriperumbudur, Chennai-602 117

Abstract

Addressing the challenges of fault detection in underground electrical cables in urban settings, this proposed system utilizes Ohm's law and an Arduino microcontroller for precise fault location identification. By applying a low DC voltage through series resistors (cable lines), the system measures current variations to pinpoint the location of a short or fault. Integrated with a rectified power supply and an ADC device, the microcontroller interprets the length of the wire in kilometers, with error creation facilitated by switches. Relay exciter ICs control relays to assess cable lines, and a 16x2 LCD displays relevant information, including fault detection, fault location, and distance from the base station in kilometers. This comprehensive data is transmitted to the base station, triggering a buzzer alarm for immediate field worker attention, ensuring efficient fault management and cable repair processes.

TITLE: A GPS-tracked autonomous vehicle powered by ultrasonic sensors for enhanced navigation and control

Authors: Mrs. A. Aswini, Dr. P. Suresh

Affiliations: Electrical and Electronics Engineering, St. Joseph College of Engineering, Sriperumbudur, Chennai-602 117

Abstract

The global interest in autonomous vehicles is on the rise, and these vehicles, equipped with sensors like Lidar, radar, ultrasonic, and infrared sensors, can autonomously perceive their surroundings and navigate through them. Safety is a paramount concern, and the challenge lies in effective obstacle detection to prevent accidents. This proposed system addresses this challenge by integrating ultrasonic sensors with an Arduino Uno in a driverless vehicle, enhancing safety through accurate obstacle detection. The vehicle's control system processes information from these sensors to identify an optimal path while detecting and avoiding obstacles. Additionally, an onboard GPS module enables the vehicle to autonomously navigate from one point to another without human intervention, making it a robust and cost-effective solution for enhancing safety in autonomous vehicles.

Revolutionizing traffic management through Radio Frequency Identification (RFID) system

Authors: Mrs. Y. Dosky, Mr. I. Sengol

Affiliations: Computer Science Engineering, St. Joseph College of Engineering, Sriperumbudur, Chennai-602 117

Abstract

Addressing the critical issue of traffic congestion, a major concern in urban planning globally, this initiative recognizes the challenges posed by signal failures, inadequate law enforcement, and inefficient traffic management systems, especially in countries like India. With existing infrastructures reaching their limits, the imperative is to enhance traffic administration for smoother flow. Traditional methods, such as infrared sensors, inductive loop detection, video data analysis, and wireless sensor networks, have been employed but often suffer from drawbacks like extended installation times and high maintenance costs. To surmount these challenges, a novel approach emerges in the form of Radio Frequency Identification (RFID), offering quicker and cost-effective implementation. This innovation aims to significantly reduce traffic congestion, thereby mitigating its adverse impact on various aspects, from the economy to the overall living standards.

Title: Transport Management System

Authors: Ms. Aminta Sabatini S, Mrs. Eugene Berna, Mrs. Subathra N

Affiliations: Computer Science Engineering, St. Joseph College of Engineering, Sriperumbudur, Chennai-602 117

Abstract

Concerns over student safety, irregular attendance, and documentation inefficiencies in institutional buses drive the need for a more effective solution. The conventional methods of manual attendance-taking through calling names or paper sign-ins are time-consuming and insecure. To address this challenge, the implementation of a Radio Frequency Identification (RFID) based attendance system proves to be a viable solution for schools, colleges, and universities. This system streamlines the attendance process by uniquely identifying individuals through RFID-tagged ID cards, ensuring a faster, more secure, and efficient method compared to traditional approaches. With a simple card placement on the reader, students and faculty can swiftly record their attendance and relevant details.

A comprehensive literature survey on design issues in RIS and IRS-aided wireless networking

Authors: Mr. S. Pavun Boss, Ms. R. Vincy Sahana

Affiliations: Computer Science Engineering, St. Joseph College of Engineering, Sriperumbudur, Chennai-602 117

Abstract

Recent research has witnessed a surge in exploring Reconfigurable Intelligent Surfaces (RIS) for advancing intelligent radio environments in wireless networks. Within these environments, surfaces can programmably manipulate incoming electromagnetic waves to actively influence channel performance, effectively optimizing the wireless channel as a controlled system block to enhance overall system performance. This article provides an overview of Smart Reflecting Surfaces (SRS) in wireless communications, elucidating working principles and showcasing diverse applications utilizing metasurfaces and reflectarrays for Reconfigurable Intelligent Surfaces (RIS). Functioning as a technology to extend radio signals in wireless networks, Intelligent Reflecting Surfaces (IRS) can dynamically alter wireless channels, enhancing communication performance through intelligent signal reflection across numerous cost-effective passive components. Anticipating a future with a hybrid wireless network incorporating active and passive elements supported by the International Revolutionary System, this promises sustained and cost-effective capacity growth. However, IRS integration into wireless networks poses challenges, including reflection optimization, channel assessment, and deployment considerations within communication design. This article offers a tutorial on wireless communication augmented by IRS, addressing these challenges and delving into reflection and channel designs, hardware architecture, practical limitations, and diverse applications in wireless networks.

An extensive survey on Educational Data Mining techniques for predicting academic performance

TITLE: Ms. A. Sunitha, Mr. B. Arunmozhi, Mr. S. Pavun Boss

Department: Computer Science Engineering, St. Joseph College of Engineering, Sriperumbudur, Chennai-602 117

Abstract

Grading students' academic performance poses a challenging task for educators, driving significant interest in the active and dynamic research field of Educational Data Mining (EDM). The primary focus of EDM is to extract valuable insights from educational datasets using data mining techniques, with a key emphasis on predicting students' performance. Researchers worldwide have contributed to this domain, publishing studies on performance prediction and emphasizing the pivotal role of EDM in aiding educational institutions. This review explores the methodologies employed by researchers, presenting a comparative analysis of the effectiveness of EDM techniques in predicting student performance. The findings underscore the adequacy and effectiveness of EDM methods in predicting academic performance, offering valuable insights for informed decision-making by educational management and teachers.

Title: Ambulance System for Emergency Services

Authors: Mr. I. Sengol, Ms. R. Vincy Sahana

Department: Computer Science Engineering, St. Joseph College of Engineering, Sriperumbudur, Chennai-602 117

Abstract

In the era of Information Technology, where the use of smartphones is exponentially increasing, a critical issue has emerged regarding the delayed arrival of ambulances, contributing to over 20% of patient deaths requiring emergency treatment. The current process involves calling hospitals for ambulance services, leading to a 10-15 minute delay in dispatching assistance, which is crucial for critical patients. To address this, the proposal is to develop an Android application named "Rapid Ambulance." This application aims to save lives by allowing users to book an ambulance within moments, leveraging a live location global positioning system. Users can submit a trip request, automatically dispatched to an ambulance driver in proximity, similar to popular ride-sharing apps like Ola. The driver is alerted to the user's location through GPRS, arriving promptly to transport them to the specified or nearby hospital. The application seamlessly organizes the navigational route, calculates distance and charges, displaying the information to the user. To access the app, users can download "Rapid Ambulance" on their Android or iOS smartphones with an active SIM card and internet connectivity for OTP verification of their mobile number.

Title: Automated Solar Tracker System for Photovoltaic Panels (MECH)

Authors: Dr. Gnanasundara Jayaraja, Mr. K. Rajkumar,Mr. R. Crushan

Department: Mechanical Engineering, St. Joseph College of Engineering, Anna University, Chennai, India

Abstract:

The global shift towards sustainable energy sources has intensified the focus on optimizing the efficiency of renewable technologies, particularly solar photovoltaic panels. This thesis presents an in-depth exploration into the design, development, and optimization of an Automated Solar Tracker System aimed at enhancing the energy output of photovoltaic panels. The overarching objective is to contribute to the advancement of solar energy technologies by addressing the inherent limitations of fixed solar panel installations. The study encompasses a comprehensive review of existing solar tracking technologies, emphasizing the advantages and drawbacks of various tracking strategies. The design phase details the selection and integration of sensors, actuators, and control algorithms, considering factors such as cost-effectiveness and scalability. Prototyping and testing procedures are rigorously conducted to validate the system's performance under diverse environmental conditions. Furthermore, the economic feasibility and environmental impact of implementing automated solar tracking systems are critically assessed. This study evaluates the potential for increased energy production, return on investment, and reductions in carbon footprint compared to traditional fixed solar installations. The findings contribute valuable insights to the field of renewable energy, paving the way for more sustainable and effective solar power solutions.

Title: Development of a Smart Agricultural Drone for Crop Monitoring

Authors: Mr. K. Venkatachalam, Mr. T. Tamilanban, Mr. S. Kanthasamy

Department: Mechanical Engineering, St. Joseph College of Engineering, Anna University, Chennai, India

Abstract:

This project centers on the development of a state-of-the-art Smart Agricultural Drone designed to revolutionize crop monitoring and management practices in modern agriculture. With the global population on the rise, there is an increasing demand for innovative technologies to enhance agricultural productivity. The smart drone, equipped with advanced sensors and imaging technology, emerges as a cutting-edge solution to address these challenges. The project follows a systematic development process, encompassing the design and fabrication of the drone's hardware components, sensor integration, and software development for data analysis and visualization. Rigorous testing and validation procedures are conducted in diverse agricultural settings to ensure the drone's reliability, accuracy, and practicality in real-world scenarios. The anticipated outcomes of this project include the empowerment of farmers with a versatile tool for precision agriculture, ultimately leading to increased crop yields, resource optimization, and sustainable farming practices. The abstract encapsulates the project's vision, objectives, and technological contributions to the evolving landscape of smart agriculture, highlighting the potential impact on global food security and sustainable agricultural development.

Title: Design and Optimization of a Wind Turbine Blade

Authors: Mr.C. Gopinath,Dr. S. D. Dhanesh Babu, Mr. Selvamani C

Department: Mechanical Engineering, St. Joseph College of Engineering, Anna University, Chennai, India

Abstract:

This project focuses on the comprehensive design and optimization of wind turbine blades to enhance both aerodynamic efficiency and structural integrity. The global demand for renewable energy has propelled the need for more efficient wind energy harvesting, making the design and optimization of turbine blades crucial for maximizing energy output. The primary objective is to contribute to advancements in wind energy technology by refining the performance of individual blades. The project entails a meticulous examination of various design parameters, including blade shape, materials, and structural configurations. Utilizing a combination of computational tools and experimental testing, the study seeks to identify the optimal combination of these parameters to achieve superior aerodynamic performance while ensuring structural reliability. The anticipated outcome of this project is a set of optimized wind turbine blade designs, supported by empirical data and computational simulations. These designs aim to contribute to the broader field of wind energy by providing insights into the intricacies of blade optimization, ultimately fostering the development of more efficient and sustainable wind power solutions. The abstract encapsulates the project's overarching goals, methodologies, and potential contributions to the renewable energy sector.

Title: Implementation of a Human-Powered Electricity Generator

Authors: Mr. Vijayarahavan T, Mr. K. Ganesan Mr. G. Sundravedivel

Department: Mechanical Engineering, St. Joseph College of Engineering, Anna University, Chennai, India

Abstract:

This project focuses on the development and implementation of a Human-Powered Electricity Generator, offering a sustainable and portable solution for generating electricity through human movement. The system integrates mechanical and electrical components to harness energy from activities such as pedaling, providing a reliable power source for off-grid scenarios or emergency situations. Through meticulous design, fabrication, and testing phases, the project aims to achieve optimal efficiency and user-friendliness. The anticipated outcome is a practical and scalable human-powered generator, contributing to the exploration of alternative energy sources and addressing challenges related to energy access in remote areas or during emergencies. This project aligns with the broader goal of promoting sustainable energy solutions and fostering innovation in the realm of decentralized power generation.

Title: Hydraulic Robotic Arm for Material Handling in Industrial Environments

Authors: Mr. Vijayanandmarimuthu, Mr. Hemanandan P, Mr. Balaji B

Department: Mechanical Engineering, St. Joseph College of Engineering, Anna University, Chennai, India

Abstract:

This project centers on the design, development, and implementation of a Hydraulic Robotic Arm tailored for efficient material handling in industrial environments. The robotic arm integrates hydraulic actuators and advanced sensors to ensure precise control, enhancing productivity and safety in tasks such as material loading and unloading within warehouses or manufacturing plants. Through a comprehensive approach encompassing conceptual design, prototyping, and rigorous testing, the project aims to deliver a robust and adaptable solution to optimize industrial material handling processes. The anticipated outcome is a versatile hydraulic robotic arm that not only streamlines industrial operations but also contributes to advancements in automation technologies, emphasizing the project's significance in enhancing efficiency and safety within industrial settings.

Title: The impact of electromagnetic stirring on Metal Inert Gas welding (MIG).

Authors: Mr. Arun Kumar V, Mr.K. Ganesan, Mr. Vignesh C

Department: Mechanical Engineering, St. Joseph College of Engineering, Anna University, Chennai, India

Abstract:

The influence of electromagnetic stirring (EMS) on molten metal has been demonstrated to significantly affect crystal orientation, grain refinement, and the macroscopic appearance of solidified structures through the application of Lorentz force. In this study, the MIG welding process of 2 mm carbon steel was experimentally investigated with and without the application of an external magnetic field. The Rockwell hardness and microstructure were systematically analyzed. Metallographic test results revealed that, compared to traditional MIG welding, the EMS-MIG weld exhibited less directional crystal orientation along the faying surface of workpieces and refined grains. Microhardness tests indicated slightly higher uniformity in the fusion zone and more pronounced hardening in the heat-affected zone of the EMS-MIG weld. In terms of mechanical properties, the impact of EMS-MIG welds demonstrated higher ultimate failure loads and longer elongations at failure points than traditional MIG welds. The EMS-MIG welds also exhibited increased hardness and strength in the welded zone. In conclusion, the application of an external magnetic field during the MIG welding process was found to enhance the weld performance of carbon steel by improving weld strength. Conducting experiments and analyzing the fatigue life of an aluminum alloy subjected to anodization.

Title: Exploration of hydrophilic coatings with self-cleaning properties designed for use in outdoor applications.

Authors: Mr.C. Gopinath, Mr. Selvamani C, Mr. Vijayarahavan T, Mr.K. Ganesan

Department: Mechanical Engineering, St. Joseph College of Engineering, Anna University, Chennai, India

Abstract

Self-cleaning coatings within the automotive industry have played a crucial role in maintaining components free from dirt and grime, gaining widespread global market acceptance. These coatings are broadly categorized into hydrophilic and hydrophobic types, with the former attracting or favoring water and the latter repelling or resisting it. The present study focuses extensively on the investigation of hydrophilic coatings, predominantly utilizing materials sourced from silicon, with titanium dioxide also being a notable component. The experimentation involves coating these materials onto glass substrates, and the resulting contact angles are measured. Sol-gel processes are employed to prepare sols of titanium dioxide and silicon dioxide using their respective precursors, ensuring a simple and cost-effective approach. These sols are then applied to glass substrates through dip coating techniques. Contact angle measurements for single, double, and triple coats are conducted. For SiO2 sol, the contact angles for single, double, and triple coats are found to be 2.7°, 3.0°, and 18.1°, respectively, while for TiO2, they are 9.5°, 7.5°, and 9.6°. Upon closer examination, the single dip SiO2 sol exhibits the lowest contact angle. Furthermore, this sol is applied to various substrates, including SS 360, Cu, and Al, with detailed results discussed in the present work.

Title: Modeling and assessing residual stresses in a structure consisting of a thick-walled pipe

Authors: Mr.K. Venkatachalam, Mr. Vijayarahavan T

Department: Mechanical Engineering, St. Joseph College of Engineering, Anna University, Chennai, India

Abstract

This research centers on the modeling and measurement of residual stresses in a thick-walled pipe structure, particularly welded using a buried-arc technique. Adopting a comparative methodology, the study seeks to elucidate the efficacy of various welding methods in controlling residual stresses within the welded structure. The integration of modeling techniques and experimental measurements contributes to a holistic comprehension of the factors impacting residual stresses, providing valuable insights for refining welding processes in thick-walled pipe structures.

Title: Analyzing the Influence of Surface Roughness on a Vehicle's Resistance

Authors: Mr. Hemanandan P, Mr. Balaji B

Department: Mechanical Engineering, St. Joseph College of Engineering, Anna University, Chennai, India

Abstract

This study provides a comprehensive investigation into the impact of surface roughness on the resistance characteristics of the KVLCC2 tanker ship, utilizing advanced Computational Fluid Dynamics (CFD) technology. The analysis systematically explores various parameters, including different roughness heights, ship velocities, and specific hull sections (bow, parallel hull segment, and stern). The study employs the RANS equations and the k-ω SST model to solve the Navier-Stokes equations, ensuring a thorough analysis. Methodological robustness is confirmed through a benchmark test involving a roughened plate, validating the effectiveness of CFD in delivering high-quality results. The research extends its focus to scrutinize the nuanced influence of surface roughness on individual resistance components, addressing both pressure and viscosity components. In the context of the growing significance of maritime transport, especially for storage and transportation advantages, shipping companies are compelled to optimize vessel fuel consumption. This imperative aligns with overarching goals of mitigating greenhouse gas emissions and reducing operational costs to enhance company profitability. Hull resistance, a key determinant impacting speed, power requirements, and fuel consumption, is thoroughly examined in this research. Leveraging the capabilities of Computational Fluid Dynamics (CFD), specialized wall functions that account for roughness effects on the boundary layer near the hull are employed

Title: Exploring the phenomenon of internal corrosion in petroleum pipelines

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Abstract

Internal corrosion in petroleum pipelines poses a significant challenge for the petrochemical industry. The inherent complexity of crude oil and its derivatives, containing acids, alkalis, salts, and other corrosive elements, facilitates corrosion reactions along the inner surfaces of the conveying pipes. This corrosion not only compromises equipment integrity but also elevates the risk of accidents and diminishes the efficacy of safety protocols. Annually, global economic losses due to various corrosion types amount to 3% to 4% of the world's GDP, underscoring the critical need to explore methods to inhibit corrosion and enhance pipeline corrosion resistance within the oil production and industry sector. Exploitation and assembly processes of oil and natural gas wells, particularly those containing carbon dioxide, condensate oil, hydrogen sulfide, and brine, contribute to severe corrosion within the oil or gas transport systems. As the transport medium in oil and gas collection and transportation pipelines comprises gas, water, hydrocarbons, and solid multi-stage flow materials, the increased water content resulting from water injection during later stages of oil and gas field development exacerbates pipeline corrosion. Consequently, internal corrosion mechanisms and technologies have garnered significant attention from corrosion resistance research institutions, emerging as a focal point for research hubs aiming to enhance corrosion resistance.

Title: Investigate material properties through the Magnetic Barkhausen-Noise method for characterization

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Abstract

Non-destructive testing of ferromagnetic materials, crucial in various industrial applications, is a significant undertaking. Utilizing the detection of changes in the magnetic field, known as Barkhausen noise, resulting from the rearrangement of the domain structure of these materials, enables the determination of diverse material properties. The application of an external magnetic field for excitation facilitates the investigation of such materials in industrial settings. The Magnetic Barkhausen-Noise measurement technique (MBN), which involves determining the root mean square (RMS) average value of noise packages, proves to be a suitable method for assessing material microstructure, stress state, chemical composition, and surface treatment of ferromagnetic materials. Since the late 1980s, a new trend in MBN has emerged, focusing on the analysis of individual noise pulses. Following proper preparation of the sample, it becomes possible to broaden the range of materials that can be tested by evaluating parameters such as amplitude, width, and area distribution functions of the noise pulses. This approach allows for the determination of additional parameters related to the structure and condition of the materials. This paper provides a summary of MBN measurement techniques, encompassing both the RMS average of noise packets and the analysis of individual noise pulses. The characteristics of these measurement techniques and their applications in determining material parameters are also elucidated.

Title: Examining the aerodynamic analysis of materials and methodologies in the context of commercial automotive applications: a comprehensive review

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Abstract

This paper delves into the application of computational fluid dynamics (CFD) modeling techniques in shaping the aerodynamics and propulsion system of Formula 1 cars. Through a comprehensive literature review, the study investigates the impact of Reynolds number variations on factors such as boundary layer status, stable and unstable flows, time-dependent wake structure, interacting shear layers, and distinct flows. As highlighted in this paper, the focal point of aerodynamic analysis is the reduction of drag force, a goal achieved through the utilization of CFD tools. The primary objective of this review is to enhance car stability and minimize drag, thereby improving track efficiency and reducing air resistance on the vehicle. By employing ideas from dimensional analysis and flow uniformity, the study asserts that the aerodynamics of commercial ground cars are predominantly influenced by transitional and trans-critical flow regimes.

Title: Study Of Partial Replacement Of Fine Aggregate By Oyster Shell And Partial Replacement Of Cement By Rice Husk Ash

Authors: Mr. R. Bathrinarayanan, M. E**,** Antontbakkia Raj, J Karuppudurai. S**,** Madhu. E**,** Stevin. S

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Abstract:

Due to the excessive usage and consumption of conventional building materials, they are not sustainable or feasible sources for construction. Therefore, it is imperative to explore alternative building materials. Conventional building materials include sand, gravel, cement, and so on. The adoption of "alternative materials" should be encouraged for widespread use by designers and developers. To achieve this, these materials must offer benefits such as cost-effectiveness, resourcefulness, and easy availability. The utilization of waste products and agricultural byproducts holds great promise. In line with the IS method, mix design has been conducted, using Rice Husk Ash (RHA) and Oyster Shell as alternative materials. To make practical use of these unconventional yet much-needed materials, a meticulous model is required. In this study, we aim to optimize the use of RHA in concrete casting. To develop this model, we replace cement with RHA at various levels, including 5%, 10%, 15%, and 20%. Similarly, fine aggregate/sand is replaced by Oyster Shell at different levels.

Keywords: Concrete, Oyster Shell, Rice Husk Ash

Title: Experimental Study on Expanded Polystyrene Concrete with M-Sand

Authors: Antony Rex.I, Aravind.K, Bhupalan.A.K, Chandraprakash.N, Ms. K. Komalavalli

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Abstract:

With the growing demand for construction materials, there have been significant advancements in construction techniques. This project explores the utilization of expanded polystyrene (EPS), a non-biodegradable waste material generated by the packaging industry. The study investigates the partial or complete replacement of coarse aggregate with EPS beads at varying proportions (50%, 75%, and 100%) to produce lightweight concrete that maintains reliable compressive strength. The substitution of EPS beads at different percentages aligns with specific design requirements and yields favorable results. This approach can substantially impact a nation's economy. The study involves conducting compressive strength and split tensile strength tests by casting cube and cylinder specimens in hardened concrete. These tests are performed at the ages of 7, 14, and 28 days. The primary objective of this investigation is to assess properties like compressive strength and split tensile strength, followed by a comparison with conventional M40 grade concrete.

Keywords: Expanded Polystyrene Concrete, M-Sand, Compressive Strength, Split Tensile Strength, Lightweight Concrete, Waste Material, Construction Materials.

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