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Department of ***Electronics and Communication Engineering*** Presents,

5th International Conference on "Smart Modernistic in Electronics and Communication" on 15th & 16th December 2023

(ICSMEC-2023) **PROCEEDINGS**

ISBN:
978-93-91420-58-1

Editor in Chief
Dr.P.Santosh Kumar Patra

nirf Ranked Institute

: 8096945566, 8008333876, 8008333886 : www.smec.ac.in

: Dhulapally, Near Kompally, Secunderabad - 500 100, T.S.

ESTABLISHED 2002

5th International Conference on "Smart Modernistic in Electronics and Communication"

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Departments of Electronics and Communication Engineering

5th International Conference on "Smart Modernistic in Electronics and Communication" (ICSMEC–23)

Patron, Program Chair & Editor in Chief

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Group Director, SMEC

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Sri. M. LAXMAN REDDY
CHAIRMAN

MESSAGE

I am extremely pleased to know that the Department of Electronics and Communication Engineering of SMEC is organizing **5th International Conference on "Smart Modernistic in Electronics and Communication" (ICSMEC-2023)** on 15th and 16th of December 2023. I understand that the large number of researchers has submitted their research papers for presentation in the conference and for publication. The response to this conference from all over India and Foreign countries is most encouraging. I am sure all the participants will be benefitted by their interaction with their fellow researchers and engineers which will help for their research work and subsequently to the society at large.

I wish the conference meets its objective and confident that it will be a grand success.

M. Laxman Reddy

M.LAXMANREDDY

Chairman

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Sri. G. CHANDRA SEKHAR YADAV
EXECUTIVE DIRECTOR

MESSAGE

I am pleased to state that the Department of Electronics and Communication Engineering of SMEC is organizing **5th International Conference on "Smart Modernistic in Electronics and Communication" (ICSMEC-2023)** on 15th and 16th of December 2023. For strengthening the "MAKE IN INDIA" concept many innovations need to be translated into workable product. Concept to commissioning is a long route. The academicians can play a major role in bringing out new products through innovations.

I am delighted to know that there are large number of researchers have submitted the paperson Interdisciplinary streams. I wish all the best to the participants of the conference additional insight to their subjects of interest.

I wish the organizers of the conference to have great success.

G. CHANDRASEKHAR YADAV
Executive Director

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Dr P. SANTOSH KUMAR PATRA

GROUP DIRECTOR

I am delighted to be the Patron & Program Chair for the **5th International Conference on "Smart Modernistic in Electronics and Communication" (ICSMEC-2023)** on 15th and 16th of December 2023. I have strong desire that the conference to unfold new domains of research among the Electronics and Communication Engineering fraternity and will boost the knowledge level of many participating budding scholars throughout the world by opening a plethora of future developments in the field of Electronics and Communication Engineering.

The Conference aims to bring different ideologies under one roof and provide opportunities to exchange ideas, to establish research relations and to find many more global partners for future collaboration. About 500 research papers have been submitted to this conference, this itself is a great achievement and I wish the conference a grand success.

I appreciate the faculties, coordinators and Department Head of Electronics and Communication Engineering for their continuous untiring contribution in making the conference a reality.

(Dr. P. Santosh Kumar Patra)
Group Director

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Dr. M. SRINIVAS RAO
PRINCIPAL

MESSAGE

Contemporary Society is technological and relies on technology for various aspects of daily life. There is no life without digital platforms, Internet, apps, codes, etc. Navigating the complexities of a technological society requires a balance between embracing innovation and addressing the challenges that come in the way. Considering the immediate needs of the technical Society, SMEC has been organizing International Conferences every year which really help a candidate in acquiring technical skills and making themselves familiar with the new inventions.

International Conferences are a Perfect Platform for enthusiastic researchers to come up with their innovative ideas, and I am delighted that SMEC is organizing the **5th International Conference on "Smart Modernistic in Electronics and Communication" (ICSMEC-2023)** this academic year as well to enhance the skills of desiring participants. The showcase of new ideas and the latest technological advancements through this Conference would facilitate the transfer of technology, helping participants to get updated with the latest tools and methodologies. I firmly believe that this Conference serves as the catalyst for change by bringing attention to pressing issues in different fields, encouraging discussions, fostering collaboration, and promoting initiatives that address different challenges on a global scale. It is an excellent opportunity to broaden our knowledge, establish meaningful connections, and contribute to advancing engineering research. I assure you that the commitment to excellence in education and research is reflected in this Conference, providing a unique platform for learning and growth.

Around 500 research papers were submitted to this Conference. I wish the authors a promising future and the Conference a grand success.

I appreciate the continuous efforts and dedication of the HOD of the Electronics and Communication Engineering department and faculty members for their invaluable contribution to advancing global discourse. My most profound appreciation to the organizers and coordinators for organizing a conference of such caliber.

Dr. M. Srinivas Rao
Principal

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DR. S.V.S. RAMA KRISHNAM RAJU
DEAN ACADEMICS

MESSAGE

It gives me an immense pleasure to know that St. Martin's Engineering College, Department of the Electronics and Communication Engineering is organizing **5th International Conference on "Smart Modernistic in Electronics and Communication" (ICSMEC-2023)**. I am sure that this conference will provide a forum to national and international students, academicians, researchers and industrialists to interact and involve in Research and Innovation. Such academic events benefit the students, teachers and researchers immensely and widen the horizons of their knowledge and work experience in the field of Electronics engineering.

I sincerely appreciate the humble efforts of the Institute in providing a platform for students, academicians, researchers and industrialists to share their ideas and research outcome through the forum of this Conference.

I give my best wishes to all delegates and organizing committee to make this event a grand success.

Best Wishes

Dr. S V S Rama Krishnam Raju
Dean Academics

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Dr. SANJAY KUMAR SUMAN
DEAN R & D

MESSAGE

Research, curiosity and discovery has been in existence ever since man's presence on this planet millions of years ago, civilization has been characterized by curiosity and discovery. Therefore, the curiosity to explore what will happen, how it happens, is there a better way to do it, has been the driving force behind all research efforts. During the past few decades, the engineering faculties have taken a number of initiatives to reorient the engineering machinery to play leading roles in the industrial development process.

I am delighted to acknowledge the international conference on Advances in **5th International Conference on "Smart Modernistic in Electronics and Communication" (ICSMEC-2023)**. I appreciate organizing team for showing their keen interest in organizing a successful conference to provide a platform for contributors to explore new ideas and exchange research findings among researchers.

I thank the support of all students, authors, reviewers, conference team, faculty members, and conference convener for making the conference a grand success.

Best Wishes

Dr. Sanjay Kumar Suman
Dean R&D

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DR. D V SREEKANTH
DEAN ADMINISTRATION

MESSAGE

The III International Conference on **5th International Conference on "Smart Modernistic in Electronics and Communication" (ICSMEC-2023)** has concluded its work successfully on 15th & 16th Dec, 2023 in St. Martin's Engineering College (SMEC), Hyderabad, India. The ICSMEC-2023 was organized online/offline by the Department of Electronics and Communication Engineering, and the objective of this conference was to bring together experts from academic institutions, industries, research organizations for sharing of knowledge and experience in the recent technologies in Electronics and Communication Engineering. The conference program featured a wide variety of invited and contributed lectures from national and international speakers with expertise in their respective fields. The ICSMEC-2023has become one of the most extensive, spectacular international events hosted by St. Martin's Engineering College (SMEC), for its high-level quality and the large size of participation. Well- known international and national invited speakers addressed the audience, shared knowledge, and rich experiences on ICSMEC-2023.

I am sure that this conference will provide a forum to national and international students, academicians, researchers and industrialists to interact and involve in Research and Innovation. Such academic events benefit the students, teachers and researchers immensely and widen the horizons of their knowledge.

Best Wishes

Dr. D V Sreekanth
Dean Administration

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DR. B. HARI KRISHNA
CONVENER

MESSAGE

The world is always poised to move towards new and progressive engineering solutions that results in cleaner, safer and sustainable products for the use of mankind. India too is emerging as a big production center for world class quality. Computer Science, Electronics, Information Technology and Electrical Engineering play a vital role in this endeavor.

The aim of the **5th International Conference on "Smart Modernistic in Electronics and Communication" (ICSMEC-23)** being conducted by the Department of Electronics and Communication Engineering of SMEC, is to create a platform for academicians and researchers to exchange their innovative ideas and interact with researchers of the same field of interest. This will enable to accelerate the work to progress faster to achieve the individuals end goals, which will ultimately benefit the larger society of India.

We, the organizers of the conference are glad to note that more than 500 papers have been received for presentation during the online conference. After scrutiny by specialist 145 papers have been selected, and the authors have been informed to be there at the online platform for presentations. Steps have been to publish these papers with ISBN number in the Conference Proceedings and all the selected papers will be published in Scopus / UGC recognized reputed journals.

The editorial Committee and the organizers express their sincere to all authors who have shown interest and contributed their knowledge in the form of technical papers. We are delighted and happy to state that the conference is moving towards a grand success with the untiring effort of the faculties of Department Head of Electronics and Communication Engineering of SMEC and with the blessing of the Principal and Management of SMEC.

Dr. B. Harikrishna
HOD, ECE

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PAPERID: ICSMEC2023-001

Automatic Railway Gate Control System and Track Breakage Alert over IOT

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ABSTRACT

Railway is the most common and popular transportation system. Railway transportation is facing many problems. Closing and opening of railway gate with human intervention will causes lots of accidents due to inaccuracy. To avoid the errors caused by humans during opening and closing of gates, this system introduces the concept such as railway gate automation. The main aim of the project is that it automatically controls the operation of Railway Gates detecting the arrival and departure of train at the Gate using the obstacle sensors. Obstacle sensors are the input components while buzzer, DC motor and LCD display are the output components. The ATmega16A microcontroller forms the main unit of the system. The gate is closed, when the train crosses the first sensor and the gate is opened, when the train crosses the second obstacle sensor. This project also includes detection of track breakage because track breakage leads to lot of damage. This system will help to improve the safety of railway management and reduce the chances of the accidents due to inaccurate opening and closing of gates.

Keywords : IOT, Rail Safety

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-002

Wavelet-Based ECG Technography for Protecting Patient's Confidential Information in IoT Application

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ABSTRACT

Due to the significant advancement in healthcare sector, the security and the integrity of the medical data became big challenges for healthcare services applications. This project proposes a hybrid security model for securing the diagnostic text data in medical images. The proposed model is developed through integrating either 2-D discrete wavelet transform 1 level (2D-DWT-1L) or 2-D discrete wavelet transform 2 level (2D-DWT-2L) steganography technique with a proposed hybrid encryption scheme. The proposed hybrid encryption schema is built using a combination of Advanced Encryption Standard, and Rivest, Shamir, and Adleman algorithms. The proposed model starts by encrypting the secret data; then it hides the result in a cover image using 2D-DWT-1L or 2D-DWT-2L. Both color and gray-scale images are used as cover images to conceal different text sizes. The performance of the proposed system was evaluated based on statistical parameters such as peak signal-to-noise ratio (PSNR) and mean square error (MSE).Compared with the state-of-the-art methods, the proposed model proved its ability to hide the confidential patient's data into a transmitted cover image with high imperceptibility, capacity, and minimal deterioration in the received stego image.

Keywords: ECG Data, Steganography, DWT, PSNR.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-003

Design of CMOS Voltage Level Shifter Using Cadence

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ABSTRACT

Voltage level shifters are used in different applications like op-amp and multi vibrators. However, the convention static levels shifters are resulted in higher area, delay, power consumption. So, this work focused on design of CMOS voltage level shifter for multi-core applications. A voltage level shifter, also know as a level translator, it is an electronic circuit or device that converts a signal from one voltage level to another or it is a circuit that is used to convert one logic voltage level to another commonly used in electronic system to interface or communicate between different voltage domains that operate at inappropriate voltage levels. The proposed design aims to minimize power consumption while maintaining reliable voltage level shifting across multi cores. The voltage level shifters are crucial primitives for system-on-chip (SOC) applications and system operating with different voltage domains. The proposed level shifters are designed based on buffer and current mirror structures. The circuits are implemented in 200nm technology and simulated using cadence.

Keywords : Energy-Efficient, Single Supply Voltage Level Shifter

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-004

Multi-Security Authenticated Personal Device Access System Using IOT

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ABSTRACT

Personal Security is one of the main concerns when it comes to offices, personal workplaces, homes, etc., In this paper, we design and implement a multi-locker authenticated security system device based on fingerprint, password, voice command, and IOT technology. which suggests using the Internet of Things (IoT) to provide secure access only to an authorized person, an alert is also sent if there is an unauthorized action detection to monitor the locker's condition and provide maximum security. This project is based on an Arduino UNO microcontroller and Embedded "C" software. In this multi-security system, the biometric data of each person for assigning the lockers is collected. Only authorized persons can recover money, and documents from the locker. we have implemented a locker security system based on fingerprint, voice command, password, and IOT technology containing a door-locking system that can activate, authorize, and validate the user and unlock the door in real time for secure access.

Keywords: Fingerprint, IOT, voice command

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-005

SAR Image Fusion using Linear Discrete Wavelet Transform

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ABSTRACT

SAR (Synthetic Aperture Radar) is an active sensor transmitting its own energy and then measuring the return scattered by the earth surface back to the satellite's antenna. SAR is mainly used because it can be used to capture the images in both day and night. The fusion process involves decomposing the SAR images into different frequency sub-bands using the DWT, and then selectively combining these sub-bands based on their spatial and spectral features. By exploiting the multi-resolution analysis capabilities of DWT, the fused image retains important details from each SAR source while reducing redundancy and noise. Experimental results demonstrate the effectiveness of the proposed SAR image fusion approach, showcasing improved image quality, better feature preservation, and enhanced interpretability, thereby providing valuable insights for various applications in remote sensing and earth observation.

Keywords: SAR, Linear DWT, Entropy Values, Variance.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-008

Kidney Stone Detection in Ultrasound and/or CT Scan Images Using Image Processing and Machine Learning

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ABSTRACT

This study presents a combined machine learning and image processing approach for kidney stone detection from CT scan images. The proposed method involves preprocessing to isolate the kidney region and extract relevant features. A machine learning model such as Decision Tree, is trained on these features to classify the presence of kidney stones accurately. A dataset of the CT scans from patients with confirmed kidney stones and a control group without stones is used for evaluation. The results demonstrate high accuracy and efficiency, offering a promising non-invasive tool for aiding radiologists in early kidney stone detection and improved patient care.

Keywords: Machine learning, CT scan, Image Processing.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-010

Machine Learning-based Detection of Malaria Infection through Blood Sample Analysis

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ABSTRACT

This study proposes a "Machine Learning-Based Approach for Malaria Detection Through Blood Sample Analysis", utilizing Random Forest and Support Vector Machine (SVM) algorithms. Digital images of stained blood smears are processed to identify and analyze parasites. A supervised machine learning model, employing Random Forest and SVM, is trained on an annotated dataset to distinguish between infected and uninfected samples. The system achieves higher accuracy compared to manual microscopy, showing promise for early and reliable malaria diagnosis. Particularly beneficial in resource-limited settings, it may aid global efforts to control and eradicate malaria. Continuous validation is vital to address potential biases and ensure ethical deployment. The proposed system offers an accessible and efficient tool for frontline healthcare workers, enabling mass screening and improving disease management.

Keywords: Machine learning, SVM , Malaria Detection.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-011

Hair Removal from Dermoscopy Images using Morphology and Image Inpainting

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ABSTRACT

Hair removal from dermoscopy images is a crucial preprocessing step in computer-aided diagnosis of skin lesions. These images are often contaminated with hair artifacts, which can obscure important diagnostic features and hinder accurate analysis. Accurate and reliable diagnosis of skin lesions is essential for early detection of skin cancer and other dermatological conditions. Dermoscopy images provide valuable information for dermatologists, but the presence of hair artifacts can lead to misinterpretation and misdiagnosis. Several methods have been proposed for hair removal from dermoscopy images, including thresholding, edge detection, and machine learning-based approaches. Thresholding-based methods rely on fixed intensity thresholds to distinguish hair from skin, making them sensitive to lighting conditions and skin tone variations. As a result, they fail to remove all hair artifacts, leading to incomplete results. The proposed method combines morphology and image inpainting techniques to address the drawbacks of existing methods. In the first step, morphological operations are applied to identify and isolate hair regions based on their texture and size characteristics. This allows for a more precise and robust detection of hair artifacts compared to fixed thresholds. Next, image inpainting algorithms are employed to fill in the detected hair regions with suitable skin texture. The inpainting process relies on contextual information from the surrounding skin regions to create seamless and realistic replacements for the removed hair, preserving the vital diagnostic features at the edges of skin lesions.

Keywords: Dermoscopy, Morphology, Image Inpainting

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-012

Multi Purpose Fuel Dispenser and EV Charging for Vehicles

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ABSTRACT

Design and development of RFID based petrol pump automation system. Normal petrol pumps are manual type. Vehicle holders need to interact with operator. Converting these into automation helps to vehicle holders and saving time. By removing manual power we can decrease maintenance cost. Here we proposed solution like RFID based petrol pump automation system. RFID reader (EM-18) Interfaced to Arduino through UART interfaces. AC pump/ DC EV charge station operated by relay which is connected to Arduino digital pin. 4X4 matrix keypad connected to Arduino digital pins. In this project initially we have to swipe RFID card and need to enter password. If password is correct then it asks amount. After entering amount Petrol pump or EV charge machine will ON and fuel will dispense according to amount. For wrong password buzzer will be ON. Amount will reduced from RFID card based on entered amount. For insufficient amount buzzer will be ON. All this information will be displayed on 16X2 LCD display.

Keywords: RFID (Radio Frequency Identification Device), Relay, NODEMCU.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-013

Barcode Modulation Method for Data Transmission in Mobile Devices

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ABSTRACT

The concept of 2-D barcodes is of great relevance for use in wireless data transmission. In this any file on a phone can be transferred to another phone through a series of images on the LCD which are then captured and decoded through the camera of the second phone. Here a new approach for data modulation in 2-D barcodes is introduced then its performance is evaluated in comparison to other standard methods of barcode modulation. In this new approach, orthogonal frequency-division multiplexing (OFDM) modulation is used together with differential phase shift keying (DPSK). The aim of this project is to establish a system that is tolerant to camera movements, picture blur, and light leakage within neighboring pixels of an LCD

Keywords: OFDM, DPSK, LCD.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-014

RFID-Gsm Integration for Signal Jump Detect Alerting System

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ABSTRACT

Technologies play a vital role in making life simpler. In the entire nation, approximately two lakh people lose their lives due to road accidents every year. By implementing traffic violations and detection technology helps to detect the violation automatically without the requirement of human power. The proposed system is implemented using RFID-GSM and ARDUINO module. Traffic signal rotating as normal green and red. In the red signal time if the RFID module recognizes any vehicle then that vehicle number automatically will send through GSM to the RTO office then place an e-challan for that vehicle automatically. The Project detects any signal break by the vehicle on the traffic signals and generates the text message through implementation of programming and hardware mechanism. Deploying the RFID technology which constitutes tags storing data and transferring that data to readers over a wireless interface. Microcontroller compares this reader's information with previously stored information of that vehicle after comparing. GSM generates the texted message and sends to vehicle registered number and RTA. Owner must pay the challan amount to the RTA office or can pay online if linked to online payment system. The main aim of our proposal is to reduce the collisions of vehicles in the traffic and makes people to follow the traffic rules.

Keywords: RFID Technology, GSM (Global system for mobile communication)

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-015

Wireless Sensor Network based Ambient Environmental Monitoring System using NodeMCU and WSN Monitoring

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ABSTRACT

The rapid growth of industrialization and urbanization has raised concerns about environmental quality, making real-time monitoring critical for better decision-making and environmental conservation. The proposed system utilizes a WSN architecture comprising numerous wireless sensor nodes equipped with various environmental sensors such as temperature, humidity, air quality, and atmospheric pressure. These nodes are distributed strategically across the monitoring area, forming a self-organizing network capable of efficiently collecting and transmitting data to a central NodeMCU gateway. Here we propose a smart environment reporting system over the internet. Our proposed system allows for weather parameter reporting over the internet. It allows the people to directly check the weather stats online without the need of a weather forecasting agency. System uses temperature, humidity, pollution monitor weather and provides live reporting and alerting of the weather statistics. The system constantly monitors temperature using DHT11, Weather pollution is monitor by CO pollution sensor. The system constantly transmits this data to the microcontroller, which now processes this data and keeps on transmitting it to the online web server over a Wi-Fi connection. This data is live updated to be viewed on the online server system. Also, system allows user to set alerts for particular instances, the system provides alerts to user if the weather parameters cross those values. Thus, the IOT based weather reporting system provides an efficient internet-based weather reporting system for users. Wireless Sensor Networks (WSNs) have gained significant prominence in various application domains due to their ability to collect and transmit data from remote and harsh environments.

Keywords: NODEMCU, DHT11, WSN, IOT.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-016

Predicting Vehicle Carbondioxide Emission using IoT Technology

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ABSTRACT

Transportation sector accounts for a large proportion of global greenhouse gas and toxic pollutant emissions. Even though alternative fuel vehicles such as all-electric vehicles will be the best solution in the future, mitigating emissions by existing gasoline vehicles is an alternative countermeasure in the near term. The aim of this study is to predict the vehicle CO_2 emission per kilometre and determine an eco-friendly path that results in minimum CO_2 emissions while satisfying travel time budget. The vehicle CO_2 emission model is derived based on the theory of vehicle dynamics. Particularly, the difficult-to-measure variables are substituted by parameters to be estimated. In this paper, we present a solution to monitor CO_2 emissions produced by vehicle. We integrated CO_2 sensor to predict emissions give to Arduino microcontroller. It process the data if emission level is fine, it ignores else it alert using buzzer and IoT server. The system is implemented based on distributed sensor nodes. We determine that the CO_2 levels in our car which is within tolerable limits. The system developed has been used as a tool to take actions in order to reduce the environmental pollution, and at peak hours when the system indicates that pollution levels are high.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-017

RTC and IoT Based Automatic Fish Feeding and Water Purity Monitoring System

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ABSTRACT

Now a day's aquaculture has become a worthwhile business activity as it promotes food security and poverty in developing countries. But the feeding process is mostly done manually to overcome the problem associated with manual feeding, an automatic fish feeding system is designed by using IoT and RTC. We are using Arduino Uno as a microcontroller unit and RTC (real-time clock) is used as a timer which remains the system to feed the fishes. Servo motor act as the door to the food container and it performs depending on RTC (real-time clock) time intervals. Temperature sensor senses the temperature of the water and turbidity sensor checks the purity of the water. Ultrasonic sensor is used to monitor the quantity of the food stored in container. Buzzer is alerted whenever the temperature raises and food quantity decreases in container. LCD (liquid crystal display) shows the temperature, turbidity values and operations. By using IoT (Internet of Things) we can do automatic fish feeding systems to enhance their functionality, efficiency, and management. In fish feed farm, it is use to feed the food in container, maintain the temperature. We have used Temperature, Turbidity and RTC (Real Time Clock). In this we using IOT module to set time customization for feeding and providing water. This system will control temperature, thus this system design provides automated poultry, reduces man power and increases production of healthy chicken. Every sensor parameters data will display on LCD and IOT database.

Keywords: Aquaculture, IoT(internet of things), Arduino uno, RTC(real time clock).

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-018

Automatic Age Group Estimation Based on Edge Methodology using MATLAB

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ABSTRACT

Age group estimation in facial features plays a significant role in various applications such as biometric systems, age-targeted marketing, and personalized user experiences. This technical abstract presents a novel approach for age group estimation using edge methodology. As one ages, wrinkles start appearing in regions like forehead, eye-corners, mouth region and cheek bone areas among others. The proposed method focuses on capturing and analyzing facial edges to extract relevant features, enabling robust and accurate age group classification. The edge methodology involves detecting and extracting the edges of key facial components such as eyes, nose, mouth and other distinctive features. The Convolution Neural Network(CNN) is trained on a large and diverse data set containing labeled images, each categorized into age groups, such as children, young and elderly individuals. Recognition of the most facial variations, such as identity, expression and gender has been extensively studied. Based on the texture and shape information, age classification is done.

Keywords: CNN.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-019

Artificial Intelligence Approach for Fire Detection from Images

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ABSTRACT

In recent years, artificial intelligence (AI) approaches have shown promising results in detecting fires from images, providing an efficient and timely response to potential fire incidents. This work proposes a novel AI-based method for fire detection from images, which aims to overcome the drawbacks of existing approaches and enhance the accuracy and speed of fire detection. This abstract presents an innovative artificial intelligence approach for real time fire detection from images, leveraging machine learning techniques to achieve accurate and efficient detection. The proposed AI system utilizes a convolution neural network(CNN) architecture, specifically designed for fire detection tasks. To improve real-time fire detection capabilities, the model is optimized for high-speed processing. Quantitative met-rices such as accuracy, precision, recall are employed to assess the model's performance. The proposed AI system utilizes a convolution neural network (CNN) architecture, specifically designed for fire detection tasks.

Keywords: Convolution Neural Network (CNN), Artificial Intelligence (AI)

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-020

RFID-Based Smart Vehicle Parking and Automated Billing using IoT

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ABSTRACT

Car parking is a major issue in many malls and cities. To avoid that problem, we developed a project on smart parking system User can find the slot availability, we use IR sensor to find the parking slot on the vacancy position. In this system we use IR obstacle sensors as vehicle presence detection and these sensors are connected to Arduino Microcontroller. All 3 IR sensors detect the 3 parking positions corresponding data will be post on LCD and IOT app. If the vehicle is valid then allow for payment of the parking fee after payment done servo motor will open and vehicle get in. after vehicle get in it will be place in any of the parking slots. That parking slots information will post into IOT sever. In combination with the usage of Internet of things i.e., sending the status of the parking slot to the Internet. Through which the user at Parking place can see which parking slot is empty. This is done by sending the data of sensor through WIFI module (ESP8266). GSM gives the Information of Transaction Details in the form of SMS And Through GSM we can send the request to find the Available Parking Slots. This proposed system will reduce waiting time at parking area and by this system we can effectively use parking zone smartly. This proposed system implemented using embedded 'C' programming language.

Keywords: RFID Module, IR Sensor, GSM Module, IoT (Internet of things).

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-021

Face Mask Detection and Contactless Hand Sanitizer Dispensing System

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ABSTRACT

In the wave of the COVID-19 pandemic, hygienic practices are now deeply embedded in our minds. The primary objective of this system is to promote lasting hygiene habits and foster a safe environment beyond the pandemic. By automating the enforcement of face mask usage and encouraging hand hygiene, the proposed system employs real-time face mask presence in individuals using the ESP32 camera module. When the system identifies a person without a mask, it triggers an alert to remind them to wear one properly. By continually promoting the use of face masks, this system significantly reduces the risk of airborne diseases, even beyond the threat of COVID-19. The system includes a touchless hand sanitizer dispenser to promote ongoing hand hygiene. Users can activate the dispenser through an ultrasonic sensor, ensuring a touchless experience that minimizes cross-contamination. The system's architecture is designed for scalability, cost-effectiveness, and easy deployment in offices, hospitals, and transport hubs. This project forms the basis for a healthier and safer environment despite future infectious

Keywords: COVID-19, Hygiene, Face mask, Hand hygiene, Automation, ESP32

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-022

Automated Street Light Control and Manhole Monitoring with Fault Detection and Reporting System

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ABSTRACT

Our Project automatically operates the Street Lights by using Sensors in timely. Additionally, the system checks manhole conditions for potential hazard, By reducing accidents and improving maintenance. When an issue is detected, it automatically sends real-time reports to the municipal department. By optimizing energy consumption and reducing response time to faults, this system contributes to sustainability and urban livability. Recently, population is increasing day by day, which gives in lack of public awareness of healthy environment. This has been creating a health issues all over the world .The world is increasingly getting smarter and looking for secure, perception and smart conclusion of resource optimization to increase quality of consumer life. This necessity has led to the development of smart and safe cities connecting the virtual world to the physical bring real-time services that modify to real-time situations based on IOT technology. This system uses various sensors for monitor of infrastructural facility in a city. System sensor connected ATmega16 micro controller using wireless communication technique IOT. We are designing a smart city for better facilities and auto alerting the treat in a community. In this project we Facilitates drainage leakage system, auto intensity control of street light for power saving everything is updated into IOT. Water level sensor used to alert the and alert through GSM with live location will notify the status and LDR used to auto power saving the power.

Keywords: GPS, IR, LDR, IOT, GSM.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-023

Implementation of Edge Detection Unit Using VLSI System for Image Processing Applications

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ABSTRACT

Edge detection has a wide range of applications, including object recognition, image segmentation, and scene analysis. It is crucial in autonomous vehicles, robotics, medical imaging, surveillance systems, and various industrial automation processes. Traditional edge detection methods, like the Sobel and Canny operators, have been widely employed due to their simplicity and effectiveness. Traditional edge detection methods, like the Sobel and Canny operators, have been widely employed due to their simplicity and effectiveness. The computation of gradients and thresholds in conventional edge detectors requires extensive processing, resulting in high computational costs. The proposed VLSI implementation of the Sobel and Canny edge detectors utilizes hybrid accumulations to address the limitations of traditional methods. By using hybrid accumulations, the hardware resource requirements are optimized, making it feasible to implement the edge detectors on resource-constrained platforms.

Keywords: Sobel operator, Canny operator

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-024

Design of Multi Bit Decoder with Gate Diffusion Technique using Cadence Virtuoso Tool

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ABSTRACT

Modern digital circuits demand efficient and compact decoder designs to facilitate the translation of encoded information into actionable outputs. The Gate Diffusion Input (GDI) technique has emerged as a promising approach for optimizing digital circuit designs, offering reduced power consumption and area utilization. In this context, this abstract presents a novel multi-bit decoder architecture implemented using the GDI methodology. The proposed multi-bit decoder leverages the inherent advantages of the GDI technique, such as reduced transistor count and improved energy efficiency, to address the challenges of conventional decoder designs By employing a combination of GDI cells and appropriate logic gates, the decoder achieves a fine balance between circuit complexity, power consumption, and signal integrity.

Keywords*:* Cadence Virtuoso, Linux, CentOS, Virtual Machine.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-025

Design of CMOS-Based CDMA Encoder and Decoder using Standard Codes

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ABSTRACT

CDMA is a widely used multiple access technique in modern wireless communication systems, offering increased capacity, robustness against interference, and improved data security. It is a fundamental multiple access technique in 3G and 4G cellular networks, allowing multiple users to access the same frequency band simultaneously. The conventional CDMA implementation based on Walsh codes has many drawbacks. The number of orthogonal codes provided by Walsh codes is limited, restricting the number of users that can be accommodated in the system. Walsh code-based CDMA involves complex encoding and decoding processes, leading to increased complexity. The proposed system utilizes standard codes-based CDMA encoding and decoding to reduce the complexity and power consumption of the existing Walsh code-based CDMA. The standard codes will be carefully selected to achieve higher capacity and improved orthogonality compared to Walsh codes. The encoding process involves spreading the data signals with the standard codes using CMOS based AND gates, while the decoding process uses the same standard codes to recover the original data signals with same AND operation. The CMOS-based CDMA encoders and decoders will be designed using the Cadence tool to meet the requirements of reduced area, and high performance.

Keywords: CDMA, Cadence

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-026

ESP32 CAMERA AND IOT BASED QR PASS SYSTEM

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ABSTRACT

The number of passengers using the metro system has expanded dramatically during the last few decades. To ride in a metro, people utilize either a smart card or a token system. Those who are new to the city or do not have cards must wait in lines to obtain metro tokens. This results in time waste. To improve commuting convenience, we propose using a permanent QR code system instead of standard metro cards and tickets with IoT integration using Arduino. By expediting the ticketing procedure, minimizing waiting times, and optimizing crowd management, this solution addresses the difficulty of reducing physical card-carrying efforts for commuters. This research intends to revolutionize metro transit by making it more comfortable and accessible to passengers. As we embark on this journey towards revolutionizing metro transit, we are not merely replacing old technologies; we are forging a path towards a smarter, more efficient, and passenger-centric public transportation system.

Keywords: Arduino, IOT, ESP32, DC Motor

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-027

IoT Based DAM Water Level Monitoring & Alerting and Management System

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ABSTRACT

The IoT-based dam water level monitoring and alerting system using Arduino is a cutting- edge solution designed to enhance dam safety and provide real-time water level updates to relevant stakeholders. The system employs Arduino microcontroller, Ultrasonic sensors, and IoT communication modules to collect and transmit data to a centralized server. The growth of Internet of Things (IOT) brought the significant attention in all fields. The objective we propose in this project is the application system with integration of Internet of Things to ensure the safety to the public about the prior alerting of flood occurrence due to the increase in the water level in dams/reservoirs. To achieve the objective cloud database technique is maintained which encapsulate the periodic monitoring water level data and vicinity information. The sensor data is collected periodically that are uploaded to the cloud database where the automatic comparison analytics about the increase in water level is noted. Through a web-based dashboard, users can monitor the water levels remotely and receive instant alerts when critical levels are detected. The idea is to describe possibilities of IOT applications in dam monitoring and safety. The sensors are used to measure different levels and to check the water level and provides alert accordingly to the authorized user. When water level reaches to the first critical level (80%), it is sensed and an alert is given to the authorities using software application. So, that the authorities take necessary actions to vacate the people living near dams and when it reaches the second higher level (100%) another alert is sent on application, a red alert is given to the sensors to provide a signal to the microcontroller so the dam gates are open automatically. This innovative system aims to mini mise the risks associated with dam overflows and potential disasters, facilitating automatic gate control, and ensuring the protection of downstream areas.

Keywords: Ultrasonic sensors, IOT module, LCD.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-028

Autonomous Farming Robot using Sensor and IoT Device

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ABSTRACT

Traditional farming employs huge efforts from farmers to monitor and produce crops since ages. The use of smart agriculture techniques can help eliminate issues like manual farm weed detection, uneven ploughing and seeding etc. Various automations in agriculture include harvesting and picking robots, farm weed detection robots, and environmental parameter value sensing robots. In the proposed system an Agri Bot is used to plough and perform seeding with ease along with sensing the temperature and humidity of the field. It is equipped with a sensor for measuring environmental parameter and an Arduino for executing the tasks such as moving in various directions, ploughing, and seeding. The robot is monitored and controlled using an IoT based application. The results explain the benefit of increasing the crop yield and reducing human intervention in farming.

Keywords: Arduino UNO, IoT, Sensor, DC Motor.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-029

Smart Drug Administration System Integrating IoT and RTC Technologies

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ABSTRACT

The main aim is to make a Smart medicine box for those users who regularly take medicines and the prescription of their medicine may be very long as it is hard to remember to patients. Also, Old age patients face problem to take pills on proper time which causes certain health issues for patients having Permanent diseases like diabetes, blood pressure, breathing problem, heart problems, cancer diseases, etc. We saw these problems in hospitals & people around us who have such kind of diseases and thus based on these two problems we made smart medicine box which solve these problems by Setting up timetable of prescribed medicines as given in prescription. Therefore, at the time of taking medicine, the system generate buzzer and display the Bright light in certain pill boxes and pill box gets open. So, patient can know the specific number of boxes from which he has to take out medicines. All pill boxes are pre-loaded in the system which patient needs to take at given time. Thus, final result of our system provides fast curing of patient health by using our advantageous system. every time we will set the time, medicine description using IoT Telnet application from mobile phone. For every remanding interval of time respective voice alerts will alert you. Every status of project is monitor in LCD using 16*2 modules.

Keywords: medicine box, LCD display, buzzer, remainder

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-030

Real Time Car Parking System using Image Processing

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ABSTRACT

With the rapid increases in the usage of vehicles in recent years, finding a parking area is more difficult, which leads to practical conflicts such as traffic congestion. Here a solid system is used to identify a free slot in a parking area and keep the record of vehicles which are parked. It is very useful for the drivers to find a free slot before they reach their destination. In a proposed system, foreground detection can be used to identify the location of a moving car and track its movement. This information can be used to determine which parking spaces are available and which are occupied. By using real-time foreground detection, the parking system can provide accurate and upto-date information about the availability of parking spaces.

Keywords: Fore ground detection, Morphological operation, Erosion, Dilation.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-031

Smart Home Security Connect Hub: IoT Edge Device Monitoring and Control Gateway for Home Security

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ABSTRACT

The Smart Home Security Connect Hub is an innovative IoT edge device designed to serve as a central monitoring and control gateway for various home security applications. With the increasing adoption of smart home devices, the need for a secure, efficient, and interconnected platform has become crucial. This hub addresses these requirements by acting as a comprehensive solution to monitor and manage diverse security devices deployed throughout the home. Smart Home Security Connect Hub leverages the power of the Internet of Things (IoT) to create a seamless and interconnected network of smart security devices, including Temperature sensor, gas sensor, IR sensor, Tank level sensor or ultrasonic sensor. The hub acts as a bridge between these devices and the user's smartphone, enabling real-time monitoring, control, and alerts. The smart home security hub provides us the IoT application for home security system such as improved monitoring of the sensors and better and faster interface as compared to previous generation

Keywords: IoT, IR Sensor

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-032

Innovative Spatio -Temporal Resolution Adaptation for Video Compression

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ABSTRACT

A Video Compression framework based on Spatio-Temporal Resolution Adaptation (VISTRA) is proposed, which dynamically resamples the input video spatially and temporally during encoding, based on a quantization-resolution decision, and reconstructs the full resolution video at the decoder. By intelligently allocating more bits to regions with high spatial details and preserving the temporal coherency of moving objects, our method achieves superior compression efficiency while minimizing the loss of visual quality. To achieve this, we employ a deep learning-based framework that combines convolutional neural networks (CNNs) with recurrent neural networks (RNNs). The CNNs extract spatial features from individual frames, while the RNNs model the temporal dependencies between consecutive frames. This joint spatio-temporal analysis enables our system to capture both spatial and temporal information effectively. VISTRA has been integrated into the high efficiency video coding reference software (HM 16.14). Experimental results verified via an international challenge show significant improvements, with BD-rate gains of 15% based on PSNR and an average MOS difference of 0.5 based on subjective visual quality tests.

Keywords: VISTRA, CNN, RNN, PSNR, MOS

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-033

A Real Time Implementation of Data Hiding in Audio for Military Application using Machine Learning

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ABSTRACT

Information security is one of the most important factors to be considered when secret information has to be communicated between two parties. Cryptography and steganography are the two techniques used for this purpose. Cryptography scrambles the information, but it reveals the existence of the information. Steganography hides the actual existence of the information so that anyone else other than the sender and the recipient cannot recognize the transmission. In steganography the secret information to be communicated is hidden in some other carrier in such a way that the secret information is invisible. In this paper an image steganography technique is proposed to hide audio signal in image in the transform domain using wavelet transform. The audio signal in any format (MP3 or WAV or any other type) is encrypted and carried by the image without revealing the existence to anybody. When the secret information is hidden in the carrier the result is the stego signal. In this work, the results show good quality stego signal and the stego signal is analyzed for different attacks. It is found that the technique is robust and it can withstand the attacks. The quality of the stego image is measured by Peak Signal to Noise Ratio (PSNR) he results show good values for these metrics.

Keywords: Audio signal, Stego signal, Robustness, Peak Siganl to Noice Ratio.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-034

IoT Based Wireless Technology Control for Industrial Robotic Arm

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ABSTRACT

Industrial production involves dealing with heavy objects, risky environment and handling of harmful drugs. To avoid these circumstances and to reduce the risk of human life, we are presenting an innovative approach to enhance industrial robotic arm control through IoT-based wireless technology. In today's manufacturing landscape, optimizing efficiency and productivity is paramount, and this solution aims to address these challenges. By leveraging the Internet of Things (IoT) and wireless communication, industrial robotic arms can be remotely monitored, controlled, and managed in real time. This integration enables seamless data exchange between the robotic arms and a central control system, facilitating precise task execution and performance evaluation. IoT-based wireless technology offers numerous benefits, including enhanced flexibility, reduced downtime, and improved safety. Operators can remotely adjust parameters, monitor progress, and diagnose issues, leading to swift response times and efficient troubleshooting. However, this approach also presents certain challenges, such as ensuring data security, addressing potential connectivity issues, and training personnel to effectively utilize the IoT-powered control system. In conclusion, the fusion of IoT and wireless technology with industrial robotic arms holds immense promise for revolutionizing manufacturing processes. It sheds light on its potential advantages and considerations, paving the way for a more streamlined and intelligent industrial automation ecosystem.

Keywords: IOT, ESP32 Camera, Robotic ARM.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-035

Scattering Inpainting Algorithm for Rain or Snow Removal on a Single Image

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ABSTRACT

Bad weather will lead to the decline of image quality of outdoor acquisition, especially the rain or snow weather. At present, most of the raindrops or snowflakes removing methods are focused on video, while there are few studies on single image rain or snow removal. The core idea behind this algorithm is to effectively eliminate raindrops or snowflakes in a single image. It prioritizes preserving the boundary information of the damaged region. The algorithm operates by continually scanning the pixel color values surrounding the identified seed points, using scatter lines to guide the inpainting process. The damaged region is filled from the outer boundary to the inner region. This stepwise, outside-in approach ensures that the repaired image maintains most of its original details. Experimental results demonstrate the effectiveness of this proposed method. It successfully removes raindrops or snowflakes from single images while retaining the majority of image details. This algorithm could have practical applications in enhancing image quality under adverse weather conditions, making it valuable for various industries and purposes.

Keywords: Inpainting, Scattering

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-036

Artificial Intelligence-Based Helmet Detection for Traffic Challan System

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ABSTRACT

Riding motorcycles without wearing helmet is one of the traffic violations which have resulted in increase in number of accidents and deaths in India. The existing system monitors the traffic violations, but this requires lot of manpower and time as the number of people using motorcycles is increasing day-by-day. Recent research has successfully done automatic look for traffic violation, based on machine learning methods. But these works are limited with respect to efficiency, accuracy which resulted in lower performance. In this project, a Non-Helmet Rider detection system is built which detects the violation of not wearing helmet and extracting the vehicles license plate number. The objects detected are a person, motorcycle at first level, helmet at second level using you only look at once (YOLO) model.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-037

Advanced Driver Assistance System (ADAS) for Vehicle Safety and Security : An IoT Approach

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ABSTRACT

Nowadays, we come across a lots of road accidents in our daily life. There are many reasons behind such accidents like rash driving, diminished vigilance level of driver, drunken driving etc. Though there are different models introduced for the safety and security, maintenance and implementation cost is high in these models. Here in this work we are proposing a simple prototype for smart embedded real time monitoring of driver vigilance to avoid accidents using expression reading and to identify whether the driver is alcoholic and to give real time alarm about the situation along with vehicle security. This Project work consists of Arduino microcontroller, DC motor, Vibration Sensor, Alcohol sensor, Wi-Fi module, LCD, Buzzer. GPS module used to send live GPS location when vehicle met with an accident. Alcohol sensor is to detect the passenger and driver safety by detection of consumption of alcohol. All the sensors are integrated to microcontroller and every alerts end to WSN IOT based server to store the data and respond in any emergency situations. The complete smart embedded real time vehicle and driver safety and security system is implemented through 5v dc power s from regulated power supply. Arduino ide software based Embedded C programming use to design this prototype application of IOT vehicle Smart automation.

Keywords: Road accidents, Driver vigilance, Alcohol detection, Real-time monitoring, Embedded system, IoT

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-038

IoT Enabled Arduino System for Real Time Energy Monitoring and Remote Control

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ABSTRACT

Nowadays, IoT has become one of the important domains not just as an area of study, but also as a domain of implementation due to its invariable applications. Home Automation has become more of a necessity than a luxury to many households. Due to the increasing usage of mobile devices, providing security features to households through mobile devices makes a lot of sense. We are proposing a project where our main objective is to create a Home Automation System which helps us to save energy and at the same time is cost-effective and flexible. This project presents the methods used for developing Wi- Fi Home Automation System for monitoring the electrical energy consumption of our houses tracked in real- time using an Arduino Uno. There are many sensors like WIFI Module (ESP8266) that will be interfaced with the Arduino Uno Board. Which will give us the real-time status of the surroundings and also assist us in monitoring various appliances like lights, fans, etc. Communication between people and devices will be interfaced through an android application which will help them to control the devices and will provide a real-time feed of various appliances and sensors.

Keywords: Energy Meter, ESP8266

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-039

RFID Based Smart Library Management System using IoT

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ABSTRACT

The RFID-based Smart Library Management System is an innovative and automated approach to improve the efficiency and security of traditional library operations. This system leverages Radio Frequency Identification (RFID) technology to streamline various library tasks, including book check-in, check-out, inventory management, and security. Traditional library management systems often rely on manual processes, which can be time-consuming and prone to errors. The core components of the system include RFID tags, RFID readers, a centralized database, and library management software. Each book in the library is equipped with an RFID tag containing unique identification information. RFID readers, strategically placed at entry/exit points, interact with these tags to collect data. The user will receive the message through GSM after collecting the book. In conclusion, the RFID-based Smart Library Management System offers numerous benefits, such as improved operational efficiency, reduced staff workload, enhanced book security, and better user experience for library patrons.

Keywords: IOT, RFID, GSM, Book Management, Readers, Tags.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-040

Maize Leaf Disease Detection and Classification using Supervised Learning Model

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ABSTRACT

This paper focuses on developing an automated system for detecting and classifying diseases affecting maize leaves using supervised learning models. Maize Plant leaf diseases can affect plant leaves to a certain extent that the plants can collapse and die completely. These diseases may drastically decrease the supply of vegetables and fruits to the market, and result low agricultural economy. The aim is to enhance crop management by timely identifying and categorizing diseases through image analysis. So, in this study we Proposed 'Supervised Learning Method', which is used to detect the different types of diseases from a 'Maize Leaf'. Leaf Blight, common Rust and Leaf Spot diseases were chosen for this study as they affect most parts of Maize Plant.

Keywords: SVM, Leaf Blight, Common Rust and Leaf Spot

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-041

Microcontroller Based Industrial Area Monitoring System for Civilian Safety

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ABSTRACT

A microcontroller-based industrial area monitoring system for civilian safety is a technology solution designed to enhance safety and security in industrial environments. This system typically employs various sensors, communication modules, and a microcontroller to monitor different parameters and provide real-time information to ensure the safety of workers and civilians within or around industrial areas. This IAMS (INDUSTRIAL AREA MONITORING SYSTEM) will broadcast the information to the civilian through Arduino IOT cloud. So anyone can view the information and they can take the safety precautions. The proposed system integrates a network of sensors strategically placed throughout the industrial area to monitor various parameters, such as temperature, humidity, gas levels, and fire accidents. These sensors continuously collect data and transmit it to a central microcontroller unit. The industrial sensor monitoring is very important for employee security. Now a day's technology enhances the security system to next level.. In the proposed article we monitor the Industrial security parameters and alerting system to prevent the over damage in case of emergency. Proposed system uses temperature sensor, smoke, fire sensors for security monitoring and data will process by Arduino Microcontroller. All the sensor data will post into IOT server and LCD which inbuilt in Arduino

Keywords: Sensors, Arduino , IoT, LCD.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-042

IoT-Enabled Wearable Tele-ECG Health Monitoring System for Portability

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ABSTRACT

This paper presents a wearable health sensor network system for Internet of Things (IoT) connected safety and health applications. Safety and health of a patient are important in hospital workplace; therefore, an IoT network system which can monitor all health parameters and update through wireless hence it is portable. The proposed network system incorporates multiple wearable sensors to monitor environmental and physiological parameters. The wearable sensors on different subjects can communicate with each other and transmit the data to a gateway via IoT platform medical signal sensing network. In the proposed system having heart rate, temperature, vibration sensors all integrated to the parallel processing microprocessor. Health parameters re measured by sensors and give the ARDUINO module. This module analyse the data aand monitor in LCD, post the same in internet of things based server. We continuously monitor, if any changes found like high heart rate, high temperature, patient movement IoT alerts the authorized person regarding health. A smart IoT gateway is implemented to provide data processing, local web server and cloud connection. After the gateway receives the data from wearable sensors, it will forward the data to an IoT cloud for further data storage, processing and visualization. Thus health can be monitored from anywhere in the world.

Keywords: IoT Platform, Arduino UNO, Wearable sensors, Portable, Cloud access

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-043

RTC Timer Driven Medicine Pill Reminder for Simplified Supervision

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ABSTRACT

RTC Timer Driven Medicine Pill Reminder is a user-friendly and innovative healthcare solution designed to simplify medication supervision and enhance patient compliance. This system leverages cutting-edge components, including the DS3231 RTC timer module for precise timekeeping, an APR33A3 voice module for clear and audible medication reminders, an HC-05 Bluetooth module for remote monitoring and control, and a 16x2 LCD display for intuitive user interaction. By seamlessly integrating these components, our system provides an efficient and personalized medication reminder experience. Users can program their medication schedule, receive timely audiovisual alerts, and even remotely monitor adherence through a mobile app. This technology not only ensures timely medication intake but also promotes independence and peace of mind for both patients and caregivers. The RTC Timer Driven Medicine Pill Reminder represents a significant step forward in simplifying medication management and improving patient well-being.

Keywords: RTC Timer, Medicine Pill Reminder, Audiovisual alert, Medication Supervision, Medication Management, Scheduling, Medication Adherence.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-045

Deep Learning-Based Traffic Sign Recognition for Autonomous Driverless Vehicle

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ABSTRACT

Traffic sign detection and recognition play a crucial part in driver assistance systems and autonomous vehicle technology. One of the major prerequisites of safe and widespread implementation of this technology is a TSDR algorithm that is not only accurate but also robust and reliable in a variety of real-world scenarios. However, in addition to the large variation among the traffic signs to detect, the traffic images that are captured in the wild are not ideal and often obscured by different adverse weather conditions and motion artifacts that substantially increase the difficulty level of this task.

Robust traffic sign detection and recognition (TSDR) is of paramount importance for the successful realization of autonomous vehicle technology. The importance of this task has led to a vast amount of research efforts and many promising methods have been proposed in the existing literature. However, the machine learning methods have been evaluated on clean and challenge-free datasets and overlooked the performance deterioration associated with different challenging conditions (CCs) that obscure the traffic images captured in the wild. In this paper, we look at the TSDR problem under CCs and focus on the performance degradation associated with them. To overcome this, we propose a Convolutional Neural Network (CNN) based TSDR framework with prior enhancement.

Keywords: TSDR, CNN, Enhancement.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-046

Sensor Guided Surveillance Robot For Enhanced Security

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ABSTRACT

The main objective behind this paper is to develop a robot to perform the act of surveillance in domestic areas. Nowadays robots play a vital role in our day-to-day life activities thus reducing human effort and human error. The purpose of this surveillance robot is to roam around and provide video information from the given environment and to send that obtained information to the user. The robot can be controlled with the help of mobile through the Internet of Things (IoT) and also can provide live feed of video both in day time as well as at night with the help of a wireless camera. The robot can be operated both in manual as well as in automated mode with the help of an Arduino microcontroller. This robot also uses various sensors that collect data and sends it to the Arduino microcontroller which controls the robot behavior. Along with the obtained live streamed video output, users can also obtain the presence of metal bombs using metal detectors. Thus, the action of surveillance can be performed. Further advancement in our project can provide surveillance even in defense areas.

Keywords*:* Surveillance, Internet of Things, Arduino Microcontroller, Sensors, Live feed.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-047

Bone Extraction in X-Ray Images by Analysis of Line Flection

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ABSTRACT

Segmentation of X-ray bone images is of concern in many medical applications such as detection of osteoporosis and bone fractures. Segmentation of such images is a challenging process. Varying brightness throughout the image makes it difficult to separate bones from background and soft tissue. Costume made as well as standard segmentation methods, such as active contour and region growing, have been applied to bone X-ray images. Although each method could perform well for some images, due to variety of bone structures and lighting conditions none of these methods can be considered as complete. In this we present a new bone segmentation method in which an image goes through pre-processing steps such as noise cancellation and edge detection. Analysis of intensity fluctuations in all rows of the image results in more accurate segmentation of bone regions. Visual evaluation show that the proposed algorithm segments bones better than conventional and some recent bone segmentation approaches.

Keywords: X-Ray Image, Sobel operator, Canny operator, Bone Segmentation, Edge detection.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-048

Predictive Analystics for Optimal Water Management in Smart Irrigation System using Node MCU Data

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ABSTRACT

Water management is a crucial aspect of modern agriculture, and the adoption of smart irrigation systems has gained significant attention due to its potential to optimize water usage while maximizing crop yields. Predictive analytics plays a vital role in smart irrigation systems, enabling farmers to make data-driven decisions based on real-time and historical data. Traditional irrigation methods often rely on fixed schedules or manual observations, which may not accurately represent the actual water requirements of crops. Additionally, some existing smart irrigation systems use rule-based approaches that consider only basic environmental factors, potentially leading to suboptimal water allocation. These methods may not adapt well to changing environmental conditions and may not fully exploit the potential of predictive analytics. In this study, we propose a predictive analytics approach for optimal water management in smart irrigation systems using machine learning algorithms with temperature, humidity data acquired from Node-MCU. The trained machine learning models are used to forecast future water requirements based on real-time data, allowing the system to predict the optimal irrigation schedule for each crops

Keywords: Node-MCU, Water allocations

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-049

Design of Reconfigurable Logic Blocks Based Sequential Circuits

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ABSTRACT

Reconfigurable sequential circuits find applications in various digital systems, including communication networks, data processing units, embedded systems, and FPGA-based designs. Their ability to adapt and reconfigure their functionality on-the-fly allows them to accommodate dynamic requirements and optimize the use of hardware resources. Traditional implementations of sequential circuits involve static configurations, where the logic and functionality are fixed during synthesis. While these methods are straightforward to design and implement, they lack adaptability and cannot be modified without redesigning the entire circuit. The proposed method involves the utilization of a dedicated Reconfigurable Logic Block (RLB) within the sequential circuits, allowing for dynamic configuration changes without altering the overall circuit structure. The RLB can be programmed to provide different logic functions using look up tables, multiplexers, enabling the sequential circuit such as counters and shift registers to change its behaviour.

Keywords: LUTs, Sequential Circuits.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-051

Soil Classification and Characterization using Image Processing

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ABSTRACT

Agriculture is most important for survival of human being on the earth. As we know that agriculture land is decreasing day by day while population increasing day by day. But it is fact that production is also increasing because of several technologies. It is also fact that income of farmer is not increasing to survive in current scenario because of that several farmers hanging themselves. That is why we require a free application that helps them in real world to inform them to identify soil by the type &there composition with suggestion likes suitable crops for the corresponding type of soil. In India there are various types of soil. Since soil is a store house of minerals. Farmers are depending on soil for growing different type of crops But mostly farmers are don't know which crop are grow in which soil. We are now taking about soil of Rajasthan. In Rajasthan, main soil is in desert form. But south part of Rajasthan of soil where farmer can grow crops. In Rajasthan there are various type of soil are available sandy, saline, alkaline, calcareous soil are also present, we can classify the soil by image processing method in which we can see the color, energy, HSV etc.

Keywords: Agriculture ,Image processing ,HSV.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-052

Real-time Cognitive Analysis and Prediction of Human Behaviour in Collaborative Environments

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ABSTRACT

Collaborative learning methods have been implemented broadly by organizations at all stages, as research recommends that active human involvement in cohesive and micro group communications is critical for effective. The conventional Machine Learning -based system architecture to promote understanding of the behaviours, group dynamics, and interactions. However, these models are resulted in poor classification performance due to lack of feature analysis. The objective of this work is to propose a machine learning-based methodology system architecture and algorithms to find patterns of learning, interaction, and relationship and effective assessment for a complex system involving massive data that could be obtained from a proposed collaborative learning environment. Collaborative learning may take place between dyads or larger team members to find solutions for real time events or problems, and to discuss concepts or interactions during situational judgment tasks. Finally, convolutional neural networks (CNNs) are developed for feature extraction, action identification.

Keywords: Collaborative environment, CNN

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-053

Advancements of CMOS Technology in Variable Gain Amplifiers for RF Communication Systems

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ABSTRACT

The variable gain amplifier (VGA) can be used in wireless communication systems, such as cellular networks (4G, 5G), Wi-Fi, Bluetooth, and Internet of Things (IoT) devices, to enhance receiver performance in diverse signal conditions. The VGA are essential components in RF receivers, providing controllable gain to adapt to varying signal strengths, improve receiver sensitivity, and mitigate dynamic range issues. The conventional bipolar or discrete RF amplifiers require a larger area on the integrated circuit, increasing production costs and limiting integration. The proposed work focused on development of complementary metal oxide semiconductor (CMOS) based VGA to address the drawbacks of existing RF amplifiers, such as limited dynamic range, high power consumption, and increased area requirements. The CMOS based VGA offers a wide range of programmable gain levels, allowing adaptation to different signal strengths and dynamic range requirements. The proposed design is implemented using the Cadence Virtuoso tool, targeting a 90nm process node.

Keywords: CMOS, IOT,VGA

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-054

Automatic Blood Cell Counting From Microscopic Images

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ABSTRACT

Blood cell segmentation is hot topic in medical field, using blood cell segmentation identify the disease and infected blood cells, sometime the white blood cell growth is low and red blood cell growth rate is higher using image segmentation of MATLAB tool is a useful tool to identify different scenarios of blood cell counting using Edge Segmentation.Microscopy image of blood cell is first reads in RGB and gray scale image segmentation and after that blood cells in image can be counted. Segmentation of partially overlapping objects with a known shape is needed in an increasing amount of various machine vision applications.

Keywords: Blood cell, Edge Segmentation, Overlapping Cells

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-055

IOT and RFID Based Bus Identification System with Voice Alert for Enhance Accessibility to Visually Impaired

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ABSTRACT

A bus detection system using RFID technology that aims to ease the traveling and movement of blind people. The proposed system consists of two detection subsystems, one on the buses and the other on the bus stations and a website. In the bus detection subsystem, the nearby stations will be easily detected and then announced through a voice message inside the bus. In the bus station subsystem, the coming buses will be detected and then announced in the station to alert the blind people. The bus details will be posted on the website using IoT. This system is used to help blind people to travel smoothly and independently from one place to another by providing complete and clear information. Every status of project is monitor in LCD using 16*2 modules. The proposed system is designed using ARDUINO microcontroller using Arduino IDE software. 5V regulated power supply used to control ARDUINO microcontroller.

Keywords: RFID Tag and Reader, IOT, Arduino microcontroller.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-056

Enhanced Motor Vehicle Security System for Rental Purposes using IoT

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ABSTRACT

Vehicle theft is a serious issue throughout the world particularly for the rental vehicles. The existing measures to arrest these issue is not sufficient enough to protect vehicles being theft, therefore an efficient security system for motor vehicle is require which should be reliable, economical and effective. Conventional security systems have limitation in terms of real-time application, control and integration. This project is attempting to solve this problem using IoT for security of both passenger as well as vehicle. This project uses GPS for tracking, employs password through keypad, fingerprint sensor for 2-step authentication, switch to determine ignition status and vibration sensor for crash detection. We also use buzzer connected to a Arduino UNO as an emergency alarm system. The proposed project provides a novel solution not only for theft protection, but also for crash detection.

Keywords: IoT, GPS, Authentication, Arduino UNO.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-057

VOTE GUARD : Fingerprint and smartcard based E- voting system for ensuring security and fraud resistant polling

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ABSTRACT

The conventional voting system is being replaced by electronic voting machine to safeguard the security reliability and transparency. There are two types of E- voting system. The first one is based on visiting a polling station: voters do not fill voting cards as in the paper form but push buttons on various electronic devices. Second type of E-votingsystem is based on smart technology. Usually electros vote using computers at distant locations or at polling stations. We design an embedded electronic voting machine that works with authentication based on smart card and fingerprint with RFID encryption. Our system is faster and more secure than conventional one.

Keywords: RFID and Smart Card

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-058

Ceramic Tile Crack Detection using Morphological Operations

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ABSTRACT

In ceramic tiles manufacturing industry, tiles are manufactured at large scale which makes it more challenging to ensure the quality of each tile according to the set standards. Mostly, Statistical Process Control (SPC) is used by tile manufacturers at each step to monitor various processing parameters. SPC procedures are implemented manually that requires sufficient number of experienced human resource to identify defected tiles from a batch of tiles. The manual inspection also gives low accuracy of defect detection due to human errors and hard environment. Considering these drawbacks, in this process an automated defect detection method is proposed which is based on image processing and morphological operation to ensure the quality and standard of tiles. The proposed method resizes and converts the input RGB image into grayscale image and removes any possible noisy artifacts. An edge detection algorithm is applied on grayscale image to enhance the edges representing the cracks. Afterwards, morphological erosion and dilation operations are applied, one at a time, to get two intermediate images. Finally, edges are detected by subtracting eroded intermediate image from dilated intermediate image. For detection, the proposed algorithm does not require any separate reference image. The algorithm is tested on an image set of sixty different defected tile images and attained 92% average detection accuracy.

Keywords: Morphology, Histogram.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-059

Smart Zone Accident Prevention Utilizing Zigbee Transceiver Technology

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ABSTACT

As far as automobiles are concerned, safety is very important to reduce the occurrence of accidents in speed restricted zones. It minimizes the loss of property and life. According to the recent surveys, in the past few years, an accident near the school zones, hospital zones and sharp turnings have increased tremendously, because of their hurry to get the targeted place soon. Therefore controlling vehicle speed has been a crucial issue to be considered. This paper aims to give a practical, compact and simple design to develop an automatic vehicle speed control system, which has to be quickly get implemented in school, college, hospital, sharp turning zones to reduce the number of accidents. This automated speed controlling system is built using the microcontroller- based platform of the Arduino Uno board. The transmitter circuit is powered by dc battery is enough for the working of ZIGBEE which is placed near the restricted zones. If the speed of the vehicle is greater than the predefined speed then the microcontroller controls the speed of the vehicle motor by sending a signal to the motor driver in it and the motor driver used reduces the speed of the electric motor, if rpm of motor decreases which automatically reduces the speed of the vehicle in that particular zone. In the receiver section, it receives the speed of the vehicle through speed encoder input signal, and other components of the receiver unit are a ultrasonic sensor, dc motor, motor driver, LCD display, Zigbee receiver, Arduino UNO as a microcontroller. Based on the signal received from the transmitter placed in a special zone the speed of the vehicles reduces automatically with the help of these devices.

Keywords: Zigbee, Arduino UNO, Automatic vehicle

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-060

Accident Detection and Traffic Flow Analysis for Intelligent Road Traffic Monitoring

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ABSTRACT

Intelligent road traffic monitoring requires efficient systems to handle the vast amount of data generated by traffic surveillance cameras every second. Manual monitoring of this data is labor-intensive and impractical, necessitating the adoption of automated solutions.The existing method requires a huge amount of hardware equipment deployed to the road. Moreover, they are very sensitive to the external noise and environmental conditions. It is more accurate when processing a limited number of vehicles, but it does not work well on large-scale datasets. To address this challenge, a deep learning approach using Convolutional Neural Networks (CNNs) can be leveraged for traffic monitoring and control. The primary objective of this work is to develop a fast and accurate traffic detection system that significantly reduces the need for human intervention. In this proposed work, we focus on accident detection and traffic flow analysis as key components of an intelligent road traffic monitoring system. The traffic surveillance data is pre-processed to construct a comprehensive training dataset. Using this dataset, we create a specialized CNN architecture by transferring a pre-trained network to traffic-related applications and retraining it with our self-established data. By utilizing the CNN, the system can effectively classify various multiclass problems, including accident detection, and identifying dense or sparse traffic conditions.

Keywords: Convolution Neural Network(CNN), Support Vector Machine(SVM)

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-062

Li-Fi Communication Based Secure Data and Audio Transmission System using UART Protocol

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ABSTRACT

The Li-Fi Communication Based Secure Data and Audio Transmission System using UART Protocol is an innovative approach to achieve secure and high-speed data and audio transmission. The system utilizes Li-Fi technology, which employs light signals for communication, providing increased security and reduced interference compared to traditional RF-based methods like Wi-Fi. The system's architecture involves integrating a Li-Fi module with the Arduino using the UART protocol. UART allows asynchronous serial communication, ensuring efficient and reliable data transfer between devices. With the combination of Li-Fi and UART, the system offers secure transmission of data and audio, making it suitable for applications where confidentiality is critical, such as military communications, healthcare, and industrial automation. Li-Fi is one of the wireless technologies which uses visible light for communication. Li-Fi has achieved remarkable success in every field of communication as it uses visible light which has high speed, more security and less interference due to which large capacity wireless data transmission is possible. The objective of this paper is to transmit text (Hexadecimal characters) and Audio information using light as carrier. The high flickering LED is used as a source to transmit text data and audio respectively.

Keywords: UART Protocol, Li-Fi, LED, Wi-Fi.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-063

Railway track fault detection by using orthogonal threshold segmentation

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ABSTRACT

Computer vision can provide many potential advantages over manual methods of railway track inspection. Great levels of performance can be achieved through the automation of inspection using computer vision systems, as they allow scalable, quick, and cost-effective solutions to tasks otherwise unsuited to humans. At a minimum, railway track components can be objectively and quantitatively inspected, as the system does not suffer from fatigue or the subjectivity inherent with human inspectors. The digital nature of the data collection involved with a computer vision based method, archiving inspection results and trending of the data becomes feasible, leading to more advanced failure prediction models for maintenance scheduling and a more thorough understanding of railway track structure. In this research paper, a computer vision based method is presented. A system has been suggested which can periodically take images of the railway tracks and compared with the existing database of non-faulty track images on a continuous basis. If a fault arises in the track section, the system will automatically detect the fault and necessary actions can be taken, to avoid any mishappening.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-065

IoT Based Smart Irrigation and Monitoring Polyhouse Farming Environment

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ABSTRACT

India is an agriculture dependent nation with almost 60 percent of land being utilized for agriculture .The growth of agriculture industry is bound to the two major parameters, quality and quantity of production. IOT based smart irrigation helps the farmers by supplying sufficient water to the plants without any manual work and the poly house farming is an excellent method which enables the production of crops with minimum resources, efforts and gives maximum yield by providing a controlled environment conditions. In the existing system we cannot monitor the environmental conditions in the house. Poly house is a methodology to grow crops under controlled environment with continuous monitoring and analyzing the parameter values such as temperature, humidity, soil moisture and rain fall by using sensors. We propose an automated IOT based smart irrigation and poly farming system in order to increase the yield and quality of crops.

Keywords: IOT, Poly house, Smart irrigation.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-066

Implementation of IoT Static Random Access Memory Cell using Cadence

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ABSTRACT

Static Random Access Memory (SRAM) is a critical component in modern digital integrated circuits, providing fast and efficient data storage for on-chip memory applications. SRAM is extensively used as cache memory in CPUs and other high-performance processors. The conventional 6T and 8T SRAM cells have read and write stability drawbacks, which limits their performance and efficiency. The 6T SRAM cell suffers from high leakage current, which results in increased power consumption and 8T SRAM cell is vulnerable to read and write disturbances, leading to potential data loss. The proposed 10T SRAM cell overcomes the limitations of the 6T and 8T cells. The additional transistors in the 10T SRAM cell enhance read and write stability, reducing the susceptibility to read and write disturbances. The implementation of 10T SRAM cell using the Cadence design tool aims to demonstrate the practicality and advantages of this cell structure in modern memory applications.

Keywords: SRAM, Cadence

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-067

Lossless and Reversible Data Hiding in Encrypted Image with Public Key Cryptography

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ABSTRACT

This paper proposes a lossless, a reversible, and a combined data hiding schemes for cipher text images encrypted by public key cryptosystems with probabilistic and homomorphic properties. In the lossless scheme, the cipher text pixels are replaced with new values to embed the additional data into several LSB-planes of cipher text pixels by multi-layer wet paper coding. Then, the embedded data can be directly extracted from the encrypted domain, and the data embedding operation does not affect the decryption of original plaintext image. In the reversible scheme, a preprocessing is employed to shrink the image histogram before image encryption, so that the modification on encrypted images for data embedding will not cause any pixel oversaturation in plaintext domain. Although a slight distortion is introduced, the embedded data can be extracted and the original image can be recovered from the directly decrypted image. Due to the compatibility between the lossless and reversible schemes, the data embedding operations in the two manners can be simultaneously performed in an encrypted image. With the combined technique, a receiver may extract a part of embedded data before decryption, and extract another part of embedded data and recover the original plaintext image after decryption.

Keywords: Cryptography, Encryption, Decryption

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-068

Two Step Authorised Smart Door Lock System

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ABSTRACT

Despite the availability of digital password lockers and advanced door locks, hacking the lock code by an unauthorized person has become a plain-sailing task. Thus, the main goal of this project is to design a highly advanced and secured Door locking security system using IOT technology. The system aims to enhance security, convenience, and user experience in residential and commercial settings. The biometric module ensures secure user identification through fingerprint recognition and PIN-based authentication The camera cables real-time monitoring and captures images enhancing surveillance and sends the image to the user through email, if any unauthorized user is identified. The LCD display provides user feedback and communication, while the integrated buzzer offers audible acknowledgment during authentication. The DC motor-driven locking mechanism ensures reliable and efficient door access. This technologically advanced Smart Door Lock System revolutionizes access control, providing a secure and user-friendly solution for safeguarding premises.

Keywords: IOT Technology, LCD, DC motor

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-069

Design and Synthesis of Vedic Multiplier using HSCG-SCG Adder

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ABSTRACT

The Modified Vedic Multiplier is a multiplication algorithm based on ancient Vedic Mathematics principles. The algorithm uses a series of vertical and crosswise calculations to perform multiplication. The Modified Half sum carry generation (HSCG)- full sum carry generation (SCG) Adder is an improved version of a conventional binary adder, which uses a decoder to generate partial products and a carry tree to produce the result. The Modified Vedic Multiplier using Modified HSCG-SCG Adder has advantages over traditional multipliers, such as reduced latency, reduced power consumption, and higher speed. It is suitable for use in applications that require high-speed multiplication, such as digital signal processing, image processing, and cryptography. The implementation of this algorithm can be done using Verilog HDL, a hardware description language. The design can be simulated and tested using a hardware simulator such as Vivado.

Keywords: HSCG-SCG, HDL, Verilog

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-072

GPS-Enabled Smart Trash Management System with Real-Time Location Tracking

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ABSTRACT

A new age of computing called the Internet of Things (IoT) is used to connect devices through the Internet. It is a huge network which gathers Information such as how they are used, where they are operated and their surroundings. The process of collecting the waste is not done in the efficient manner some bins would be left out without collecting the waste and sometimes even though the bin overflows with waste it will be collected only at the scheduled days. This may lead to diseases like Malaria, Dengue etc. The existing system used GSM technology to pass the information of the garbage bin to the garbage collecting truck driver or to the government web server, rather than Sending messages through text, viewing the information in google map will be more efficient. Using IoT technology, a smart living concept called smart garbage tracking system is implemented. This system was an integration of technologies such as IOT, Android and GPS. We can overcome social issues such as overflow of dustbins, control the spread of bacterial and viral infections and also we are helping the community for a cleaner environment.

Keywords: GSM technology, GPS, Smart garbage tracking system.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-073

Remote Control Anti Accident ROBPOT near Railway Tracks

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ABSTRACT

The main aim of our project is to operate and control the unmanned Railway track crack detection in the proper manner in order to avoid the accidents in the unmanned railway crossing. In a country like ours where there are many unmanned railway crossings, Accidents are increasing day by day. In terms of network size, Indian Railways is the fourth largest in the world. The accidents of trains harm the lives of people and property of train hence it is necessity to maintain the good track without any defaults. To overcome this problem we proposed a modern solution using IR Sensor, Ultrasonic sensor and Wireless Communication Technology By this we can detect the obstacles on railway tracks as well as detect the damage of railway tracks. This proposed system we check the obstacle present in front of the train, detect the left and right railway crack. If any abnormalities in those it send automatic GSM based SMS to the station master to avoid the accidents.

Keywords: Ultrasonic sensor, IR sensor, GSM.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-080

Smart Shopping Trolley Using RFID and ZigBee Technology

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ABSTRACT

To begin with, the modern technology has increased the standard of living for humans. Today however, shopping has developed into a world of its own. The "Smart Shopping Trolley Using RFID and ZigBee" aims to revolutionize the shopping experience by introducing a technologically advanced shopping cart. This innovative cart is equipped with Radio-Frequency Identification (RFID) and ZigBee communication, creating a seamless and efficient shopping process. RFID technology allows customers to simply place items with RFID tags into the cart. The system automatically identifies and records the items, eliminating the need for manual scanning and checkout queues. As shoppers move through the store, the ZigBee communication system keeps track of their cart's contents, ensuring accurate billing. The aim is to reduce the time consumption needed for the billing system.

Keywords: Power supply, PIC Microcontroller, RFID, ZigBee transmitter and receiver, LCD display.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-081

Barcode Modulation Method for Data Transmission in Mobile Devices

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ABSTRACT

The concept of 2-D barcodes is of great relevance for use in wireless data transmission. In this any file on a phone can be transferred to another phone through a series of images on the LCD which hare then captured and decoded through the camera of the second phone. Here a new approach for data modulation in 2-D barcodes is introduced then its performance is evaluated in comparison toother standard methods of barcode modulation. In this new approach, orthogonal frequency-division multiplexing (OFDM)modulation is used together with differential phase shift keying (DPSK).The aim of this project is to establish a system that is tolerant to camera movements, picture blur, and light leakage with in neighboring pixels of an LCD

Keywords: OFDM, DPSK, LCD.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-082

IoT Based Smart Home Automation System

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ABSRACT

The aim of this project is to control the lights, fans and detecting of fire and gas leakage at home using the IoT Blynk cloud platform, an ESP32, and an L298N motor driver. By doing so we can enable remote control of these devices, providing greater convenience and flexibility for the enduser. The ESP32 will act as the central hub of the project, receiving and processing data from the Blynk cloud platform. The L298N motor driver will be used to control the lights and fans, with the ESP32 sending signals to the driver to turn the devices on or off as required. Through the Blynk cloud platform, the user will be able to remotely control the lights and fans, turning them on or off as needed from a mobile device or computer. This will be achieved through the creation of a customized interface in the Blynk app, allowing the user to interact with the devices using buttons or switches. Overall, this project offers a practical and effective solution for remotely controlling the lights and fans in a home, and also detects fire and gas leakage and enhancing the comfort and convenience of the living space.

Keywords IoT, ESP32, L298N motor driver, Blynk cloud platform.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-083

Generation of Power from Railway Tracks

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ABSTRACT

In this project, we are generating electrical power as a non-conventional method by simply running the train on the railway track. Non-conventional energy using railway tracks needs no fuel input power to generate the output of the electrical power. This project uses simple drive mechanisms such as rack and pinion mechanisms. The control mechanism carries the rack and pinion, D.C generator, battery, and inverter control. In this, we are attaching the dynamo with gear (pinion) set up on the train and we are placing the rack on the track. Rack & pinion used the rotational motor to affect the linear motion via a rack & pinion combination. The generator used here is a permanent magnet D.C. generator. The generated voltage is 12Volt D.C. The battery is connected to the inverter. This inverter is used to step down the 12 Volt D.C to the 230 Volt A.C. This 230 Volt A.C voltage is used to activate the light, fan, etc. By increasing the capacity of the battery and inverter circuit, the power rating is increased.

Keywords: Railway Track, DC motor, rack and pinion mechanism, DC Generator, Inverter, Rechargeable Battery.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-084

Electric Vehicle using Renewable Resources

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ABSTRACT

The revolution from gasoline-powered vehicles to electric vehicles (EVs) has been a gradual process to stabilize climate change due to global warming and maintain our standard of living. Zero emission of harmful exhaust gases is a good sign for our health. EVs have several benefits than petrol/diesel vehicles like less noise pollution, low maintenance cost, and low cost of fuel per km. This is effective solution for EV trikes which can be driven by human power by from an electric motor. In this paper, we focused on feasible design solution of a user-friendly three-wheeler electric vehicle which can access with finger print also which consist of self-charging dynamo and solar to charge the EV battery. This vehicle consists of GSM module for sending the SMS and GPS module for vehicle tracking.

Keywords: EV vehicle, PIC microcontroller, Solar panel, Dynamo, Charging circuit, Rechargeable Battery, LCD display, GSM, GPS, Fingerprint module

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-085

Design of Fingerprint Tricycle using Renewable Resource

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ABSTRACT

Non-renewable energy is already causing problems with the supply of electricity. Today the main emphasis is placed on the production of electricity from renewable resource. In this project, a feasible design solution in the form of an easy-to-use three-wheel. An electric vehicle capable of being accessed with a fingerprint. This electric vehicle utilizes solar and a self-changing dynamo is used to charge the battery. The battery of tricycle is charged by a self-adjusting dynamo and solar power. The primary disadvantage of solar-electric vehicles is that they can retain energy in the event of precipitation. in our project, Parallel charging is used to charge the battery. Initially, the tricycle uses solar energy that is stored in its batteries. The dynamo helps the battery store energy while the tricycle is operating. We are adding a cabin to the tricycle to improve its efficiency. Our vehicle's ability to store energy during the rainy seasons, when there is less sunlight, is its primary benefit.

The main controlling device of the whole system is a Microcontroller. Fingerprint module, relay along with vehicle ignition and LCD are interfaced with it. The Microcontroller reads the input from the finger print module and provides access to ignition system if it is valid. The status will display on LCD. When compute two control buttons, to store and remove the fingerprints. With the help of key, the vehicle gets started.

Keywords: Solar panel, Dynamo, Fingerprint module, LCD display, Microcontroller.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-086

A Cutting-Edge Smart Lock with Multistage-Multimode Security Integration

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ABSTRACT

In general, the traditional or smart locks are single staged as well as external visible device so there is a maximum chance for trespasser to damage (Physical or Hacking) the locker system. The proposed paper is a prototype of Novel Smart Lock device, which is a high secured compact device with mandatory of Internal (Secondary Stage) and External (Primary Stage) security verification. The Primary Stage is having a Primary Door (sliding door) with its operating security modules visible for external access and the Secondary Stage is having a Main Door along with its smart security verifying modules kept internal to the Primary Door. To design this model RFID module and Bluetooth HC05 modules are used as Primary Stage Security System (PSSS), Fingerprint Scanner and Voice Recognition modules are used as Secondary Stage Security System (SSSS). However, the Primary Door is accessed by a proper Authentication of any one module in the PSSS and the Main Door is accessed by its successful Authorization of any one module in the SSSS. Therefore, when we want to access the Main Door, we must pass our credentials at Primary Stage as well as at Secondary Stage, then only we can access the actual door lock system. Hence the proposed solution is a high secured door lock device, and it completely controls unauthorized access of trespassers or hackers at its under limits.

Keywords: Primary Door, Main Door, Authentication, Authorization, Primary Stage Security System, Secondary Stage Security System

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-087

Bluetooth and Voice Controlled Wheel Chair using ARDUINO

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ABSTRACT

The "Bluetooth and Voice Controlled Wheelchair using Arduino" project aims to enhance accessibility and mobility for individuals with physical disabilities. This innovative wheelchair system integrates Arduino microcontroller technology with Bluetooth and voice control capabilities to provide a user-friendly and efficient means of navigation. The core of the system involves an Arduino microcontroller that serves as the central processing unit, orchestrating the wheelchair's movements based on input received through Bluetooth and voice commands. A Bluetooth module enables seamless communication between the wheelchair and a mobile device, such as a smartphone or tablet, offering users the flexibility to control the wheelchair remotely. This connectivity is especially advantageous for users with limited hand dexterity, as it eliminates the need for complex physical interfaces. Furthermore, the integration of voice control adds an additional layer of accessibility. Users can command the wheelchair to move in specific directions, adjust speed, and even stop through simple vocal instructions. This hands-free approach empowers individuals with mobility challenges, offering them greater independence and control over their movements. The project not only addresses practical mobility concerns but also showcases the potential of assistive technology to improve the quality of life for people with disabilities. By combining Bluetooth connectivity and voice control in a wheelchair system, this project exemplifies a user-centric approach to technology, promoting inclusivity and autonomy for individuals facing mobility impairments.

Key Words: Arduino, Wheel chair

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-088

Smart IoT Based Energy Metering System for Microgrids

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ABSTRACT

This article proposes a Microgrids offer sustainable energy solutions as alternatives to traditional power networks. At present, the number of smart meter users in the world is still limited. The traditional and conventional utility of the smart meters was mainly to establish a bi-channel communication – one is to provide the billing information of the electricity consumed through GSM modules to the end users and the other is to provide energy data and other related information to the supplying utility. The modifications are made in this project is to avoid two different channels of communication and instead of bi-channel communication it concentrates the entire data into one storage system i.e. a cloud server. The server facilitates both the users and the concerned utility which provides access to the real-time data from anywhere in the world and also an upgradation has been made to automatically detect and protect loads from transients in the line such as overvoltage, undervoltage and overcurrent with a load management algorithm utilizing the features of the smart energy meter IC.

Keywords: IOT, Energy metering, Sensor networks, Real-time monitoring

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-089

Design of Fuzzy Logic Controller for Solar PV Fed BLDC Motor with Zeta Converter for Precision Controlled System

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ABSTRACT

This paper proposes a system of BLDC motor drive fed through a solar pv. To provide the required power to the motor, a zeta converter is used to boost up the voltage. A Zeta converter is a 4th order DC-DC converter that is built with two inductors and two capacitors and able to work in either step up mode or step-down mode. The proposed system adapts a fundamental functioning of three phase inverter which isswitching and this will eliminate the power losses. Fuzzy logic rules are written to control the speed of the BLDC motor. The hall sensor and the reference speed to compared using controller and it is provided as feedback for the three-phase inverter. With increased system efficiency, the proposed drive is built to work in various speed ranges. The proposed system is simulated through Matlab simulating software followed by an experimental setup.

Keywords: MATLAB/Simulink, Fuzzy Logic Controller, solar, BLDC motor, Three phase inverter.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-090

GSM Based Automated Watering System for Plants

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ABSTRACT

In a country with a tropical monsoon like India, where rainfall is unpredictable, unreliable, and variable, irrigation is the most crucial agricultural input. Until and unless a sizable planted area is brought under guaranteed irrigation, India cannot make sustained growth in agriculture. Modernizing irrigation systems with the use of intelligent technologies is the sole suggested answer to this problem. The goal of this study is to create an automated irrigation system that uses multiple sensors and is "GSM based." On the field, sensors are positioned, and these sensors continuously measure the crop parameters and communicate the information to the farmer. Farmers can know about the parameters without going to the fields. A farmer can operate the system based on the parameters from his mobile phone through SMS, even in a faraway location. However, the system will automatically turn on without the farmer's permission to maintain the right water level in the field if the water level rises to a dangerous level. By keeping an eye on the soil's moisture level and the weather, it provides the crop with the amount of water it needs, preventing water resources from being wasted. Farmers will also benefit greatly from it.

Keywords: Automatic irrigation system, Arduino, GSM, crops, cell phone, sensors.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-092

A Hybrid Wind-Solar Energy System: A New Rectifier Stage Topology

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ABSTRACT

Environmentally friendly solutions are becoming more prominent than ever as a result of concern regarding the state of our deteriorating planet. This paper presents a new system configuration of the front end rectifier stage for a hybrid wind/photo voltaic energy system. This configuration allows the two sources to supply the load separately or simultaneously depending on the availability of the energy sources. The inherent nature of this Cuk-SEPIC fused converter, additional input filters are not necessary to filter out high frequency harmonics. Harmonic content Is detrimental for the generator lifespan, heating issues, and efficiency. The fused multi-input rectifier stage also allows Maximum Power Point Tracking(MPPT) to be used to extract maximum power from the wind and sun when it is available .An adaptive MPPT algorithm will be used for the wind system and a standard perturb and observe method will be used for the PV system. Operational analysis of the proposed system will be discussed in this paper. Simulation results are given to highlight the merits of the proposed circuit.

Keywords: Cuk-SEPIC,MPPT,PV

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-100

Millimeter Antenna for 5G Wireless Communication using IoT

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ABSTRACT

This paper presents MIMO with micro strip patch antenna for future 5G-communication technology at centered frequency 38GHz and 54GHz having bandwidth 1.94GHz and 2GHz respectively with low cost substrate and small size patch best suited for miniaturized devices. It consists of Rogers RT5880 (lossy) substrate with dielectric constant 2.2 with loss tangent of 0.0013 and standard thickness 0.508mm, PEC patch and PEC ground. Substrate of dimensions 6mm×6.25mm and patch with dimensions 2mm×2mm is used. Microstrip-line feeding technique is used. Array having 4 elements with 4mm spacing has been proposed to achieve 12 dB gain for mobile data Applications on millimeter wave frequencies at 38.6GHz, 47.7GHz and 54.3GHz having bandwidth 3.5GHz, 2.5GHz and 1.3GHz respectively with Tapered line feeding. Overall size of antenna is 6mm×6.25mm×0.578mm. The proposed Antenna design is simulated on CST Microwave Studio.

Keywords: PEC, MIMO, CST

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-101

Embedded healthcare system based on SIP using telephone

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ABSTRACT

Healthcare has been primarily concentrated in the hospital domain. With the current technology trends, some e-healthcare services have evolved. However, healthcare has not been accessible for the common man. Generic healthcare services available today focus on technology marvel. This paper illustrates our implementation of the healthcare service that uses the conventional telephone. The usage of telephone for facilitating Voice and Video over IP (V2oIP) communication to the home generates a new lease of life to the senior residents of the society. This embedded healthcare system uses the telephone connected to the Home Server that connects to the hospital network over the Internet. The telephone uses a special sequence character to invoke the healthcare application. The application connects to the hospital network using Session Initiation Protocol (SIP) to facilitate multimedia communication. The output can be configured for display on the TV connected to the Home Server and/or any conventional display.

Keywords: SIP, V2oIP, Multimedia Communication.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-102

IoT Based Manhole Monitoring System

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ABSTRACT

A smart city is the future goal of clean and better public services. Underground infrastructure is an important factor to consider when launching a smart city. The monitoring of the water supply system is critical to maintaining the city clean and hygienic. Due to the ineffectiveness of physical manipulation this results as un-dealing with issues that slow down water and require longer to fix. To address all these issues a system based on a wireless sensor network comprised of built-in sensor nodes has been developed. When the water flow level is lowered the suggested system sends low-cost, low-maintenance IoT-based real-time notifications over the management channel. This approach lowers the danger of mortality for fishermen who clean subterranean canals while also benefiting the community. Manholes are not effectively checked in developing countries. These unsecured manholes can endanger lives in a number of ways. The article describes an intelligent automatic manhole monitoring system that detects dangerous gases and temperatures within the manhole, as well as the lack of a hole cover, and emits an alarm to passers-by alerting authorities to the system's status. The system has the potential to enhance overall environmental quality. The technique was used to perform automatic manhole monitoring in order to assess suggested enhancements.

Keywords: Drainage Level, Smart City, Water flow level, Manhole Monitoring

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-103

Circularly Polarized MIMO Antenna for 5G Wireless Communications

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ABSTRACT

A compact size wideband circularly polarized (CP) 2-port multiple-input-multiple-output (MIMO) antenna is designed for the fifth generation (5G) region under the sub-6 GHz band. The presented antenna has (≤ -10 dB) impedance bandwidth of 900 MHz (3.3–4.2 GHz) and has 100% 3-dB axial ratio bandwidth. The antenna covers the potential 5G band ranging from 3.3 to 3.8 GHz having left-handed circular polarization characteristics. To validate performance attributes of the MIMO antenna designed various diversity parameters such as envelope correlation coefficient (ECC), total active reflection coefficient, and diversity gain are calculated. The low envelope correlation coefficient ($ECC < 0.10$) and the isolation between the antenna elements greater than 15 dB justify the acceptance of the proposed design as a MIMO antenna. The proposed design exhibits good agreement between the simulated and the measured results.

Keywords: ECC, MIMO, CP.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-104

A Cross-Layer QoS-Aware Communication Framework in Cognitive Radio Sensor Networksfor Smart Grid Applications

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ABSTRACT

Electromagnetic interference, equipment noise, Multi-path effects and obstructions in harsh smart grid environments make the quality-of-service (QoS) communication a challenging task for WSN-based smart grid applications. To address these challenges, a cognitive communication based cross-layer framework has been proposed. The proposed framework exploits the emerging cognitive radio technology to mitigate the noisy and congested spectrum bands, yielding reliable and high-capacity links for wireless communication in smart grids. To meet the QoS requirements of diverse smart grid applications, it differentiates the traffic flows into different priority classes according to their QoS needs and maintains three-dimensional service queues attributing delay, bandwidth and reliability of data. The problem is formulated as a Lyapunov drift optimization with the objective of maximizing the weighted service of the traffic flows belonging to different classes. A suboptimal distributed control algorithm (DCA) is presented to efficiently support QoS through channel control, flow control, scheduling and routing decisions. In particular, the contributions of this paper are three folds; employing dynamic spectrum access to mitigate with the channel impairments, defining multi-attribute priority classes and designing a distributed control algorithm for data delivery that maximizes the network utility under QoS constraints. Performance evaluations in *ns-2* reveal that the proposed framework achieves required QoS communication in smart grid..

Keywords: Cognitive radio sensor networks (CRSNs), cross layer Quality-of-service (QoS), smart grid.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-105

Deep Recurrent Neural Network for Singer Identification and Classification

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ABSTRACT

In article work, we are utilizing a deep recurrent neural network technique called LSTM (long short-term memory) to be able to determine the name of the performer and their gender based on a study of the audio voice component. The author of the work being suggested is currently working on constructing two LSTM models. One of these models is used to predict singer gender or gender identification, while the other model is used to predict or classify singer name. Both models will be used in the proposed work. The accuracy of the LSTM model will be compared with that of two current approaches, namely the SMV and the MLP, as part of the research project that we have proposed. In order to carry out this project, we will be utilizing the MIR-1K dataset. This dataset contains signers' own audio recordings that they made at the time of signing. We are going to train several different algorithms, including LSTM, SVM, and MLP, using this dataset. LSTM is the new approach that we propose, and SVM and MLP are the algorithms that are already in use. When measured against the most recent developments in the field, the proposed approach displays significantly better performance.

Keywords: SVM, MLP, LSTM

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-106

Wheel Chair Movement Control using Arduino Controller

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ABSTRACT

This paper describes the design of a smart, motorized, gesture controlled wireless wheelchair using ARDUINO. People with physical disabilities and partial paralysis always find it difficult to navigate through their habitat or their home without the assistance of someone. Often after paralysis or physical disability the wheelchair is the most common means of locomotion for such people. But to navigate through one's own house without help of someone every time can be demoralizing for the person as well. This project introduces a wheelchair, which operates on some easy hand gesture. As it works on hand gestures this wheelchair does not requires help of any other person for pushing it, hence handicapped or physically disabled person feel independent. This wheelchair will also be helpful for increasing the self-confidence of handicapped or physically disabled persons.

The controller then follows a control algorithm and sends the commands to the motor driver L293D circuit to drive the motors accordingly. Old homes, hospitals and bed ridden soldiers are the application of this type of wheelchair.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-107

A Survey on Handwritten and Printed Telugu Numeral Recognition Technique

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ABSTRACT

Day by day technology is going very fast, digital recognitions are playing wide role and providing more scope to perform research in OCR techniques. Recognition of Telugu handwritten numeral is complicated compared to English and other western numerals. However, many researchers have provided real time solution for printed Telugu numerals. Printed numeral documents recognition still offers many motivating challenges to researchers. Current research offers many solutions on Telugu handwritten documents recognition even then reasonable accuracy and concerning handwritten numeral recognition. For the development of a high performance OCR algorithm has become essential. OCR research work has been undertaken by several researchers which aim at developing a high performance OCR algorithm. The purpose behind an OCR is to identify and analyze a document image by dividing the page into line elements, further sub-dividing into words, and then into characters. These characters are compared with image patterns to predict the probable characters. Recognition of characters can be done either from printed documents or from hand written documents. In particular, Telugu hand written OCR is more complicated than other related work. This is because Telugu numerals have more angles (curves). Challenges that researchers face during recognition process are due to the curve in the numerals and number of strokes and holes, sliding numerals, different writing styles so on. The steps involved in character recognition comprise pre-processing, segmentation feature extraction and classification.

Keywords- OCR, pre-processing, image extraction and classification.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-108

Photo Switch Circuit

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ABSTRACT

Photo switch is a sensor that detects the presence or absence of light. It is known as Photocell or Photo resistor. Photo cell is a sensor that changes its resistance when the light shines on it. A high intensity of light incident on the surface will cause a lower resistance. Where as a lower intensity of light will cause a higher resistance. It works same as the switch, but the difference is it works based on the presence and absence of light. The presence and absence of light decides the on and off of the device. The main function of this is to detect light when alight is on, otherwise whenever the sun is out (sunset). These are used in dusk-to-dawn lights. The main advantage of Photo Switch is that they are small, inexpensive, low-power, easy to use and don't wear out. This can be used by connecting to an electrical or electronic circuit in an extensive range of applications like sunset to sunrise lighting that mechanically turns on whenever intensity of light is low. These are also used in other applications like intruder alarms and also automatic doors. They are used as switches as well as sensors.

Keywords: Sensor, Photo resistor, Switch, Integrated Circuit

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-109

Analysis of multifunctional Input Output pad under Testing

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ABSTRACT

Input/output cells (I/O pads) are the structures that sit between the circuit's core and the chip's external pins. A chip's circuitry must communicate with other circuits. Before tape-out to the fab, the designed IO cells must be confirmed. Design validation is the most significant part of the product development process, accounting for up to 80% of the overall time spent on the project. The major goal of this article is to use Verilog and Verilog-AMS coding to validate the planned IO cell. Manual testbench generation is becoming increasingly time demanding and complex as hardware designs get more complex. This study proposes a method for automatically generating the testbench, which saves the generation time by three times when compared to manual testbench generation. Variability is a key factor in circuit performance at nanoscale technology nodes.

Key words: IO cell, Verilog-AMS, characterization, liberty file, validation.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-110

Design of Generative Adversarial Networks for the Classification of Medical Images and Early Detection of Breast Cancer

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ABSTRACT

Breast cancer is the leading disease pertaining to the high women mortality rate not only in India but across the world. As per the recent statistics of the Indian Council for Medical Research (ICMR), 10% of all cancer deaths in women are due to breast cancer and thereby, the breast cancer requires primary attention in terms of prognosis. The masses are the small specks of calcium deposits found in the breast. The digital representation of breast cancer consists of the X-rays and the images that are stored in digital forms acquired through various views/angles. Those digital forms constitute mammograms, which is the reliable screening technique for the breast cancer. The less exposure of mammograms with low energy consequences in inefficient way of expressing the vital information on the breast region. Therefore, it is imperative to deepen the image brightness/contrast to change the improper effects found in the image. In addition, the presence of few artifacts/noises in the acquired mammogram would definitely mislead the processing phase. Hence, enhancement and filtering techniques are to be adopted, that forms the pre-processing stage in the mammogram analysis, which would in turn assist in the subsequent processing of digital mammograms.

Segmentation is the next step after pre-processing that aims to segment the mammogram into a disjoint group of objects, based on the similarity/dissimilarity of the intensity values with respect to some characteristics such as gray level, texture, brightness and contrast. These segmented regions are anatomically meaningful, which would simplify the computational process of feature extraction and classification.

Keywords: Generative Adversary Networks (GAN), Machine learning, Phython, Image Processing and Pattern Recognition, MATLAB

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-111

Examining IoT Protocols for Context-Aware Anonymity Authentication in E-Health

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ABSTRACT

In the realm of healthcare, the integration of the Internet of Things (IoT) has significantly enhanced existing systems and data management. However, this advancement comes with its own set of challenges, particularly concerning the security and privacy of patients' sensitive information. A notable vulnerability lies in the potential interception of data during transmission, which could result in the unauthorized linkage of patient data to the identities of the transmitting sensors. Such a breach poses a significant threat, as it could unveil confidential medical conditions. Moreover, this risk is further exacerbated in resource-constrained environments, where the capacity for implementing robust security measures is limited. In this context, ensuring anonymous authentication for sensor nodes becomes a paramount concern. Anonymous authentication is vital not only for safeguarding patient privacy but also for mitigating the potential exploitation of stringent resource constraints. Recognizing the urgency of addressing this security gap in the healthcare industry, the study proposes an innovative solution known as a Secure Anonymous Authentication Protocol with Advanced Encryption Standards (SAAPAES). This protocol aims to fortify the identification process by incorporating advanced encryption standards, thereby ensuring a high level of security. The proposed methodology not only addresses the immediate concern of securing patient data but also acknowledges the resource limitations commonly faced in healthcare environments. By introducing SAAPAES, the study seeks to establish a robust and effective identification scheme tailored specifically for the healthcare sector. This approach is designed to meet the dual objectives of enhancing security services and preserving the confidentiality of private customer data in the ever-evolving landscape of healthcare IoT applications.

Keywords: IoT, security, health-care sector, hash-key identification, SAAPAES algorithm.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-112

Automatic Vehicle Counting for IoT Based Smart Traffic Management System for Smart Cities

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ABSTRACT

For smart city management, efficient handling of road traffic is one of the key aspects. Traffic congestion can be managed effectively, if the numbers of vehicles that are to pass through a crowded junction can be pre-estimated in time. The proposed method presents a framework, which has the capability to continuously convey the vehicle count and generate an alarm in case of large vehicle gathering to the controlling station in the Chandigarh or alike urban Indian cities. The number of vehicles passing through a location well before the required traffic junction can be estimated using the help of image processing techniques. Further, the monitoring details can be shared to a distant controlling centre situated anywhere in the city through internet usage. The performed experiments demonstrate the effectiveness of this Internet of Things (IoT) based technology.

Keywords: IoT, SENSORS

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-113

Haze Monitoring System Using ARM7 and GSM

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ABSTRACT

Metropolitan cities in India have periodic problems with air quality reaching hazardous levels because of smoke haze. The heavy haze, described as a pall of smoke caused widespread health problems especially among the elderlies, the young and kids. Haze is an atmospheric phenomenon where dust, smoke and other dry particles obscure the clarity of the sky. This haze pollution has serious implications to health as well as for the whole environment. This paper described a mobile monitoring system developed to detect the level of haze particulates. Data collection was achieved with the use of gas sensor, and mobile alert implementation was developed with Global System Mobile (GSM) connection and Short Messaging System (SMS).

Keywords: GSM, SMS, HAZE.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-114

IoT Creating New Business Model and Challenges with IoT Security, Privacy and Awareness

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ABSTRACT

Internet of Things (IoT) or Internet of Intelligent Things is one of the most buzzing and discussed topic in business and research field today. The Internet of Things (IoT) refers to systems that involve computation, sensing, communication, and it involves the connection between humans, non-human physical objects, enabling monitoring, automation, and decision making within organization. The Internet of Things (IoT) is a network of 'smart' devices that connect and communicate via the Internet. The concept of the IoT is to establish a pervasive and ubiquitous environment (i.e., an IoT ecosystem) with a variety of things or objects (e.g., RFID tags, sensors and actuators, smart phones, washing machines, smart TV, etc.) that can autonomously collaborate, and cooperate to reach common goals providing smart services for the benefit of humankind. Because of lack of awareness within the public about devices, lack of standardization for devices, and characteristics of IoT are highly dynamic, and continuously change because of mobility, for that reasons IoT alleviates concerns about security, and privacy. In this paper research is mainly focusing on the concept of IoT, architecture, new business model and security and privacy issues with suggested countermeasure and cyber security awareness in IoT threats, also outlines recommendations for how to mitigate or reduce the effects of these IoT concerns.

Keywords: IoT, SENSORS

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-115

An Energy-Efficient Binary-Interfaced Stochastic Multiplier using Parallel Data paths

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ABSTRACT

Stochastic computing (SC) typically requires a low design complexity compared with weighted binary computing, so it has been successfully applied in neural networks (NNs). Usually, SC utilizes random bit streams as its medium, which makes it suffer from a long delay that offsets its advantages. This drawback can be alleviated by utilizing parallel data paths, which, however, will significantly increase the hardware cost due to the requirement of multiple parallel computing units. In this article, a hybrid bit-splitting generator (HBSG) is proposed to efficiently produce parallel bit streams in a single clock cycle to reduce delay. The HBSG uniformly splits binary numbers into R segments, each of which is encoded in parallel by using hardwired connections according to the weight of each bit. A binary-interfaced parallel stochastic multiplier (BipSMul) using the HBSG is then proposed to accelerate the multiplication in SC. Experimental results show that the BipSMul is more energy efficient than the state-of-the-art parallel and serial stochastic designs, as well as their binary and Booth counterparts, in delay, power-delay product (PDP), and area-delay product (ADP).

Keywords: HBSG, BipSMul, PDP, ADP.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-116

Automatic Vehicle Counting for IoT based Smart Traffic Management System for smart cities

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ABSTRACT

For smart city management, efficient handling of road traffic is one of the key aspects. Traffic congestion can be managed effectively, if the numbers of vehicles that are to pass through a crowded junction can be pre-estimated in time. The proposed method presents a framework, which has the capability to continuously convey the vehicle count and generate an alarm in case of large vehicle gathering to the controlling station in the Chandigarh or alike urban Indian cities. The number of vehicles passing through a location well before the required traffic junction can be estimated using the help of image processing techniques. Further, the monitoring details can be shared to a distant controlling centre situated anywhere in the city through internet usage. The performed experiments demonstrate the effectiveness of this Internet of Things (IoT) based technology.

Keywords: IoT, SENSORS

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-117

Fingerprint & Smart Card Based E-Voting System for Ensuring Security and Fraud resistant polling

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ABSTRACT

The conventional voting system is being replaced by electronic voting machine to safeguard the security reliability and transparency. There are two types of E- voting system. the first one is based on visiting a polling station: voters do not fill voting cards as in the paper form but push buttons on various electronic devices. Second type of E-voting system is based on smart technology. Usually electros vote using computers at distant locations or at polling stations. We design an embedded electronic voting machine that works with authentication based on smart card and fingerprint with RFID encryption. Our system is faster and more secure than conventional one.

Keywords: RFID, Voting machine.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-118

A Heading Drift Correction Method for Pedestrian Inertial Positioning

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ABSTRACT

Pedestrian inertial positioning is an effective means when satellites fail. Heading accuracy determines the performance of pedestrian inertial positioning. To realize an accurate positioning, a heading drift correction method was proposed. An in situ active rotation is performed before autonomous positioning, and the error compensation coefficient of bi-axial geomagnetic measurement is obtained by using the ellipse fitting correction method to achieve effective suppression of external environmental geomagnetic interference. The corrected bi axial geomagnetic measurement information is used to directly calculate the heading information and combine it with the peak stride detection method and linear step estimation model to achieve autonomous positioning of pedestrians. To verify the effectiveness and stability of the algorithm, several sets of experiments on the autonomous positioning of pedestrians are carried out in an outdoor environment. The experimental results show that the average deviation between the starting point and the endpoint of the proposed algorithm's positioning trajectory accounts for 0.95% of the total travel in the 150 m positioning experiments.

Keywords: Geomagnetic Measurement, Heading Solution, Autonomous Positioning, Active Rotation, Geomagnetic Correction

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-119

Design and Implementation of a Wearable Sensor Network System for IoT-Connected Safety and Health Applications

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ABSTRACT

This paper presents a wearable sensor network system for Internet of Things (IoT) connected safety and health applications. Safety and health of workers are important for industrial workplace; therefore, an IoT network system which can monitor both environmental and physiological can greatly improve the safety in the workplace. The proposed network system incorporates multiple wearable sensors to monitor environmental and physiological parameters. The wearable sensors on different subjects can communicate with each other and transmit the data to a gateway via a LoRa network which forms a heterogeneous IoT platform with Bluetooth-based medical signal sensing network. Once harmful environments are detected and, the sensor node will provide an effective notification and warning mechanism for the users. A smart IoT gateway is implemented to provide data processing, local web server and cloud connection. After the gateway receives the data from wearable sensors, it will forward the data to an IoT cloud for further data storage, processing and visualization.

Keywords: IoT, LoRA

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-120

Methodology for CNN Implementation in FPGA-Based Embedded Systems

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ABSTRACT

The increasing interest in convolutional neural networks (CNNs) is driving the study and design of different implementations for a variety of platforms, each intended to optimize performance, power consumption, or latency, according to the application's needs. While GPUs have dominated the high-performance terrain, FPGAs have proved to be a promising alternative due to their relatively high performance and reduced power consumption and costs, compared with GPUs. The main concern regarding FPGA implementations lies in the effort needed to develop the systems and difficulties reusing or combining designs by different authors, due to the highly heterogeneous architectures used in each project. This work proposes a methodology and a high-level architecture designed for CNN implementations in FPGAs, which eases the development process, allows the reusability of designs, and helps to maximize performance, minimize latency, reduce resource utilization, and avoid possible bottlenecks, while allowing high design flexibility. This proposal is validated by implementing a set of blocks that are later used to build different CNNs.

Keywords: CNN, GPU, FPGA

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-121

Robust Virtual Inertia Control of an Islanded Microgrid Considering High Penetration of Renewable Energy

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ABSTRACT

Nowadays, traditional generations are being replaced by a large amount of renewable energy sources (RESs). Consequently, the inertia of islanded microgrids significantly falls and may increase variations in system frequency.This paper presents robust virtual inertia control of an islanded microgrid considering high penetration of renewable energy sources (RESs). In such microgrids, the lack of system inertia due to the replacement of traditional generating units with a large amount of RESs causes undesirable influence to microgrid frequency stability, leading to weakening of the microgrid. In order to handle this challenge, the H robust control method is implemented to the virtual inertial control loop, taking into account the high penetration of RESs, thus enhancing the robust performance and stability of the microgrid during contingencies. The controller's robustness and performance are determined along with numerous disturbances and parametric uncertainties. The comparative study between H and optimal proportional integral (PI)-based virtual inertia controller is also presented. The results show the superior robustness and control effect of the proposed H controller in terms of precise reference frequency tracking and disturbance attenuation over the optimal PI controller. It is validated that the proposed H -based virtual inertia controller successfully provides desired robust frequency support to a low-inertia islanded microgrid against high RESs penetration.

Keywords- RES, microgrid frequency, PI controller

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-122

Paper on Low Power VLSI Design Techniques

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ABSTRACT

Low power has emerged as a principal theme in today's world of electronics industries. Power dissipation has become an important consideration as performance and area for VLSI Chip design. With shrinking technology reducing power consumption and over all power management on chip are the key challenges below 100nm due to increased complexity. For many designs, optimization of power is important as timing due to the need to reduce package cost and extended battery life. For power management leakage current also plays an important role in low power VLSI designs. Leakage current is becoming an increasingly important fraction of the total power dissipation of integrated circuits. This paper describes about the various strategies, methodologies and power management techniques for low power circuits and systems. Future challenges that must be met to designs low power high performance circuits are also discussed.

Keywords: Power Dissipation, low power, process nodes, leakage current, power management.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-123

Promoting the use of Ephemeral Computing in Embedded Systems

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ABSTRACT

The emerging class of transient computing systems enables computation to be sustained despite power outages due to the variable nature of energy harvesting. However, existing approaches are largely designed for specific architectures, and hence are not broadly applicable across different IoT devices. Emerging platforms based on portable, hardware-independent software should rely on lightweight operating systems (OSs) designed specifically for embedded IoT applications, such as Arm mbed OS and Contiki OS. To enable the widespread use of transient computing, transient approaches need to be integrated into these operating systems. In this paper, we discuss the challenges of providing software primitives for transient computing to facilitate hardware-independent implementation using standard OS APIs, and present the integration of a state-of-art transient approach, Hibernus into mbed OS. This OS is chosen due to the large community of developers and the open-source IoT code availability. Transient computing is offered through a modular and layered structure that uses the available mbed OS APIs, including different strategies for retaining the system state designed for different types of flash memory. To illustrate the applicability of the proposed design, we implemented Hibernus on two mbed platforms with different flash memories, which respectively requires 4.7mF and 4.9mF of additional storage.

Keywords: Adoption, Transient Computing, Embedded Systems, Accelerating, Boosting.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-124

Design of Smart Healthcare Monitoring Framework using Cloud Computing and IoT

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ABSTRACT

Modern technology is widely used in different fields to improve the quality of life for people. One of the major challenges that have been identified as having a direct impact on both an individual's quality of life and the growth of the country is health-related difficulties. Avoiding medical supervision has harmful impacts in numerous areas. Healthcare is one of several significant industries where applications using the Internet of Things (IoT) platform have gained widespread acceptance. The creation of a smart healthcare monitoring framework utilizing cloud computing and IoT is presented in this method. The suggested architecture improves the effectiveness of biosensor-based data gathering and aggregation and, in the event of an emergency, informs the relevant doctor. In the situation of any intense conditions, it also results in the development of a real-time efficient decision support system. Giving patients access to appropriate and effective medical facilities is the research's suggested outcome

Keywords: IoT, Bio sensor, Framework.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-126

A Survey on Recent Advancements and Challenges of Internet of Things in Smart Agriculture

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ABSTRACT

The integration of Internet of Things (IoT) technology into agriculture, often referred to as "Smart Agriculture" or "Precision Agriculture," has witnessed significant advancements in recent years. This survey paper provides a comprehensive overview of the latest developments and challenges in IoT applications within the agricultural sector. The paper explores the use of IoT devices and sensor networks for enhancing various aspects of agriculture, including crop management, livestock monitoring, environmental control, and supply chain optimization. The survey begins by examining the recent advancements in IoT technology, highlighting key components such as sensors, communication protocols, and data analytics. It also discusses the integration of satellite technology, drones, and other emerging technologies in smart agriculture. The review of case studies and real-world applications demonstrates the positive impact of IoT on increasing crop yields, reducing resource wastage, and ensuring sustainable agricultural practices. Finally, this survey provides valuable insights into the evolving landscape of IoT in smart agriculture, highlighting the potential benefits and addressing the current challenges. It serves as a useful resource for researchers, practitioners, and policymakers interested in harnessing the power of IoT to transform agriculture and ensure global food security in an increasingly interconnected world.

Keywords*:* Internet of Things, Sustainable agriculture, Smart agriculture.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-127

Design and Estimation of Delay Power and Area for Parallel Prefix Adders

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ABSTRACT

In Very Large Scale Integration (VLSI) designs, Parallel prefix adders (PPA) have the better delay performance. The binary addition is the basic arithmetic operation in digital circuits and it became essential in most of the digital systems including Arithmetic and Logic Unit (ALU), microprocessors and Digital Signal Processing (DSP). At present, the research continues on increasing the adder's delay performance. In many practical applications like mobile and telecommunications, the Speed and power performance improved in FPGAs is better than microprocessor and DSP's based solutions. Additionally, power is also an important aspect in growing trend of mobile electronics, which makes large-scale use of DSP functions. Because of the Programmability, structure of configurable logic blocks (CLB) and programming interconnects in FPGAs, Parallel prefix adders have better performance. This paper investigates four types of PPA's (Kogge Stone Adder (KSA), Spanning Tree Adder (STA), Brent Kung Adder (BKA) and Sparse Kogge Stone Adder (SKA)). Additionally Ripple Carry Adder (RCA), Carry Look ahead Adder (CLA) and Carry Skip Adder (CSA) are also investigated. These adders are implemented in Verilog Hardware Description Language (HDL) using Xilinx Integrated Software Environment (ISE) 13.2 Design Suite. These designs are implemented in Xilinx Vertex 5 Field Programmable Gate Arrays (FPGA) and delays are measured using Agilent 1692A logic analyzer and all these adder's delay, power and area are investigated and compared finally.

Keywords: BKA ,Carry Look Ahead Adder

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-128

High Speed Counter Architectures

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ABSTRACT

Counters are primal blocks in most of digital circuits. The speed of a counter mainly depends on how effectively we utilize the clock signals and how effectively the signal passes through the critical path of circuit. We are going to discuss a new counter architecture which has constant counting rate independent of the length of the counter. By using prescaling techniques we split our large counter into segments and use a systolic structure in the middle of these discrete counter segments thereby we are making the delay of the counter as constant. Thus we are speeding up the counter by maintaining counter rate as constant irrespective of the counters length.

Keywords: counter, systolic, two-bit dependency.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-129

An Alarming Based on an IoT Fire and Authentication System for Workhouse

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ABSTRACT

Ensuring minimum rights and safety of the garment workers has become a burning issue nowadays. The workers of garment factories are facing some labyrinths and broken out of fire is surely one of them. The investors are losing their interest and the prominence of this sector is getting toneless. In this paper, we have propounded a system which is capable to detect fire. The LM35 sensor and WIFI Modules will be interfaced with Node MCU microcontroller. When any fire is identified then the information will be updated in the IOT web-server to give the real time information to the authorized persons. A relay is used to activate the fire suppression device. Thealarm gets activated to alert the nearby users.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-130

The Role of Millimeter-Wave Technologies in 5G/6G Wireless Communications

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ABSTRACT

Ever since the deployment of the first-generation of mobile telecommunications, wireless communication technology has evolved at a dramatically fast pace over the past four decades. The upcoming fifth-generation (5G) holds a great promise in providing an ultra-fast data rate, a very low latency, and a significantly improved spectral efficiency by exploiting the millimeter-wave spectrum for the first time in mobile communication infrastructures. In the years beyond 2030, newly emerged data-hungry applications and the greatly expanded wireless network will call for the sixth-generation (6G) communication that represents a significant upgrade from the 5G network – covering almost the entire surface of the earth and the near outer space. In both the 5G and future 6G networks, millimeter-wave technologies will play an important role in accomplishing the envisioned network performance and communication tasks. In this paper, the relevant millimeter-wave enabling technologies are reviewed: they include the recent developments on the system architectures of active beam forming arrays, beam forming integrated circuits, antennas for base stations and user terminals, system measurement and calibration, and channel characterization. The requirements of each part for future 6G communications are also briefly discussed.

Key words: Data rate, Latency, Spetral Efficiency, Data- Hungry, Antennas, Integrated circuits.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-133

Dual Band 'I' Shaped MSA with Diffracted Ground Plane

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ABSTRACT

The emerging class of transient computing systems enables computation to be sustained despite power outages due to the variable nature of energy harvesting. However, existing approaches are largely designed for specific architectures, and hence are not broadly applicable across different IoT devices. Emerging platforms based on portable, hardware-independent software should rely on lightweight operating systems (OSs) designed specifically for embedded IoT applications, such as Arm mbed OS and Contiki OS. To enable the widespread use of transient computing, transient approaches need to be integrated into these operating systems. In this paper, we discuss the challenges of providing software primitives for transient computing to facilitate hardware-independent implementation using standard OS APIs, and present the integration of a state-of-art transient approach, Hibernus into mbed OS. This OS is chosen due to the large community of developers and the open-source IoT code availability. Transient computing is offered through a modular and layered structure that uses the available mbed OS APIs, including different strategies for retaining the system state designed for different types of flash memory. To illustrate the applicability of the proposed design, we implemented Hibernus on two mbed platforms with different flash memories, which respectively requires 4.7mF and 4.9mF of additional storage.

Keywords: Adoption, Transient Computing, Embedded Systems, Accelerating, Boosting.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-134

Smart Pet Feeder Using Node MCU

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ABSTRACT

This project is about designing an automatic pet feeder that could automatically serves food to the pets. The title of this project is Pet Feeder Using IoT. The pet meals that will be served are from the small types because some studies have shown that feeding the pet with smaller meals over the course of the day can prevent pet obesity and lead the pets to better health. The user will specify when their pet will be fed. This automatic pet feeder uses a Node MCU microcontroller and it consists of an interface with buttons, DC servo motor, water pump and the hardware part. The DC servo motor will be attached at one side of a feeding device. When the motor runs, the motor rotates the spinner which is in feeding device which will turn pet food drops down through the perforated feeding bowl. The water pump will be kept in a can containing water. When the water pump runs, the pump pumps the water into the water bowl of pet. So, the pets will receive regular amounts of food and water on a steady feeding schedule.

Keywords: Node MCU, Ultrasonic Sensor, L293D Motor driver

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-135

MAC Protocol for MANETS

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ABSTRACT

Today's wireless Networks are characterized by a fixed spectrum assignment policy. However, from the literature it is concluded that only 15% to 85% of spectrum ranges are used effectively and efficiently. The lack of efficient usage of limited available spectrum necessitates a new communication paradigm to use the existing wireless spectrum opportunistically . Although in the past fixed spectrum assignment worked properly , still there are have been a lot of interest from research community to access the limited spectrum dynamically. DARPAS approach on Dynamic Spectrum Access Network is called as next Generation (XG) Program .XG Communication is also known as Dynamic Spectrum Access Networks(DSANS) as well as cognitive Radios. The main aim of the MAC Protocol is to provide fair access to the wireless medium among the number of different users efficiently.MAC protocols can be classified into three categories such as contention-based MAC protocols, Contention based MAC protocol with reservation-based mechanism and Contention based MAC protocol with scheduling mechanism. My project works aims at analysing the various types of MAC protocols involved in the wireless network and to develop new MAC protocol which will be more efficient in the MAC protocols in the literature. So the development of MAC Protocol using Cognitive Radio Technology is becoming a hottest research topic among many researchers.

Keywords: MANETS, Cognitive Radio, MAC.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-151

MICROSTRIP ANTENNA STRUCTURE FOR 5G COMMUNICATIONS

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ABSTRACT

A milli meter antenna has introduced for simplifies fabrication, facilitates easy shunt as well as series surface mounting, eliminates the need for wraparound and via holes, and reduces radiation loss and the size. Small antennas can be made denser than conventional microstrip circuits. A thorough parametric analysis is performed with the chosen physical dimensions of the stub and radiating patch. The effect of each parameter on the bandwidth is analyzed and presented. Furthermore, this design has been modified with a sharp grove to enhance the broad banding. The investigation is performed in the form of parametric analysis which revealed the fact that the multi-resonant patch antenna is sensitive to change in magnitudes of its dimensions. It covers the entire UWB range.

Keywords: Rectangular patch, UWB

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-152

Smart Blind Stick with GPS Tracking using GSM

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ABSTRACT

Blind sticks are the supporting devices to help visually impaired individuals in scanning their surroundings and identifying the obstacles without the need of assistance from external agents. The current mechanical form of the blind sticks needs up-gradation for better support to the subject.

This system integrates a smart blind stick with GPS tracking capabilities and GSM communication, enabling real-time tracking and remote assistance. The smart blind stick utilizes ultrasonic sensors to detect obstacles and provide haptic feedback to the user. It also incorporates a GPS module that constantly updates the user's location. The GSM module facilitates communication between the blind user and their caregivers or family members, allowing for immediate assistance in case of emergencies or navigational challenges. The integration of GPS tracking and GSM communication empowers visually impaired individuals to navigate more confidently and securely in their surroundings.

Keywords: GPS, GSM, Communication System.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-153

VLSI Researches for Machine Learning and Neuromorphic Computing

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To accelerate performance per power in demanding machine learning applications in data centers, recently graphics processing units (GPU), field-programmable gate array (FPGA) and application specific integrated circuit (ASIC) are broadly utilized by equipping massively parallel digital multiply-accumulators, where multiply-accumulation is an arithmetic bottleneck in software workloads using neural networks. Some of intelligent edge devices also become equipping ASIC or IP cores including such massively parallel multiply-accumulators optimized for specific machine learning applications at low-power consumption. This presentation introduces our current research activities in analog-based machine learning accelerators and analog-based spiking neural network processors aiming at high performance per power in machine learning applications by taking advantage of high-speed and low-power analog multiply-accumulation arithmetic over densely-packed synaptic non-volatile memory (NVM) resistive device arrays.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-154

Securing Diagnostic Text Data in Medical Photographs: A Novel Hybrid Approach Integrating AES-RSA Encryption and 2D-DWT Steganography

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ABSTRACT

Encryption cryptography refers to the systematic procedure of transforming messages into a format that renders them unintelligible to unauthorized individuals, while allowing authorized workers to decipher and comprehend the content. The present study employs two primary methods for data encryption, namely the Advanced Encryption Standard (AES) and the Rivest-Shamir- Adleman (RSA) algorithm. The Advanced Encryption Standard (AES) is a symmetric cryptographic algorithm that use a single key for both encryption and decryption processes. The system possesses a predetermined block size of 128 bits for both plaintext and ciphertext messages, and utilizes keys that are either 128, 192, or 256 bits in length. In the context of message transmission, longer messages are typically partitioned into blocks of 128 bits. Evidently, the utilization of lengthier keys in a cipher increases the level of difficulty in deciphering it, however at the expense of prolonging the encryption and decryption procedures. Contrary to popular belief, the RSA algorithm is a commonly utilized public key encryption method that finds extensive application in both commercial and personal communication domains. One of its advantages is in its capability to accommodate a variable key size, which can range from 2 to 2048 bits. The healthcare sector has encountered considerable hurdles in ensuring the security and integrity of medical data due to the notable progress of the internet of things (IoT) in this domain. This study presents a novel hybrid security approach aimed at ensuring the protection of diagnostic text data contained inside medical photographs. The model under consideration is formulated by incorporating either the 2D Discrete Wavelet Transform 1 Level (2D-DWT-1L) or the 2D Discrete Wavelet Transform 2 Level (2D-DWT-2L) steganography approach with a novel hybrid encryption scheme. The hybrid encryption scheme under consideration is constructed by integrating the Advanced Encryption Standard (AES) and the Rivest, Shamir, and Adleman (RSA) algorithms. The suggested model commences by employing encryption techniques to secure the confidential data. Subsequently, the model conceals the encrypted output under a cover image, employing either 2D-DWT-1L or 2D- DWT-2L methodologies. Cover images are employed to hide varying font sizes, using either color or gray-scale graphics.

Keywords: Advanced Encryption Standard (AES), Rivest-Shamir-Adleman (RSA), internet of things, Discrete Wavelet Transform

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-155

Detection of Moving Vehicle Speed usingMATLAB

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ABSTRACT

Vehicle flow estimation is an important part of traffic management system. It plays an important role in tracking systems, automatic video surveillance and also to avoid collision. This paper proposes a method to estimate the speed of vehicles on the highways and city areas. The proposed method can be effectively implemented to control the over speed vehicles and to found guilty in leading to traffic accidents. Each vehicle in the video recorded by the camera is identified. A bounding box is created on the identified vehicle and its centroid coordinates are marked. Some systems failed to create proper bounding box as it is necessary for accurate analysis of the motion of the vehicle and its speed. Another disadvantage is that shadow produced by vehicles on the different lanes of the road creates a fuss and the system detects the shadow too as a different object and creates a bounding box over it.

Keywords: Traffic management, Traffic accidents, Camera, Bounding box, Centroid.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-156

Floating Point FFT algorithm using Parallel Prefix Multiplier

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ABSTRACT

The communication system operations, mainly deal with signal processing, are largely depend on efficient Fast Fourier Transform (FFT) algorithm. There are number of FFT algorithms developed in recent years. However, there is a need for a high throughput and low latency at less cost FFT co-processor for signal processing applications. The basic components of any FFT algorithm are complex multipliers and complex adders in the form of radix-2 or radix-4 butterfly structure. Both the fundamental structures operate very fast while dealing with fixed point arithmetic, but slow in the case of floating point (FP) arithmetic which is more prevalent now. To combat the slowness effect of FFT, this paper propose a modified FP butterfly architecture with parallel prefix (PP) multiplier which provide fast operation in floating point arithmetic. Also the FP butterfly FFT with PP multiplier gives better performance than unmodified FP FFT.

Keywords: Butterfly, complex number, Fast Fourier Transform floating point, Parallel prefix multiplier.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-157

Electromyography Signals Analysis using Machine Learning

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ABSTRACT

In this study, we will analyze EMG data using ml techniques. Electromyography (EMG) is a method employed in biomedical & biomechanics studies to quantify electrical impulses in myocytes. The mission's overarching goal is to create and assess ml algorithms for EMG signal analysis & processing, with the expectation that this will lead to better diagnostic and therapeutic results. Several unsupervised & supervised ml techniques will be investigated in this study to better identify trends in EMG information and make accurate findings. The findings of this study will enhance clinical & biomechanics studies by increasing our comprehension of the possibilities of ml in the processing of EMG data.

Keywords:ML, EMG, RF, NN, Supervised learning, Regression

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-158

Truncation Errorless Discrete Cosine Transform using High Throughput Data with High Accuracy Error-Compensated Adder Tree

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ABSTRACT

Discrete cosine transform (DCT) is a widely used tool in image and video compression applications. Recently, the high-throughput DCT designs have been adopted to fit the requirements of real-time application. Operating the shifting and addition in parallel, an error-compensated adder-tree (ECAT) is proposed to deal with the truncation errors and to achieve low-error and high-throughput discrete cosine transform (DCT) design. Instead of the 12 bits used in previous works, 9-bit distributed arithmetic. DA-based DCT core with an error-compensated adder-tree (ECAT).The proposed ECAT operates shifting and addition in parallel by unrolling all the words required to be computed. Furthermore, the error-compensated circuit alleviates the truncation error for high accuracy design. Based on low-error ECAT, the DA-precision in this work is chosen to be 9 bits instead of the traditional 12 bits. Therefore, the hardware cost is reduced, and the speed is improved using the proposed ECAT.

Keywords: Distributed arithmetic (DA)-based, error-compensated adder-tree (ECAT), 2-D discrete cosine transform (DCT).

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-159

Smart IoT Device for Child Safety and Tracking

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ABSTRACT

The objective of the project is to design a smart wearable device to help the parents to locate and monitor their children remotely. This device can be controlled through the cell phone using mobile application (app) and GSM module. The parents are able to send commands to device, as SMS text messages, to get the information about GPS coordinates, temperature and radiation index of the location.

The device also consists of bright SOS Light and distress alarm buzzer which can be activated by the parents via SMS text to get the attention of the bystanders, so that they can easily spot as a sign of distress. Touch sensor is also used to identify the presence of child. An Emergency help key is also provided on the device, to send automatic help message to three registered mobile numbers by the GSM module, indicating the GPS coordinates.

The camera is also provided on the device, to send images of the location. Camera usually in standby mode and waits for the command, which is sent from the smart phone application via GSM module, will activate the camera to start clicking a snapshot of the surrounding and save the file temporarily on the external microSD card. Then, the board will access the saved image from the microSD storage and transfer it to the GSM module which is sent it to the parents.

Keywords: GSM, SMS

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-160

Securing IoT Devices and Securely Connecting the Dots Using REST API and Middleware

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ABSTRACT

Internet of Things (IoT) is a fairly disruptive technology with inconceivable growth, impact, and capability. We present the role of REST API in the IoT Systems and some initial concepts of IoT, whose technology is able to record and count everything. We as well highlight the concept of middleware that connects these devices and cloud. The appearance of new IoT applications in the cloud has brought new threats to security and privacy of data. Therefore it is required to introduce a secure IoT system which doesn't allow attackers infiltration in the network through IoT devices and also to secure data in transit from IoT devices to cloud. We provide the details on how Representational State Transfer (REST) API allows to securely expose connected devices to applications on cloud and users. In the proposed model, middleware is primarily used to expose device data through REST and to hide details and act as an interface to the user to interact with sensor data.

Keywords: IoT, security, REST API, middleware.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-161

Structure of Deep Learning Inference Engines for Embedded Systems

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ABSTRACT

For the last several years, various types of deep learning applications have been introduced. Most deep learning related research and development have been done on servers or PCs with GPUs. Recently there have been a number of moves to apply those applications to the industrial sector. When deep learning techniques are applied to actual targets, w e c an f ace some spatial and environmental constraints unlike the laboratory environment. In this paper, we describe requirements when deep learning applications run for embedded systems. We introduce our ongoing project on developing a deep learning framework for embedded systems, especially automotive vehicles. Generally, deep learning application development process can be divided to two steps: t raining a data model with a big data set and executing the data model with actual data. In our framework, we focus on the execution step. We try to design an inference engine to satisfy the operational requirements for embedded systems. We describe our design direction and the structure. We also show preliminary evaluation result.

Keywords: deep learning neural network, embedded system

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-191

Textile-Based Antenna using Microstrip with DGS

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ABSTRACT

Microstrip antennas have gained prominence in contemporary wireless communication systems due to their cost-effectiveness, slim profile, compactness, ease of manufacturing, and seamless integration with microwave circuits. It explores the integration of textile materials into these antennas, primarily as substrates or conductive elements within clothing. Emphasis is placed on the prerequisites of wearability, durability, and flexibility for textile materials. Characterizing the properties of textile materials becomes imperative, given their typically low dielectric constants, which mitigate surface wave losses and enhance antenna impedance bandwidth. The study delves into Radio Frequency Identification (RFID) technology, utilizing electromagnetic and electrostatic coupling within the radio frequency (RF) segment of the electromagnetic spectrum to uniquely identify objects, animals, or individuals. It also explores the design methodology, with a focus on developments in personal communication networks, wide-area networks (WANs), and information systems. Textile antennas are envisioned as integral components of clothing systems for long-distance communication, whether directly printed on textile substrates or integrated as microstrip antennas onto garments. Their operational range spans 10-100 meters, with potential for longer distances through technological advancements and the use of laptops or mobile phones. Short-range connections can be established via wireless links employing induction.

Keywords: Microstrip antennas, RFID

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-192

Challenge and Research on VLSI Placement Research

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ABSTRACT

Given the significance of placement in integrated circuit (IC) physical design, extensive research studies performed over the last 50 years addressed numerous aspects of global and detailed placement. The objectives and the constraints dominant in placement have been revised many times over, and continue to evolve. Additionally, the increasing scale of placement instances affects the algorithms of choice for high-performance tools. We survey the history of placement research, the progress leading up to the state of the art, and outstanding challenges. Modern placement is an optimization problem with many objectives and constraints. However, the most common approach is to first develop a wire length-driven global placement engine that solves a straightforward mathematical formulation and is competitive on common benchmarks. This is a prerequisite for strong performance in multi objective optimization, and the handling of additional objectives and constraints can be implemented as the next step.

Keywords: placement research

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-193

Security Challenges on IoT and its Applications

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ABSTRACT

The Internet of Things (IoT) revolutionized the global network comprising of people, smart devices, intelligent objects, information, and data. It is no secret that as more and more devices connect to the internet, the challenges of securing the data that they transmit and the communications that they initiate are becoming more profound. Over the years, we have seen a surge in IoT devices, broadly in 2 areas – in homes and in manufacturing. With the former, we have seen an entire ecosystem built around Amazon's Echo devices using the Alexa Voice Service. Google, Microsoft, and Apple have followed suit as well. Since these are independent and closed platforms, the responsibilities of securing the devices rest with the platform providers. In this paper, we highlights cyber security in manufacturing and related industries. Industries such as manufacturing, oil & gas, refining, pharmaceuticals, food & beverage, water treatment, and many more are constantly looking to add the right layers of security, as they bring an increasing number of equipment and devices online. Device manufacturers and plant operations managers constantly face pressure to protect their physical assets from cyber threats. Moreover, for each of these industries, the nature of the data, topologies of IoT devices, and complexities of threat management and ensuring compliance vary widely.

Keywords: Internet of Things, Cyber-attack, Security threats

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-194

A Simple and Efficient Optical Character Recognition System for Basic Symbols in Printed TELUGU text

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ABSTRACT

Optical Character Recognition (OCR) systems have been effectively developed for the recognition of printed characters of non-Indian languages. Efforts are on the way for the development of efficient OCR systems for Indian languages, especially for Telugu, a popular South Indian language. We present in this paper an OCR system developed for the recognition of basic characters (vowels and consonants) in printed Telugu text, which can handle different font sizes and font types. Hu's invariant moments and Zernike moments that have been progressively used in pattern recognition are used in our system to extract the features of printed Telugu characters. Neural classifiers have been effectively used for the classification of characters based on moment features. An encouraging recognition rate of 97·8% has been obtained. The system methodology can be extended for the recognition of other south Indian languages, especially for Telugu.

Keywords: Telugu text; OCR; invariant moments; neural networks

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-195

Design and Implementation of Arithmetic Logic Unit using Modified Novel Bit Adder Using QCA

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ABSTRACT

Moore's law states that the number of transistors that could be integrated into a single die would grow exponentially with time. Thus, this causes increasing computational complexity of the chip and physical limitations of devices such as power consumption, interconnect will become very difficult. According to recent analysis the minimum limit for transistor size may be reached. Thus, it may not be possible to continue the rule of Moore's law and doubling the clock rate for every three years. So, in order to overcome this physical limit of CMOS-VLSI design an alternative approach is Quantum dot Cellular Automata (QCA). In ALU adder plays a vital role. In this survey a binary adder is taken for analysis and a new adder is designed based upon QCA technology. This modified novel bit adder is implemented into ALU structure. The aim of this proposed technique is that to reducing number of majority gates used in the design. This will lead to reduce number of QCA cells so that total area of ALU circuit can be minimized compare to previous designs. It also achieves reduced power consumption and high-speed performances than all other existing ALU design which uses normal full adder.

Keywords :QCA,ALU, Noval bit adder

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-196

IoT-Enabled Accident Detection and Rescue System with Location Alerts

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ABSTRACT

Road accidents cause millions of deaths and injuries annually throughout the world, raising serious concerns about public health. The survival rate of accident victims can be considerably increased by prompt intervention. To quickly detect accidents and start the rescue procedure, this paper proposes an Iot-Enabled Accident Detection and Rescue System with Location Alerts that makes use of a variety of sensors and communication technologies. Vibration sensor is used to identify unexpected tremors and impacts that could be signs of an accident Real-time vehicle location is determined by a GPS module. The Arduino Uno microcontroller is used to process sensor data and initiate communication protocols and safety measures. An LCD display shows the system status and any detected accidents visually. Safety switch make sure the driver is wearing a seatbelt or a helmet to help prevent serious injuries. To prevent any unforeseen situations, the vehicle's engine is turned off. Buzzer then sounds an audible alarm to notify emergency services and people in the vicinity. Emergency services and pre-registered contacts receive accident details and emergency notifications from the IoT module.

Key Words:

Internet of thing, Microcontroller, Vibration Sensor, GPS Sensor.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-197

Design and Synthesis of Soil Moisture Monitoring System using Arduino

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ABSTRACT

With respect to professionalism and the demanded resources, the agricultural field is high in demand always. Now a day's majority of the nations depend on the agricultural economy growth, consumption of food, employment and trade. So there are many challenges rise for the agriculturalists. So various agriculturalists, scientists, farmers around the world believe to formulate these methods and plans and ideas to deal with challenges. Anyways this project Is mainly describing the use of embedded systems in the field of agriculture. Especially monitoring the crops. The resources are in crisis in somehow. So this projects is intends to use these limited resources in efficient manner so that the cost may reduced. Apparently it is very much important to utilize the resources in a proper way. Lay of land, whether and insects, water availability etc are factors which affecting the crops mainly.

The proposed model consists of a micro controller, sensors like soil moisture sensor, gate walls (i.e. DC motor) and a water pump represents by the water pump. The sensors senses all the parameters and moderated by the micro controller, and send the information to the micro controller. Based up on the receiving information the micro controller di the necessary action such as turning on the water pump using the appropriate application. So the Farmers can save their time which they used it for irrigation.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-198

Determination of Energy Consumption for Non-Prepaid Metered Electricity Consumers using GSM Technology

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ABSTRACT

Mobile communication system advances daily that they can be applied for automatic reporting of faulty equipment over a long distance. The aim of this research work is to assists the Distribution Companies (DISCOs) in Nigeria in keeping an accurate record of hours a transformer in a feeder supplies power to the consumers. This is achieved by ensuring that the operational state of transformers in the distribution network is known at all times, with the developed system automatically reporting any distribution transformer trip to the Distribution System Operator (DSO). The records, in turn, help DISCOs in monthly energy consumption calculation and billing for non-prepaid metered (estimated-billed) electricity consumers, using the correct total number of hours that power is supplied to them in a month. This work comprises a 12V DC power supply unit, voltage sensor unit, controller unit, GSM module, and LCD unit. The controller unit is the ATMEGA328P microcontroller with its instruction set written in C- language. It was observed that the developed system could automatically report a transformer trip to DSO, who then takes a daily record of the total number of hours the transformer is energized in that month and with that value, accurate monthly energy consumption values for non-prepaid metered (estimated-billed) consumers can be calculated and processed.

Keywords :- ATMEGA328P microcontroller, GSM Module, LCD, Distribution transformer, Voltage sensor, DISCO, DSO.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-199

Business Management and Modernization: A Significant Study of Undersized Business Success

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ABSTRACT

This study explores the intricate relationship between business management strategies and the successful modernization of undersized businesses. Through a comprehensive examination of small enterprises, employing qualitative interviews and quantitative analysis, the research aims to uncover the pivotal factors contributing to their prosperity in the contemporary business landscape. The findings underscore the fundamental impact of effective business management on the triumph of undersized enterprises. Strategic planning, judicious resource allocation, and adept decision-making emerge as key components driving success. Additionally, the study highlights the transformative influence of modernization, emphasizing the significance of technology adoption and innovative marketing approaches in enhancing competitiveness and fostering sustained growth. The research not only identifies best practices but also underscores the need for customized management approaches that acknowledge and address the unique challenges faced by undersized businesses. Furthermore, it emphasizes the proactive integration of modernization measures as a critical aspect of ensuring long-term viability. This study's insights are of paramount importance to policymakers, business advisors, and small business owners seeking practical strategies to optimize their management practices and embrace modernization. By delving into the nuanced dynamics of undersized business success, this research provides valuable guidance for stakeholders aiming to contribute to the resilience and sustainability of small enterprises in a rapidly evolving business landscape.

Keywords: Small Business Growth, Business Innovation, Entrepreneurship, Business Success

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-200

Frequency Efficient VLSI Architecture of Multi-Stage Linear Feedback Shift Register Counters Decoding Logic

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ABSTRACT

This study presents a frequency-efficient VLSI architecture for multi-stage linear feedback shift register (LSFR) counters' decoding logic. LSFR counters are widely used in various applications, such as error detection and correction, cryptography, and communication systems. However, their implementation often faces challenges related to speed and power consumption. The proposed VLSI architecture addresses these challenges by introducing a frequency-efficient design for the decoding logic of multi-stage LSFR counters. Through a combination of optimized circuitry and innovative design techniques, the architecture aims to enhance the decoding process's speed while minimizing power consumption. The research involves a detailed analysis of existing LSFR counter decoding logic architectures, identifying bottlenecks and areas for improvement. Subsequently, the proposed architecture is presented and compared with conventional designs, showcasing its advantages in terms of frequency efficiency and power optimization. Simulation results and performance metrics demonstrate the effectiveness of the proposed VLSI architecture, indicating significant improvements in decoding speed and energy efficiency. The study concludes by discussing potential applications and implications of the frequency-efficient LSFR counter decoding logic in various digital systems, laying the groundwork for advancements in VLSI design for sequential circuits. This research contributes valuable insights to the field of digital circuit design, offering a promising avenue for the development of high-performance and energy-efficient LSFR-based systems.

Keywords: VLSI, Shift register, Adders, Counter

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-201

Contrast Enhancement Algorithm for Colour Images

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ABSTRACT

Conventional contrast enhancement techniques often fail to produce satisfactory results for low-contrast images, and cannot be automatically applied to different images because processing parameters must be specified manually to produce satisfactory results for a given image. This paper proposes a contrast enchantement technique to enhance colour images captured under poor illumination and varying environmental conditions. Images are converted from RGB to HSV colour space where enhancement is achieved and reconverted to the RGB. Class Limited Adaptive Histogram Equalization (CLAHE) is used to enhance the luminance component (V). Discrete Wavelet Transform is applied to the Saturation (S) components, and the decomposed approximation coefficients are modified by a mapping function derived from scaling triangle transform. The enhanced S component is obtained through Inverse Wavelet transforms.

Keywords; contrast enhancement, colour images, Wavelet transforms, Discrete Wavelet Transform, scaling triangle transform

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-202

Design and Integration of RPLiDAR Sensor Drone for Oil and Natural Gases

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ABSTRACT

This paper focuses on the design and development of a cutting-edge drone integrated with the state-of-the-art RPLiDAR AIM8-R6 sensor. The drone's distinguishing feature lies in its configuration of six propellers, which sets it apart from conventional drones. The primary objective of this project is to revolutionize aerial mapping and surveillance capabilities by harnessing the power of advanced sensor technology. This innovative approach aims to address the limitations observed in traditional drones, particularly in terms of obstacle detection and mapping accuracy. Through the integration of the RPLiDAR AIM8-R6 sensor and the incorporation of a six-propeller configuration, we hypothesize that the drone's navigation and mapping capabilities can be significantly improved. The proposed system encompasses a custom-built drone meticulously crafted to be lightweight and agile, thereby enabling enhanced flight efficiency and manoeuvrability. Key to this system is the integration of the RPLiDAR AIM8-R6 sensor, renowned for its exceptional lidar capabilities. With the ability to perform a full 360-degree scan and a remarkable range of up to 12 meters, this sensor provides highly accurate distance measurements and facilitates efficient obstacle detection. Consequently, the integrated drone can navigate complex environments with ease while adeptly avoiding collisions.The experimental results unequivocally demonstrate that the integrated drone equipped with the RPLiDAR A1M8-R6 sensor, and six propellers surpasses the capabilities of conventional drones in terms of obstacle avoidance, mapping accuracy, and overall flight performance.

Keywords: LiDAR sensor, 3D Mapping, Obstacle Avoidance, Remote Sensing, UAV

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-203

Design and Development of Railway Track Fault and Obstacle Avoidance using Internet of Things

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ABSTRACT

Indian Railways has one of the world's largest networks. Train movement is always reliant on railway rails alone. If one of these rails develops a crack, it becomes a huge issue. Many railway accidents occur because of the presence of a crack. The most difficult aspect of a railway analysis is detecting structural faults. If these flaws are not addressed early on, they could lead to a series of accidents, resulting in a significant loss of life and property. The proposed railway track fault detection and object detection system detects faulty railway tracks and objects that are in front of the train automatically and without the need for human intervention. This project intends to create autonomous railway track crack detection and object detection system that uses Arduino UNO, ultrasonic sensors, Infrared Sensors, and IoT module to detect cracks and objects along its journey. The ultrasonic sensor detects the objects, IR Sensor detects the faults in the crack. Sensors are utilized to detect cracks and objects, and if a crack or object is detected, the system will halt and sound an alarm. The proposed railway track fault detection and object detection system prevent accidents and saves human life and property of the train.

Keywords: Internet of things, Railway faults, Obstacle avoidance, Arduino UNO,IR Sensors, Ultrasonic Sensor.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-204

Securing IoT Gadgets and Securely connecting the Specks utilizing REST API and Middleware

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ABSTRACT

Internet of Things (IoT) is a fairly disruptive technology with inconceivable growth, impact, and capability. We present the role of REST API in the IoT Systems and some initial concepts of IoT, whose technology is able to record and count everything. We as well highlight the concept of middleware that connects these devices and cloud. The appearance of new IoT applications in the cloud has brought new threats to security and privacy of data. Therefore, it is required to introduce a secure IoT system which doesn't allow attackers infiltration in the network through IoT devices and also to secure data in transit from IoT devices to cloud. We provide the details on how Representational State Transfer (REST) API allows to securely expose connected devices to applications on cloud and users. In the proposed model, middleware is primarily used to expose device data through REST and to hide details and act as an interface to the user to interact with sensor data.

.Keywords :IoT,Security, REST API, middleware

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-205

Design and Simulation of Two Stage CMOS Operational Amplifier in 130nm CMOS

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ABSTRACT

In this paper the design and simulation of a two stage CMOS operational amplifier in 130nm CMOS technology is presented. Size of all the transistors in the CMOS op amp is designed. High gain enables the circuit to operate efficiently in a closed loop feedback system, whereas wide bandwidth makes the circuit to operate for high speed applications. The designed operational amplifier is modeled using Cadence Virtuoso schematic editor and simulated using Cadence Spectre, while the layout has been developed using Virtuoso. The op-amp provides a DC gain of 84dB and a unity gain bandwidth of 10MHz at 2pF. The power consumption is found to be 12.8µW, slew rate is 26.8V/µs and area occupied is 13µm ×12µm.

Keywords: Low voltage, Phase Margin, High gain, Slew rate, n-channel, Compensation, Differential pair and CMRR.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-206

Revolutionizing ALUs: Integrating QCA for Designing of 8-bit ALU

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ABSTRACT

The design of Arithmetic Logic Units (ALUs) is a critical aspect of modern digital circuitry, influencing the overall performance of processors. This study introduces a novel approach to QCA based ALU design by employing Majority Logic Gates (MLGs) instead of traditional AND, OR, and XOR gates which uses CMOS technology. The conventional ALU systems typically rely on a combination of these gates, leading to increased complexity, higher power consumption, and larger silicon footprint. The drawbacks of conventional ALU designs include limited scalability, longer critical paths, and a greater number of transistors, contributing to elevated production costs. In contrast, the proposed system utilizes Majority Logic Gates to perform logical operations, taking advantage of their inherent efficiency and reduced transistor count. The utilization of MLGs enables a streamlined and compact ALU design, enhancing both performance and energy efficiency. The study evaluates the proposed ALU's functionality, efficiency, and performance metrics through simulations and compares the results with traditional ALU designs, demonstrating the viability and advantages of the Majority Logic Gates-based approach in ALU design. This research contributes to the ongoing efforts to optimize digital circuitry for improved computational capabilities in a more resource-efficient manner.

Keywords: Arithmetic Logic Unit, Majority Logic Gates, Quantum-dot Cellular Automata, CMOS technology, Processor design.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-207

IoT based Indoor Senior Citizen Monitoring and Alerting System

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ABSTRACT

An Indoor Senior Citizen Monitoring and Alerting System with IoT Sensors should he implemented as it helps facilitate the monitoring process of senior citizens, especially in the rapidly ageing era where most senior citizens live alone in their houses. With increasing maturity in Internet of Things (IoT) technologies and cloud computing, IoT hardware is easier to be obtained, and cloud services are expanding into edge computing, reducing the development cost of IoT systems. Besides that, with the arising of 5G technology, network bandwidth is significantly increased, allowing more IoT devices to be connected in an area. Therefore, this research attempts to solve the human-based monitoring issue of senior citizen monitoring with the use of IoT technologies..

Keywords :IoT,Security,5G

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-208

Design and Analysis of A Low Power UWB Transmitter using Second Derivative Gaussian Pulse

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ABSTRACT

A low-power ultra-wideband (UWB) transmitter is proposed with the basic building blocks having an oscillator, modulator, and pulse generator using 90-nm CMOS technology in Cadence Virtuoso using a smaller number of transistors and passive elements. Frequency is generated using a ring oscillator with a common-gate switching n-MOS to vary the delay. Different frequency is generated by varying the control voltage from 1V to 5V generating a 5.6 GHz to 7.0 GHz carrier wave. Moreover, a different range of frequency generation is also proposed with different capacitor values with the ring oscillator. BPSK modulation technique is implemented for its higher efficiency over other techniques. Ultra-wideband (UWB) technology is always preferred for fast and reliable high data transmission in the short distance among other radio technologies. It has immense use in various applications like Bluetooth, Wi-Fi, medical appliances [1], RADAR, etc. The transmitter itself generates a radio frequency alternating current which is applied to the antenna. The main purpose of the transmitter design is the radio communication of information over a distance. The UWB transmitter generally operates in a higher UWB band which is centered at 7.7 GHz and it is optimized for a pulse bandwidth of 1.5 GHz. When excited by this alternating current, the antenna radiates radio waves. A very compact high-frequency BPSK design is proposed for the modulation circuit. The maximum sizing used for the transistors does not exceed 2 µm. The simulation results show the better performance of the transmitter in case of noise, efficiency, and BER over the other existing UWB transmitters.

Keywords: BER , UWB transmitters, BPSK.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-209

MAC Protocol for MOBILE ADHOC NETWORKS

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ABSTRACT

Mobile Ad Hoc Networks (MANETs) represent a dynamic and decentralized communication paradigm where nodes collaborate to form a self-configuring network without the need for a fixed infrastructure. Efficient Medium Access Control (MAC) protocols are crucial in MANETs to manage the shared communication medium and enhance overall network performance. This abstract introduces an innovative MAC protocol designed to address the unique challenges posed by the dynamic nature of MANETs. The proposed MAC protocol focuses on three key aspects: adaptability, collision avoidance, and energy efficiency. To achieve adaptability, the protocol dynamically adjusts its parameters based on the network's changing conditions, including node mobility, traffic load, and link quality. By employing advanced collision avoidance mechanisms, the protocol minimizes contention and improves channel utilization, thereby enhancing the overall throughput of the network. Additionally, the protocol incorporates energy-efficient strategies to prolong the operational lifespan of battery-powered nodes. Energy-aware mechanisms are integrated into the MAC layer to optimize communication while minimizing energy consumption, ensuring a more sustainable and resilient network. Simulation results demonstrate the effectiveness of the proposed MAC protocol in comparison to existing protocols, showcasing improvements in terms of throughput, latency, and energy efficiency. The protocol's performance is evaluated under various scenarios, including high node mobility, varying network sizes, and diverse traffic patterns, highlighting its robustness and versatility.

Keywords: MANETS, Cognitive Radio, MAC.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-210

IoT Based Child Safety Monitoring System Using Arduino and Raspberry Pi

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ABSTRACT

This paper discusses the concept of a smart wearable device for little children. The major advantage of this wearable over other wearable is that it can be used in any cell phone and doesn't necessarily require an expensive Smartphone and not a very tech savvy individual to operate. The purpose of this device is to help parents locate their children with ease. At the moment there are many wearable's in the market which help track the daily activity of children and also help find the child using Wi-Fi and Bluetooth services present on the device. But Wi-Fi and Bluetooth appear to be an unreliable medium of communication between the parent and child. Therefore, the focus of this paper is to have an SMS text enabled communication medium between the child's wearable and the parent as the environment for GSM mobile communication is almost present everywhere. When the child pressed the push button, the wearable device will send back with a text containing the real time accurate location of the child which upon tapping will provide directions to the child's location on google maps. Hence this paper aims at providing parents with a sense of security for their child in today's time.

Keywords: Children Safety; GPS; GPRS; Sensors; Serial camera

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-211

A Novel IoT Access Architecture for Vehicle Monitoring System

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ABSTRACT

The Internet of Things (IoT) is becoming increasingly important for traffic monitoring, medical treatment and other industrial applications. With the continuous development of the IoT, more and more "things" will be able to access to the IoT. Considering a large number of heterogeneous "things", how to provide a unified access mechanism to the IoT is a fundamental and key issue. In this paper, we propose a novel IoT access architecture based on field programmable gate array (FPGA) and system on chip (SoC), which can provide a unified access to the IoT for a wide variety of low-speed and high-speed devices with associated extendibility and configurability. We have adopted IEEE1451.2 standard for this design and applied the proposed design to vehicle monitoring system. The results indicate that the system can provide good performance in practical application.

Keywords: FPGA, IOT, SOC

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-212

Long-range & Self-powered IoT Devices for Agriculture & Aquaponics Based on Multi-hop Topology

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ABSTRACT

This article presents the prototype design and testing of a long-range, self-powered IoT devices for use in precision agriculture and aquaponics. The devices are designed using the ultra-low power nRF52840 microcontroller with Bluetooth 5 support and ambient energy harvesting. A power of 942µW is harvested in an indoor environment. The devices are therefore suitable for both indoor and outdoor use, as natural sunlight will provide far more energy compared to artificial indoor lights. A line-of-sight range of up to 1.8km is achieved with the use of coded transmissions. However, the coverage area and range can be extended significantly by deploying the devices in multi-hop network topology. The custom multi-hop protocol provides energy efficient communication from any device in a wireless sensor network to a gateway while consuming an average of 267µW with a transmission interval of 5 minutes. The sensor data is transmitted to a gateway, which then forwards it to a local server or cloud service, where the data can be analyzed to optimize the production in agriculture and aquaponics.

Keywords: IOT, Multi-hop protocol, Microcontroller

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-213

Flexible FPGA Architecture realized of General Purpose SOG

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ABSTRACT

In this paper, we describe an FPGA of high realization method flexibility, using general purpose SOG (sea of gates) gate array. Realization method flexibility means that we can realize the architecture by any method of realization, i.e. gate arrays and full customs. FPGAs determine their functions from their programmed internal state circuit. For example, SRAM program FPGAs do so by setting values to SRAMS. Our FPGA also uses SRAM program memory, but not limited. We will show one example of realization using general purpose SOG gate arrays. Our test SOG FPGA has a capacity of 6.5Kgate on a 14mm x 14mm die, with less than 2ns propagation delay between local logic cells.

Keywords: Field programmable gate arrays.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-214

Integrated Circuits in Safeguarding Systems: Exploring VLSI Design and Test Perspectives on Computer Security

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ABSTRACT

Computer security is becoming more and more important as more aspects of our life rely on information technology. The fundamental building block of information technology is semiconductor. Semiconductor enables Very Large-Scale Integrated (VLSI) Circuits which power the digital infrastructure. This presentation examines the challenges and opportunities of security from the point of view of VLSI design and technology. We first explain why security in general and hardware security in particular is challenging. We present a survey of different aspects of hardware security. We argue more work needs to be done in building the components to enhance hardware security. Moreover, we look at how design considerations of these components need to be different from regular design. As an example, we will take a deeper dive into Physically Unclonable Functions (PUF). PUF have been gaining attention since early 2000s and are now an established secure alternative to other key storage methods for many integrated circuits (ICs) such as FPGAs and microcontrollers. There are many works on the design of PUFs. However, the merits of a particular PUF should go beyond the normal Power-Performance-Area (PPA) of a standard digital integrated circuit. This is because the security primitive only occupies a very small portion of the whole chip. Improving a PUF design by some percentage makes little impact on the PPA of the whole chip. As a security primitive, it should be evaluated also on what its designated functionality as well. We summarize some of the evaluation criteria important for PUF. We also discuss some experience we had with challenges of SRAM based PUF.

Keywords: PUF, PPA

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-215

Security Analysis of a User Authentication Scheme for IoT-Based Healthcare

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ABSTRACT

In this paper we proposed a lightweight and anonymity-preserving user authentication scheme to establish secure communication between the doctor, the gateway, and sensor nodes in IoT-based healthcare, aiming to ensure the privacy of the patient's physiological data. In this article, however, we carefully revisit their scheme and first point out that the scheme is not practically implementable in its current form, and second we show that it is vulnerable to session key disclosure attacks, off-line password guessing attacks, and traceability attacks, under the assumption that the attacker can gain access to the sensor nodes and the doctor's device. We also propose fixes for each of these issues or vulnerabilities

Keywords: IoT, Health care system

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-216

Data Security Testing for Sensor Networks in IoT Environments

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ABSTRACT

In the IoT perception layer network, the transmission of a large amount of the similar data seriously consumes the energy of the network. Therefore, how to reduce the redundancy between similar data and reduce the amount of data transmission is the current data analysis of the IoT perception layer. Data security testing for sensor networks in IoT environments is the major topic of this paper. The sensor nodes in the monitoring area can collect and further process the relevant environmental information data, and then establish the routing in the form of the single-hop or multi-hop to transmit the data information to the convergence node or the base station. This is a complex scenario and the efficient security testing toll is essential. In the designed model, the high-performance management nodes can greatly improve the performance of the system.The smart contract, the core logic part of the model, is designed using multi-level thinking. For the testing tool, Metasploit penetration attack platform is applied. The simulation proves the performance.

Keywords : IoT, Security

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-217

Speed Counters

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ABSTRACT

Counters are primal blocks in most of digital circuits. The speed of a counter mainly depends on how effectively we utilize the clock signals and how effectively the signal passes through the critical path of circuit. We are going to discuss a new counter architecture which has constant counting rate independent of the length of the counter. By using prescaling techniques we split our large counter into segments and use a systolic structure in the middle of these discrete counter segments thereby we are making the delay of the counter as constant .Thus we are speeding up the counter by maintaining counter rate as constant irrespective of the counters length.

Keywords: counter, systolic, two bit dependency.

ISBN: 978-93-91420-58-1

PAPERID: ICSMEC2023-218

The Application of Smart Antenna in Radio Communication Technology

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ABSTRACT

Smart antenna has become one of the important technologies in the field of communication. The smart antenna is the combination of adaptive antenna technology, digital signal processing technology and software radio technology; the smart antenna can also improve the system capacity and communication quality by adjusting its own parameters, and can delete or suppress the interference signal. The performance of the communication system can be improved by increasing the antenna gain and spectrum utilization through the application of smart antenna. In this paper, the basic structure of smart antenna is described, the advantages of smart antenna are compared, the development trend of smart antenna technology is analyzed, and the future of smart antenna is prospected.

Keywords: Smart Antenna, DSP, Radio Technology

ISBN: 978-93-91420-58-1

ABOUT CONFERENCE

5th International conference on "Smart Modernistic in Electronics and Communication" (ICSMEC-23) will be organized by St. Martin's Engineering College, Secunderabad, Telangana, India, during 15th & 16th December, 2023. ICSMEC-23 will serve as a colloquy for sharing the proficiency among academicians, researchers, scientist and industrial personnel from all over the world in the areas of engineering and technology for estimation and prevention of complex situation. All papers will be reviewed by eminent researchers and all accepted papers will be sent to UGC care/ Scopus journal publication. All the abstracts will be published in conference proceedings with ISBN & UGC Care Journal. Participants can present papers in online/offline mode.

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SIRO RECOGNITION BY MINISTRY OF SCIENCE & TECHNOLOGY, GOVT.OF INDIA.
Dhulapally, Near Kompally, Secunderabad - 500 100, T.S. www.smec.ac.in

ISBN:
978-93-91420-58-1

Editor in chief
Dr.P.Santosh Kumar Patra