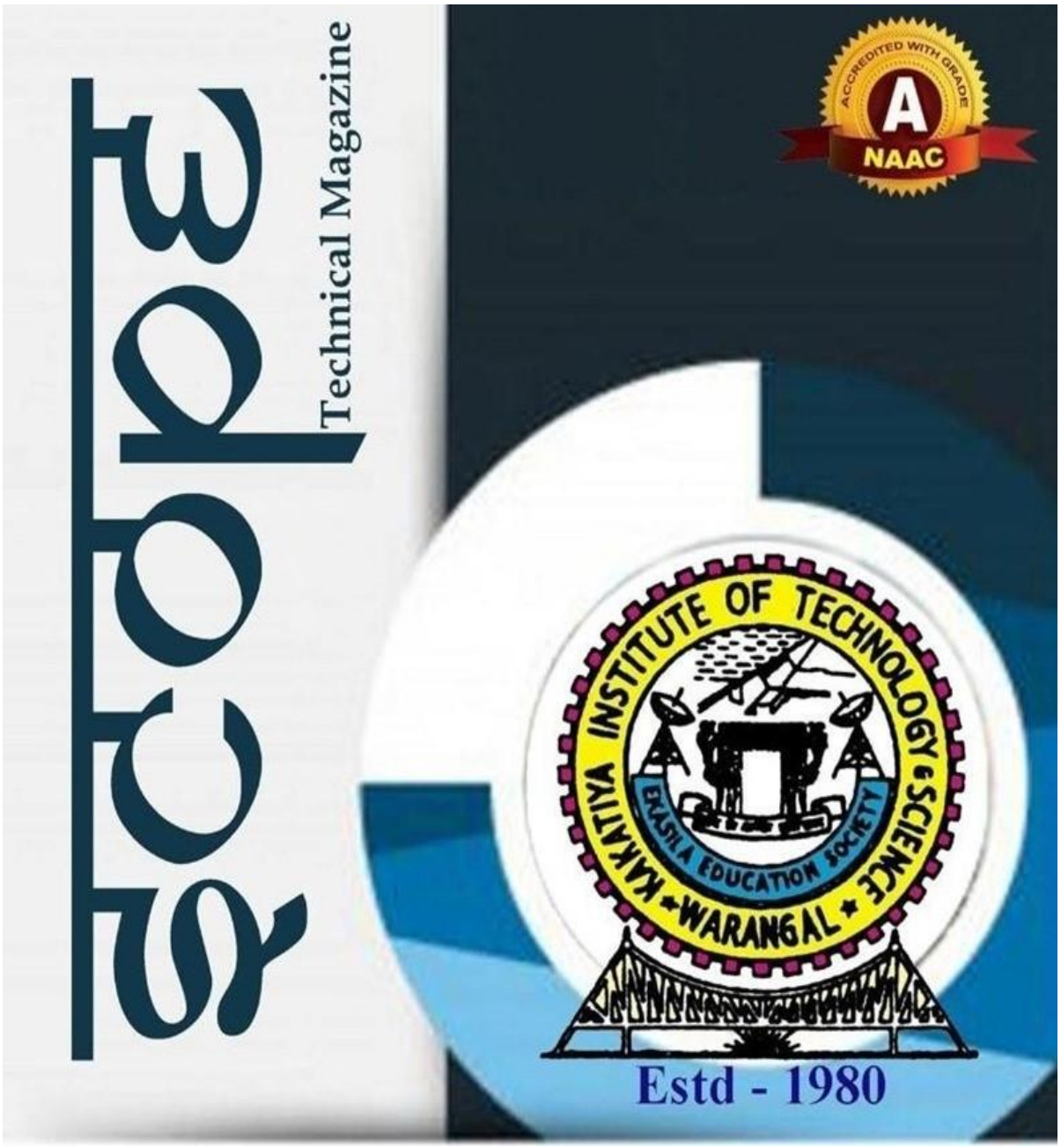

DEPARTMENT OF ELECTRONICS COMMUNICATION AND INSTRUMENTATION ENGINEERING

KAKATIYA INSTITUTE OF TECHNOLOGY AND SCIENCE WARANGAL – 506015

(an Autonomous Institute under Kakatiya University Warangal)

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SCOPE

Technical Magazine

Electronics Communication & Instrumentation Engineering

Department of Electronics Communication & Instrumentation Engineering
KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE Warangal-506015

(An Autonomous Institute under Kakatiya University, Warangal)

DEPARTMENT OF ELECTRONICS COMMUNICATION & INSTRUMENTATION ENGINEERING

KAKATIYA INSITUTE OF TECHNOLOGY & SCIENCE : WARANGAL-15

VISION

To provide equlity education in Electronics communication & Instrumentation Engineering by nurturing thestudents with strong technical, analytical, practical skills and ethics to make them engineering professionals who cater to the societal needs with a high degree of integrity and social concern.

MISSION

1. To provide progressive and quality educational environment with the help of dedicated faculty and staff by fully utilizing the information technology aiming at continuous teaching and learning process.

2. To produce engineering graduates fit for employability with a competence todesign, develop, invent and solve instrumentation engineering problems.

3. To make the students ethically strong by inculcating sense of brotherhood.

4. To make the students research oriented by providing latest technical knowledgeand thus cater to the changing needs of industry and commerce.

EDITORIALBOARD

PREFACE

This magazine summarizes the current state of Electronics Communication and Instrumentation Engineering, providing an arena for the student community to showcase their technical talents in a great way. Keeping in view of the present era of technological revolution in the field of Instrumentation Engineering, the students of ECIE department, KITS Warangal presents you **SCOPE**.

We acknowledge the essential contribution of the reviewers, whose efforts are deeply appreciated.

We feel that such technical magazine is very well required as it helps in updating the knowledge of future engineers.

The Department of ECIE is very much thankful to the Management for their continuous support and encouragement for making the TechnicalMagazine **SCOPE**.

Program Outcomes (POs)

1. **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and researchmethods including design of experiments, analysis and interpretation of data, and synthesis of theinformation to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to man-age projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMSPECIFICOUTCOMES(PSO's)

PSO1: An ability for immediate professional practice as an Electronics & Instrumentation Engineer.

PSO2: An abilitytousefundamentalknowledgetoinvestigatenewandemergingtechnologiesleadingtoinnovationsin the field of Electronics &Instrumentation Engineering.

Mini Project Abstracts

A Novel Parking Management System for Smart Cities, to save Fuel, Time and Money

Effective parking management systems are critical for optimizing resource usage and reducing inefficiencies in urban environments. This mini-project aims to simulate a smart parking management system to address challenges like prolonged search times, resource wastage, and mismanagement in parking facilities. The simulation models a system that integrates hardware concepts such as Raspberry Pi devices, ultrasonic sensors, and cameras, alongside software components implemented using Python. The project focuses on simulating core functionalities, including license plate recognition, parking spot allocation, and error handling for misallocated or conflicting parking scenarios. Using a Python-based environment, the simulation replicates various real-world scenarios, such as correct parking, incorrect parking with error correction, and dynamic reassignment of parking spots. Performance metrics like processing speed, system responsiveness, and accuracy will be evaluated to validate the proposed approach. This simulation demonstrates the potential of smart parking systems to enhance parking efficiency, reduce time and fuel wastage, and offer scalable solutions for urban infrastructures like shopping malls, hospitals, and event venues. The project highlights the feasibility of implementing affordable and efficient parking management systems through simulation.

A.SAI DATTU
(B23CI076L)

Real-Time Drunk Driving Prevention Using GPRS and Vehicle Control Technologies

Drunk driving is a critical issue causing numerous road accidents, severe injuries, and loss of life worldwide. To address this problem, In this proposed mini project, we presents a "Drunk and Drive Detection System" with an emphasis on leveraging GPRS technology for real time communication and enhanced safety. The system employs an alcohol sensor to monitor the driver’s breath for alcohol levels. Upon detection, the system prevents the vehicle from starting by disabling the ignition through a relay mechanism. Simultaneously, a GPRS module transmits an alert message containing the vehicle's real-time GPS location to the nearest police station or emergency contact, ensuring swift action.The integration of GPRS technology is pivotal, enabling reliable and immediate reporting. Unlike conventional systems that merely alert the driver, this solution extends its functionality to inform authorities, supporting faster intervention and law enforcement. The system’s design is efficient and cost-effective, making it suitable for consumer-grade vehicles while ensuring robust performance under real-world conditions.

J.SHIVA KUMAR
(B23CI069L)

FEATURE EXTRACTION & TIME-FREQUENCY ANALYSIS OF PHYSIONET PCG SIGNALS

Heart sound analysis is important for detecting heart problems like murmurs or arrhythmias. This project focuses on analyzing heart sounds using both time and frequency domains to better understand the heart's condition. We will first record heart sounds using a stethoscope or a sensor that picks up heartbeats. The recorded signals will be cleaned to remove noise. In the time domain, we will analyze the heartbeats by looking at the timing and strength of each sound, especially the S1 and S2 sounds. In the frequency domain, we will use a technique called Fast Fourier Transform (FFT) to convert the sounds into frequencies. This will help us identify patterns or unusual sounds that could suggest a heart issue.

P.SRAVANI
(B23CI073L)

An IOT platform for smart charging EV fleets, using real time data and production forecasts

The rapid adoption of electric vehicles (EVs) presents new challenges and opportunities in energy management. This project proposes the development of an IoT-based platform for the smart charging of EV fleets, leveraging real-time data and renewable energy production forecasts. The system integrates IoT devices, cloud computing, and predictive analytics to optimize energy consumption and reduce reliance on conventional power grid. The platform collects real-time data on vehicle state-of-charge (SOC), energy demands, and grid conditions while incorporating renewable energy sources such as photovoltaic (PV) panels. A fuzzy logic-based decision-making algorithm dynamically manages charging priorities and schedules based on factors like energy availability, grid load, and fleet requirements. The system also enables vehicle-to-grid (V2G) and vehicle-to-vehicle (V2V) energy transactions to enhance energy efficiency and sustainability.

M.HARIKA
(B23CI070L)

Optimal Charging of Plug-in Electric Vehicles for a Car-Park Infrastructure.

The increasing adoption of plug-in electric vehicles (PHEVs) necessitates intelligent charging systems to manage energy demand effectively. This project focuses on designing and implementing an optimal charging system for a car-park infrastructure that integrates renewable energy sources, such as photovoltaic (PV) panels, with the utility grid. The objective is to minimize the impact of PHEV charging on the grid while maximizing the utilization of renewable energy.

The system employs a fuzzy logic-based controller to dynamically adjust charging rates based on real-time inputs, including the state-of-charge (SOC) of the vehicles, energy prices, grid load, and predicted PV output. Vehicles are prioritized into different charging levels based on departure times and energy requirements, ensuring efficient energy distribution while meeting user demands. The system also supports vehicle-to-grid (V2G) and vehicle-to-vehicle (V2V) energy transactions, enhancing grid stability and energy flexibility.

G.ANJALI
(B23CI072L)

Design and Simulation of Logic-in-Memory Full Adder Circuit using Floating Gate Field Effect Transistor

In this project, we will explore the design and analysis of a Logic-in-Memory (LiM) full adder circuit using Floating Gate Field Effect Transistor (FGFET) technology, with the aid of Xlinks software for enhanced simulation and modeling. As the traditional von Neumann architecture struggles to meet the performance demands of data-intensive applications such as artificial intelligence, the integration of memory and logic within LiM technology offers a promising solution to overcome the von Neumann bottleneck. This study will focus on developing a compact model for FGFETs, which feature a structure similar to widely-used floating gate memory cells. Using Xlinks for technology computer-aided design (TCAD) simulations, we will simulate FGFET characteristics at the 32nm technology node and implement various full adder circuit designs. These designs will be evaluated based on key performance metrics such as delay, power consumption, and area efficiency. The outcomes will be benchmarked against conventional CMOS-based full adder circuits to demonstrate the improvements in static power and power delay product (PDP) offered by FGFET-based designs.

M.ABHINAVA
(B22CI006)

IOT based Smart Home Security System using ESP8266 and PIR sensor with Email Alert

The Smart Home Security project utilizes an ESP8266 microcontroller with a Passive Infrared (PIR) sensor to create a smart home security solution. The system continuously monitors for motion detection through the PIR sensor, which is connected to the ESP8266. When motion is detected, the system triggers an alert, sending notifications via the Blynk app and can also be configured to send an email alert to the user. This functionality is achieved through the Blynk platform, which allows for remote monitoring and control. The ESP8266 connects to a Wi-Fi network, enabling real-time communication and alerts, making it an effective tool for enhancing home security.

M.SREEJA
(B22CI001)

Optimal Charging of Plug-in Electric Vehicles for a Car-Park Infrastructure.

The increasing adoption of electric vehicles (EVs) in urban areas has highlighted the critical need for a well-structured public charging infrastructure. This project aims to analyze and quantify the public charging demand for personal vehicle travel in cities by leveraging real-world travel data, energy consumption patterns, and urban mobility trends. The project focuses on identifying key factors that influence public charging demand, such as travel distances, vehicle energy consumption, and daily parking habits. Using predictive modeling and geographic data analysis, the charging requirements at various urban locations, including residential areas, workplaces, and public parking spaces, are assessed.

A.RAJENDRA
(B23CI064L)

Mobile Personal Health Monitoring for Automated Classification of Electrocardiogram Signals in Elderly

Develop a mobile PHM system integrating a wearable ECG sensor with Bluetooth-enabled transmission and a smartphone interface.Employ machine learning algorithms for automated classification of normal and abnormal ECG patterns.Enhance the usability of the system to cater specifically to the elderly population with reduced vision and dexterity.Validate the system's accuracy, sensitivity, and specificity in classifying ECG signals through real-life testing. Improve access to timely cardiac care for elderly individuals in low resource settings.

Syed Nawaz Ahmed
(B23CI079L)

Reconfigurable Booth Multiplier

The increasing demand for high-performance and energy-efficient arithmetic operations in modern digital systems necessitates the design of flexible and optimized hardware solutions. This project presents the implementation of a Reconfigurable Booth Multiplier, which leverages the Booth encoding algorithm to perform high-speed multiplication while adapting dynamically to varying computational requirements. The proposed design supports variable bit-width operations, enabling efficient utilization of hardware resources in real-time applications such as digital signal processing (DSP) and image processing. By integrating reconfigurable logic, the multiplier can switch between power-optimized and performance-optimized modes, catering to the trade-off between speed and energy efficiency. The implementation is verified using simulation tools, and its performance is evaluated against conventional multipliers in terms of delay, area, and power consumption. This reconfigurable approach offers a scalable solution for next-generation processors and embedded systems requiring versatile and high-throughput arithmetic units.

S. NAGA LAXMI
(B23CI066L)

Low Power & High Speed Carry Select Adder Design Using Verilog

This project involves the design and simulation of a 16-bit Carry Select Adder (CSLA), a high-performance digital adder widely used to optimize arithmetic operations in modern computing systems. The CSLA addresses the delay caused by carry propagation in traditional adders by precomputing sum and carry outputs for two possible carry-in conditions (0 and 1) in parallel. These precomputed results are then selected using multiplexers based on the actual carry-in value. This approach reduces computation time, making the CSLA highly efficient for applications in processors, digital signal processors, and arithmetic-intensive hardware systems. The project involves implementing the CSLA at the circuit level using SPICE simulation tools. The design is modular, dividing the 16-bit adder into 4-bit Ripple Carry Adder (RCA) blocks, with 2:1 multiplexers used for carry selection. The simulation validates the correctness of the design under various input conditions and evaluates its performance in terms of delay, power consumption, and scalability. The CSLA is expected to demonstrate significant improvements in speed compared to conventional Ripple Carry Adders, offering a balanced trade-off between hardware complexity and performance.

V.KALYAN
(B22CI005)

Smart kitchen using IOT

Smart kitchen is a tech-enabled cooking space with iot-connected appliances like smart ovens & fridges, offering automation, remote control and personalised features. The role of iot in smart kitchen is to connect devices seamless connection , automation and control. Iot allows task like monitoring ,remote controlling appliances, receiving real-time alerts, & optimising energy usage. Sensors like DHT11 and Arduino board are used in this project. Arduino connecting to Wi-fi network serial monitor will display humidity and temperature .If any type of accidents occur in kitchen we receive notification through mobile app.The simulation of the project using proteus software.This project highlights the advantages of empowering individual to manage their cooking task more efficiently, enabling them to balance their busy schedule while enjoying healthier and more optimised meal preparation.

G.SOUMYASREE
(B23CI068L)

Energy-efficient Algorithms For Human Face Detection

A crucial tool in several fields, including human-computer interface, security and surveillance, is face detection. Even though contemporary deep learning techniques like YOLO and SSD are expected to provide excellent accuracy, their considerable processing overhead will likely render them inappropriate for devices with limited resources. The theme of this research will be to use Haar Cascade Classifiers, which are based on the ViolaJones algorithm, to develop an energy-efficient face identification system. Hand-crafted features and an AdaBoost classifier will be employed by Haar Cascade Classifiers to identify faces in real- time video feeds and photos. In order to increase processing speed and lower energy consumption, the project will improve the detection parameters, such as scale factor and minimum neighbors. Python and OpenCV will be used to test the system on various datasets and real-world situations. The system's performance will be assessed in terms of energy efficiency, speed, and detection accuracy

M. CHANDANA
(B23CI081L)

MACHINE LEARNING FOR CARDIOVASCULAR HEALTH: A PPG SIGNAL APPROACH

Cardiovascular diseases (CVDs) remain a leading cause of mortality worldwide, necessitating continuous and non-invasive monitoring techniques. Photoplethysmography (PPG) signals have emerged as a promising tool for cardiovascular health assessment due to their accessibility and ease of acquisition. This study explores the application of machine learning (ML) techniques in analyzing PPG signals to detect and predict cardiovascular conditions. By leveraging advanced signal processing, feature extraction, and deep learning models, we aim to improve the accuracy and reliability of cardiovascular monitoring. Our approach includes preprocessing raw PPG data, extracting key biomarkers, and training ML models for classification and prediction tasks.

VAISHNAVI
(B22CI029)