MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

Autonomous Institution – UGC, Govt. of India

Accredited by NBA & NAAC with 'A+' Grade

NIRF Indian Ranking, Accepted by MHRD, Govt. of India | Band – Excellent, National Ranking by ARIIA

Maisammaguda, Dhulapally, Secunderabad – 500 010, Telangana

A.Y : 2024-25 VOL.1

Under

Student Chapter IEEE, IETE & Technical Association Electro Spikes

TECHNITRONIX

HALF-YEARLY TECHNICAL MAGAZINE

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ECE

www.mallareddyecw.com

DEPARTMENT VISION

- Our vision is to develop the department in to a full fledged Centre of learning in various fields of Electronics and Communication Engineering keeping in view the latest developments and to invoke enthusiasm among the Students to continually renew their education in rapidly developing technological scenario.

Vision

DEPARTMENT MISION

- Our mission is to inculcate a spirit of scientific temper and analytical thinking & train the students in contemporary technological trends in electronics and communication to meet the challenging needs of the industry by providing versatile sound knowledge in the field of engineering and technology

Mission

ABOUT THE DEPARTMENT

The Department of Electronics and Communication Engineering is accredited by NBA, with an intake of 240 in B.Tech Programme and also offers M.Tech Programme in Embedded Systems. The department has state of the art laboratories with latest softwares like MENTOR GRAPHICS, CADENCE, MATLAB, XILINX, CCSTUDIO, KEIL, RTOS, RT Linux, OSCAD, PSPICE and MULTISIM. The department consists of well equipped Robotics- Centre of Excellence to train the students in specific modules to design and develop innovative projects that extend the state of the art in Robotics. It has well qualified and experienced faculty members. The highly competent and professional faculties, many of them drawn from premise institutions and industry have extensive experience and contribute to the holistic development of academics, research and career building of students. 32faculty members attained patent rights. The department faculty published 82 papers in SCI/Scopus indexed journals, 156 papers in UGC indexed/International journals and presented 226 papers in various national & international conferences and published 28 textbooks with ISBN. The department established IEEE, IETE & ISTE student chapters under which it organizes Technical Symposiums and various co-curricular activities every Academic Year. The department organized National Conference on Signal Processing Communications and System Design (SPCOMSD) in 2014and is organizingInternational Conference on Signal Processing Communications and System Design (ICSPCOMSD) every year, from past 7 years. The department also organized Faculty Development Programmes on Analog & Digital Design using CADENCE Tools, Embedded System using 32 bit processor, Programmable System on Chip Mixed Signal Microcontroller, Refresher Courses on Analog and Digital Communications, Digital Signal Processing, VLSI Design using CADENCE Tools and One Week Refresher Course on “VLSI & Embedded Systems”. The department organized AICTE Sponsored Two Week Faculty Development Programme on “Speech, Image & Video Processing Techniques, Analysis & Applications”, AICTE Sponsored One Week Short Term Training Programme on “Optimization Techniques through Machine Learning for Wireless and IOT”, AICTE Sponsored One Week Short Term Training Programme on “Emerging Trends in Wireless Sensor Networks and Applications”, AICTE Sponsored One Week Short Term Training Programme on “Deep Learning Techniques for Electronic Health Record Analysis”, AICTE Sponsored One Week Short Term Training Programme on “Emerging Trends in Advanced Signal & Image Processing”, AICTE Sponsored One Week Short Term Training Programme on “Emerging Trends in VLSI Technology” and the department also received AICTE sanctioned MODROB’s on “Advanced VLSI Lab” and Advanced Microwave Engineering Lab”. The department also publishes the Registered Journal “International Journal of Research in Signal Processing, Computing and Communication-System Design (IJRSCSD)” with an ISSN: 2395-3187.

PO'S

PO1	Engineering knowledge	An ability to apply knowledge of mathematics (including probability, statistics and discrete mathematics), science, and engineering for solving Engineering problems and modeling
PO2	Problem analysis	An ability to design, simulate and conduct experiments, as well as to analyze and interpret data including hardware and software components
PO3	Design / development of solutions	An ability to design a complex electronic system or process to meet desired specifications and needs
PO4	Conduct investigations of complex problems	An ability to identify, formulate, comprehend, analyze, design synthesis of the information to solve complex engineering problems and provide valid conclusions.
PO5	Modern tool usage	An ability to use the techniques, skills and modern engineering tools necessary for engineering practice
PO6	The engineer and society	An understanding of professional, health, safety, legal, cultural and social responsibilities
PO7	Environment and sustainability	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and demonstrate the knowledge need for sustainable development.
PO8	Ethics	Apply ethical principles, responsibility and norms of the engineering practice
PO9	Individual and team work	An ability to function on multi-disciplinary teams.
PO10	Communication	An ability to communicate and present effectively
PO11	Project management and finance	An ability to use the modern engineering tools, techniques, skills and management principles to do work as a member and leader in a team, to manage projects in multi-disciplinary environments
PO12	Life-long learning	A recognition of the need for, and an ability to engage in, to resolve contemporary issues and acquire lifelong learning

PSO'S

The graduates of the department will attain:

PSO1: The ability to analyze, design and implement application specific electronic system for complex engineering problems for analog, digital domain, communications and signal processing applications by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.

PSO2: The ability to adapt for rapid changes in tools and technology with an understanding of societal and ecological issues relevant to professional engineering practice through life-long learning

PSO3: Excellent adaptability to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities.

PEO'S

PEO1-PROFESSIONAL DEVELOPMENT

To develop in the students the ability to acquire knowledge of Mathematics, Science & Engineering and apply it professionally within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability with due ethical responsibility.

PEO2-CORE PROFICIENCY

To provide ability to identify, formulate and solve engineering problems with hands on experience in various technologies using modern tools necessary for engineering practice to satisfy the needs of society and the industry.

PEO3- TECHNICAL ACCOMPLISHMENTS

To equip the students with the ability to design, experiment, analyze and interpret in their core applications through multi disciplinary concepts and contemporary learning to build them into industry ready graduates.

PEO4- PROFESSIONALISM

To provide training, exposure and awareness on importance of soft skills for better career and holistic personality development as well as professional attitude towards ethical issues, team work, multidisciplinary approach and capability to relate engineering issues to broader social context.

PEO5- LEARNING ENVIRONMENT

To provide students with an academic environment and make them aware of excellence, leadership, written ethical codes and guidelines and the life-long learning to become a successful professional in Electronics and Communication Engineering

MESSAGES

Founder Chairman's Message

Ch. Malla Reddy

Founder Chairman, MRGI
Hon'ble Minister, Govt. of Telangana State

MRECW has made tremendous progress in all areas and now crossing several milestones within a very short span of time and now I feel very happy to know that the students and faculty of the ECE department of MRECW are bringing out the volume-1 of the Quaterly Technical magazine Technitronix in A.Y 2024-25. As I understand this magazine is intended to bring out the inherent literary talents in the students and the teachers and also to inculcate leadership skills among them. I am confident that this issue will send a positive signal to the staff, students and the persons who are interested in the educational and literary activities

Principal's Message

I congratulate the department of ECE, MRECW for bringing out the issue of the prestigious Quaterly department technical Magazine Technitronix under A.Y: 2024-25, I am sure that the magazine will provide a platform to the students and faculty members to expand their technical knowledge and sharpen their hidden literary talent and will also strengthen the all round development of the students. I am hopeful that this small piece of literary work shall not only develop the taste for reading among students but also develop a sense of belonging to the institution as well. My congratulations to the editorial board who took the responsibility for the arduous task most effectively. I extend best wishes for the success of this endeavor.

Dr. Y. Madhavee Latha

Principal

HOD'S MESSAGE

It is an occasion of great pride and satisfaction for the department of ECE,MRECW to bring out the issue of the Quaterly of the Technical magazine Technitronix under A.Y:2024-25, it gives me immense pleasure to note that the response to the magazine has been over whelming. The wide spectrum of articles gives us a sense of pride that our students and faculties possess creative potential and original thinking in ample measures. Each article is entertaining interesting and absorbing.

I applaud the contributors for their stimulated thoughts and varied hues in articles contributed by them.

Dr. K. Sudhakar

HOD

SCIENTIST OF THE QUATERLY YEAR

Satyendra Nath Bose

Satyendra Nath Bose FRS, (1 January 1894 – 4 February 1974) was an Indian theoretical physicist and mathematician. He is best known for his work on quantum mechanics in the early 1920s, in developing the foundation for Bose–Einstein statistics and the theory of the Bose–Einstein condensate. A Fellow of the Royal Society, he was awarded India's second highest civilian award, the Padma Vibhushan, in 1954 by the Government of India.

He is renowned for his collaboration with Albert Einstein, which led to the development of Bose-Einstein statistics and the concept of Bose-Einstein condensate. These contributions are foundational to quantum theory, particularly in the study of bosons, a class of particles named after Bose.

His work on Planck's law and the behavior of photons led Einstein to recognize its significance and extend it further, making Bose a pivotal figure in modern physics.Bose's legacy also extends to his contributions in education and his influence on Indian scientific thought. He was a professor of physics and contributed to the growth of research in India, especially during his time at the University of Calcutta.

FACULTY ARTICLES

Biosensors

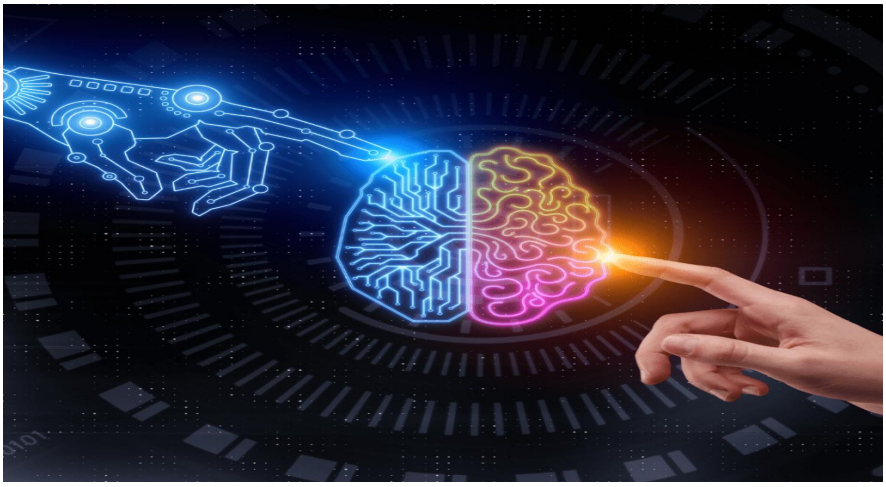
Biosensors are analytical devices that integrate a biological sensing element with a transducer to detect and quantify biological or chemical substances. They are widely used in healthcare, environmental monitoring, and defense. The key components of biosensors include a bioreceptor (such as enzymes, antibodies, or nucleic acids) that interacts with the target analyte and a transducer that converts the biological response into a measurable signal, typically electrical, optical, or thermal.

Recent advancements in biosensors focus on increasing sensitivity, selectivity, and miniaturization. Wearable and implantable biosensors are gaining attention for their potential in real-time health monitoring, such as tracking glucose levels in diabetics or detecting biomarkers for diseases like cancer. Emerging trends also involve the development of multi-analyte biosensors that can detect multiple biomarkers simultaneously in small biofluid volumes, enhancing diagnostic accuracy.

Novel materials, such as nanomaterials and advanced polymers, are being used to improve the performance of biosensors, enabling faster response times and lower detection limits. Additionally, biosensors are increasingly integrated with machine learning algorithms and data analytics to process complex data, enhancing their diagnostic capabilities. Applications in defense include monitoring stress levels, fatigue, and cognitive performance through wearable devices that measure physiological parameters.

Mrs. SIVAPARVATHI MOVVA
Department of ECE

Human-Machine Symbiosis

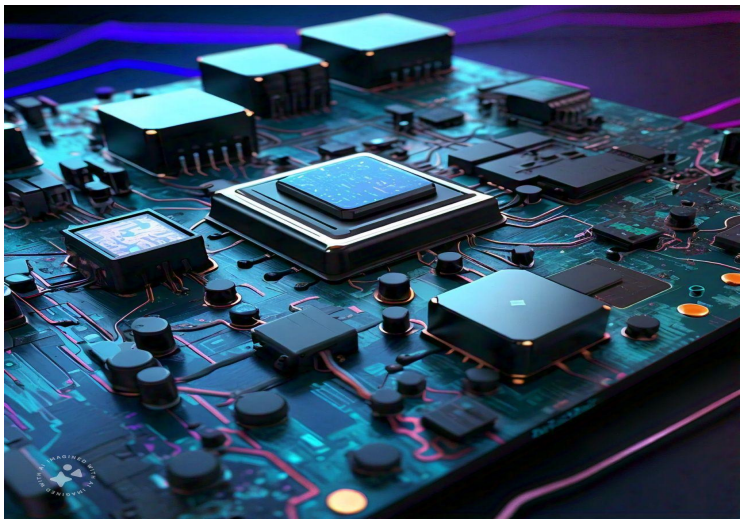


Human-Machine Symbiosis refers to the growing integration of humans and technology through advanced interfaces that allow for seamless communication and interaction. This field focuses on creating systems that not only respond to human input but also enhance cognitive and physical performance. Key areas of research include brain-machine interfaces (BMIs), neuromodulation, and adaptive algorithms that interpret physiological and behavioral signals. The goal is to develop symbiotic systems where machines can augment human capabilities in tasks such as decision-making, training, and real-time cognitive enhancement, ultimately fostering deeper cooperation between humans and technology.

This concept leverages brain-machine interfaces (BMIs), wearable devices, and neuromodulation technologies to read, interpret, and influence human brain activity and physiological states. The ultimate goal is to enhance human cognitive functions, decision-making, and physical abilities by enabling machines to anticipate human needs and provide real-time feedback or augmentation. Research areas include adaptive algorithms that interpret human signals and novel materials for developing non-invasive, high-fidelity interfaces. This symbiotic relationship promises breakthroughs in fields like rehabilitation, defense, and even everyday tasks, allowing for enhanced performance through close collaboration between human intelligence and machine learning systems.

Mr. NAGA DASARADHA KAMANURU
Department of ECE

Next-Generation Power Electronics



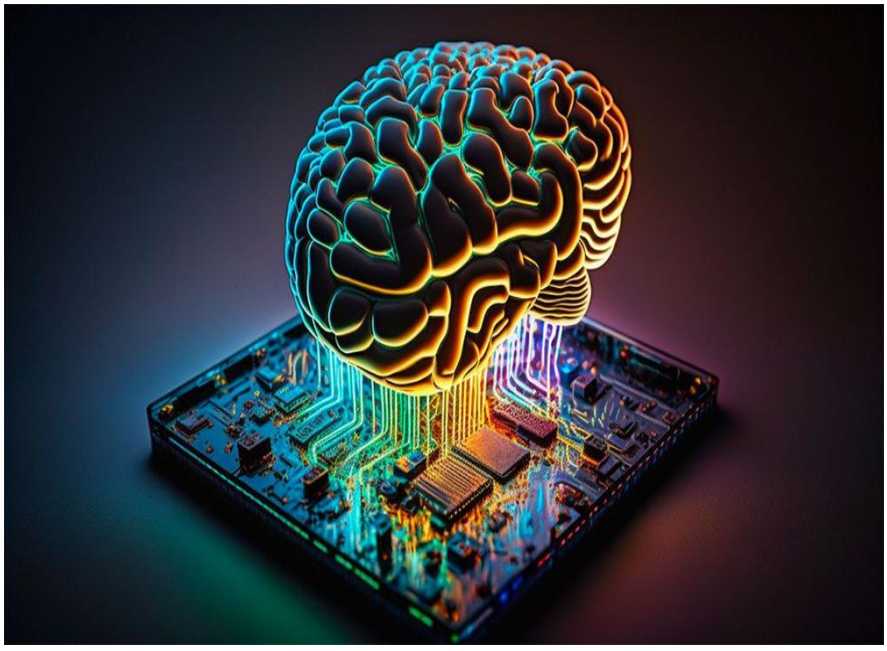
Next-Generation Power Electronics focuses on the development of highly efficient, compact, and reliable power conversion systems, driven by advancements in semiconductor technologies and innovative materials. One of the key breakthroughs is the use of **wide-bandgap (WBG) semiconductors**, such as gallium nitride (GaN) and silicon carbide (SiC). These materials enable higher voltage operation, faster switching speeds, and greater thermal efficiency compared to traditional silicon-based devices, making them ideal for applications like electric vehicles (EVs), renewable energy systems, and industrial automation.

Key research topics include the design of **high-frequency power converters**, which allow for reduced component size and improved efficiency, and **integration of power electronics with smart grid technologies** for better energy management. GaN and SiC devices are revolutionizing sectors like automotive, aerospace, and telecommunications by enabling more compact and energy-efficient systems.

Further advancements include the development of **modular multi-level converters (MMCs)** and **solid-state transformers**, which offer improved scalability and fault tolerance. These innovations are crucial in addressing the growing demand for efficient power systems in electrification and renewable energy integration

Mrs. DURGA BHAVANI
Department of ECE

Neuromorphic Computing and Its Applications



Neuromorphic computing is an innovative approach that mimics the structure and functioning of biological neural systems to create more efficient and adaptive computing architectures. Unlike traditional computing, which relies on binary logic and sequential processing, neuromorphic systems are designed to process information in parallel, much like the human brain. This architecture is particularly well-suited for tasks that require real-time data processing, pattern recognition, and decision-making under uncertainty, making it highly applicable in fields like artificial intelligence (AI), robotics, and sensory processing.

Neuromorphic computing systems often employ specialized hardware like **spiking neural networks (SNNs)** and **memristors**, which closely emulate the dynamics of biological synapses and neurons. These systems are designed to consume significantly less power, making them ideal for applications where energy efficiency is critical, such as edge computing and autonomous devices.

Ms. MANNE PRIYANKA
Department of ECE

STUDENT ARTICLES

AUTOMATIC FIRE FIGHTING ROBOTIC VEHICLE

Fire incidents are disasters that can potentially lead to the loss of life and property. It can also cause damage and permanent disability to the affected victim. Firefighters are primarily tasked to handle fire incidents, but they are often exposed to high risks when extinguishing the fire, especially in a hazardous area . The development of a fire extinguishing robot with an SMS alert feature that can sound an alarm to occupants of the building, send an alert SMS message to the registered phone number, and also proceed to extinguish the fire unmanned. It is designed to be compact for ease of movement into narrow spaces.

The robot is equipped with an ultrasonic sensor to avoid collision with any obstacle and surrounding objects, while the flame sensor was used to detect the fire. This developed autonomous system demonstrates the capabilities of identifying fire locations automatically and extinguishes the fire using the stored water in the container on it .This project leverages Arduino technology to create a sophisticated autonomous robot capable of detecting fire using three fire sensors and an ultrasonic sensor for navigation. The robot is equipped with a servo motor to enable precise control of a water pump for fire suppression. Upon detecting a fire, the robot initiates the water pump, aiming to extinguish the flames. Simultaneously, a buzzer alerts nearby individuals to the emergency situation.

P.SRINIDHI
22RH5A0406
III-ECE

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III ECE

AVOIDING MEDIAN ACCIDENTS

The Avoiding Median Accidents System is an advanced safety solution designed to mitigate accidents on curved road sections using Arduino and a combination of ultrasonic sensors, LED indicators, a GSM module, and a buzzer. The system employs two ultrasonic sensors strategically placed on opposite sides of a road curve: one sensor is positioned to monitor vehicles approaching from the upward curve, while the other tracks vehicles coming from the downward curve. By measuring the distance of vehicles from both directions, the system can detect if vehicles are approaching too closely or if there is a potential collision risk at the median. When both sensors detect vehicles within a critical distance, indicating an increased risk of an accident, the system activates LED indicators at both ends of the curve to alert drivers of the potential danger.

Additionally, a GSM module sends an automatic SMS to nearby emergency contacts or authorities to notify them of the hazardous condition. Simultaneously, a buzzer emits an audible alert to draw attention to the situation. This multi-faceted approach ensures that drivers are warned of potential dangers in advance, reducing the likelihood of accidents and enhancing overall road safety. The Avoiding Median Accidents System provides a proactive solution for managing traffic safety on challenging road curves, leveraging real-time data and immediate alerts to prevent accidents and improve driving condition.

A. Prasanna
21RH1A0414
IV-ECE

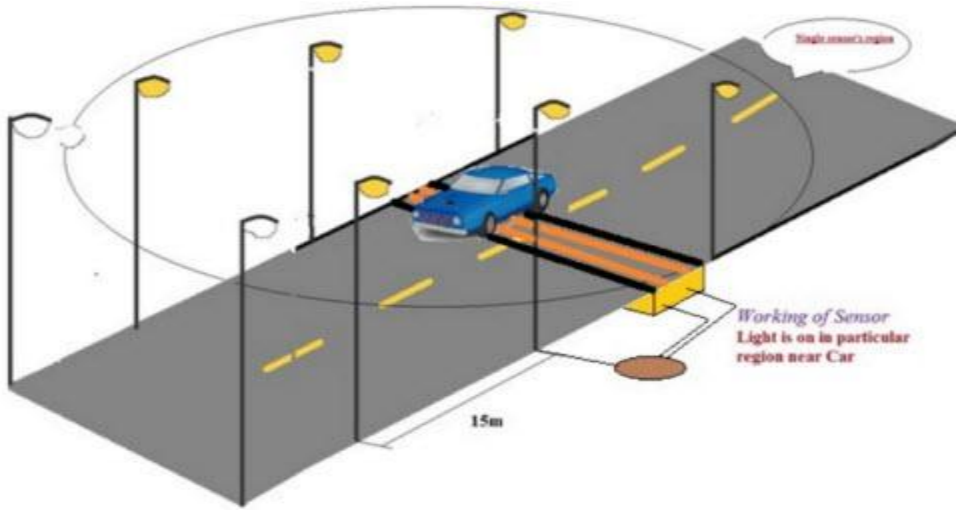
THERMAL MANAGEMENT SYSTEM FOR EV BATTERIES USING GSM

As the demand for electric vehicles (EVs) continues to grow, the efficient thermal management of lithium-ion batteries is a critical factor in ensuring their performance, safety, and longevity. EV batteries generate heat during charge and discharge cycles, and improper temperature control can lead to reduced battery life, safety hazards, and efficiency losses. This paper explores advanced thermal management systems (TMS) designed to maintain optimal operating temperatures for EV batteries. The study focuses on various cooling technologies such as air cooling, liquid cooling, and phase change materials (PCM), analyzing their effectiveness, energy consumption, and integration feasibility within EV designs.

Key challenges addressed include thermal runaway prevention, uniform temperature distribution, and the impact of ambient conditions on battery performance. Comparative analysis highlights the trade-offs between passive and active cooling methods, emphasizing the need for hybrid solutions to balance thermal regulation and energy efficiency. Additionally, the study considers emerging technologies such as thermoelectric cooling and innovative battery designs with enhanced thermal properties. This research aims to contribute to the development of more efficient and safe battery thermal management systems, ultimately enhancing the overall performance and reliability of electric vehicles.

B.KUSUMA SREE(22RH5A0404)
D.JANANI (22RH5A0405)
D.NAVYA (22RH5A0406)
G.ANJALI (22RH5A0407)

SMART SREET LIGHT USING SOLAR ENERGY



Now-a-days the amount of power consumed by lighting and streets shares a major energy demand. The vehicles are passing over always and a part of places will be consisting of less density areas and even no vehicle moments itself in few areas. But during night all street lights will be on in conventional street lighting system. To overcome from this issue, a proper energy saving methods and lighting control to be implemented. The proposed work is to controls like, to switch of lights during no vehicle moments in streets and automatically switch it on when vehicles arrive.

In this system, a number of DC street lights are powered by a photovoltaic (PV) source. A battery is added to store the excess energy of the solar panel, which can later be retrieved at night time, or whenever the sunlight is being obstructed by clouds or other forms of shading. A charge controller is used to protect the battery from overcharging and to control the overall system operation and LED lights are used for street arrangement, the Photo diodes and IR sensors are used to sense vehicle movements. The control signals of sensors have been fed to microcontroller. In the microcontroller the control logic is implemented to control lights based on vehicles and pedestrian movements. From this proposed method the overall energy being utilized now-a- days for lighting can be minimized.

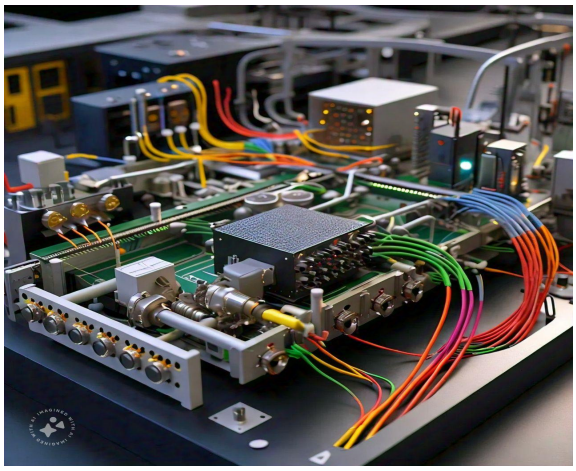
KAVYASRI SANDANALA
22RH1A0439
III-ECE

An advanced IoT and GPS-GSM-based real-time automated data monitoring robot designed for critical applications in human life safety and landmine detection

An advanced IoT and GPS-GSM-based real-time automated data monitoring robot designed for critical applications in human life safety and landmine detection. The system integrates state-of-the-art image processing techniques and live streaming capabilities to enhance operational efficiency and data accuracy. The robot utilizes a combination of GPS for precise location tracking and GSM for remote communication, enabling real-time monitoring and control. Equipped with high-resolution cameras and advanced sensors, the robot employs image processing algorithms to identify potential threats, including landmines and hazardous obstacles. The collected data is transmitted via GSM to a centralized server, where it can be accessed by operators through a user-friendly interface. This setup allows for immediate decision-making and action, significantly reducing the risks associated with manual detection methods.

SAMMETA MANOGNA
21RH1A04M8
IV-ECE-A

IOT BASED WIRELESS DATA TRANSMISSION THROUGH VISIBLE LIGHT COMMUNICATION



LiFi (Light Fidelity) is a wireless communication technology that uses LED light to transmit data at high speeds. Unlike WiFi, which relies on radio frequency (RF) waves, LiFi uses visible light, making it a more efficient and secure method for data transfer. The technology works by modulating the intensity of LED light bulbs, which change faster than the human eye can detect, to send data. This allows for two-way communication with much higher data rates, exceeding 10 Mbps, which is faster than typical LAN connections. LiFi also has several advantages over traditional WiFi.

It operates within the 60 GHz spectrum, providing a larger bandwidth and making it less prone to interference from electromagnetic sources. Additionally, LiFi can only function in areas where light is present, creating a more controlled and secure environment. This makes it ideal for settings where RF communication is unreliable or restricted. With its energy-efficient operation and potential to reduce communication costs, LiFi is emerging as a promising technology for future wireless communications, offering higher data rates, reduced latency, and improved security compared to conventional wireless methods.

P. SINDHU
21RH1A04K7
IV – ECE - D

ARTIFICIAL INTELLIGENCE BASED HUMAN DETECTION ROBOT FOR EARTHQUAKE RESCUE OPERATION

Natural calamities do occur and they are unstoppable. But humans are becoming increasingly aware in the concept of intelligent rescue operations in such calamities so that precious life and material can be saved though calamities cannot be stopped. Still there are lots of disasters that occur all of a sudden and Earthquake is one such thing. Earthquakes produce a devastating effect and they see no difference between human and material. Hence a lot of times humans are buried among the debris and it become impossible to detect them. A timely rescue can only save the people who are buried and wounded. Detection by rescue workers becomes time consuming and due to the vast area that gets affected it becomes more difficult.

So the project proposes an autonomous robotic vehicle that moves in the earthquake prone area and helps in identifying the alive people and rescue operations. In this iot based live human detecting robot for earthquake rescue operation project, a new method for detecting surviving humans in destructed environments using simulated autonomous robot is proposed.

M SUPRAJA
20RH1A04A3
IV-ECE-C

OMICRON: DESIGN OF SWARM ROBOT WITH WIRELESS COMMUNICATION

This work focuses on the issue of designing, constructing, and programming an individual robot within a robotic swarm. It also provides a brief overview of the swarm robotics and development of robotics, its methods, and characteristics.

The mutual interaction between humans and robots is based on communication between them. This approach is applied in swarm robotics, not only between humans and machines but also among machines themselves. This paper will offer an overview about the relations between concepts, knowledge, and principles of swarm robotics.

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RAJPUT.POOJITHA SINGH
21RH1A04L5
IV ECE-D

ADVANCED PUBLIC BUS TRANSPORT MANAGEMENT SYSTEM

In the present era, public bus transportation services often lag behind in adopting modern technologies, resulting in numerous operational complexities. These issues encompass challenges such as poor passenger density control, operational inefficiencies, inadequate live tracking, limited real time capabilities, suboptimal resource management, route ambiguities, safety concerns, and more.

This research paper introduces a comprehensive solution an Advance Public Bus Transport Management System (APBTMS) that aims to address these challenges for the benefit of both passengers and transport management authority. Our proposed system leverages various sensors and IoT (Internet of Things) modules deployed within buses to monitor various onboard activities and physical environmental factors.

Rajaram Harika
21RH1A04L9
IV-ECE D

SOLAR TREE

The Solar Tree is an innovative, aesthetically designed structure that integrates solar panels, mimicking the natural shape of a tree. This sustainable solution generates renewable energy, reduces carbon footprint, and enhances urban landscapes. With its unique design, the Solar Tree optimizes energy production, promotes environmental awareness, and provides shade. Suitable for public spaces, buildings, and rural areas, this technology combines art and functionalityThe term IoT, or Internet of Things, refers to the collective network of connected devices and the technology that facilitates communication between devices and the cloud, as well as between the devices themselves.

Thanks to the advent of inexpensive computer chips and high bandwidth telecommunication, we now have billions of devices connected to the internet. This means everyday devices like toothbrushes, vacuums, cars, and machines can use sensors to collect data and respond intelligently to users.

Reference link : https://ieeexplore.ieee.org/document/8191921

AKULA NIKITHA
23RH1A0405
II-ECE-A

PILL CAMERA TECHNOLOGY

Pill camera technology, also known as capsule endoscopy, is a revolutionary advance in medical imaging that enables non-invasive visualization of the gastrointestinal (GI) tract. A small, swallowable capsule equipped with a camera, light source, and transmitter captures high-resolution images and transmits them to an external receiver for real-time viewing and diagnosis, offering a pain-free and comprehensive alternative to traditional endoscopy.

This technology has transformed the diagnosis and treatment of GI disorders, including small bowel bleeding, Crohn's disease, ulcers, tumors, and celiac disease, and has improved patient comfort and acceptance while reducing the risk of complications, with ongoing advancements in image resolution, battery life, and data transmission poised to further enhance its capabilities.

Reference link :https://ieeexplore.ieee.org/document/10089416

P SAI PRASANNA
21RH1A04J9
IV-ECE-C

WIRELESS NETWORKS

Wireless networks offer mobility and elimination of unsightly cables and utilize radio waves or microwaves to maintain communication. It is rapidly growing in popularity for both home and business networking. Wireless technology keeps on improving and at the same time the cost of wireless products are continuously decreasing. The demand for ubiquitous personal communications is driving the development of wireless networks that can accommodate mobile voice and data users who move throughout buildings, cities, or countries. The objective of this chapter is to provide the fundamentals of wireless networks so that the general readers can be able to easily grasp some of the ideas in this area.

REFERENCE:https://ieeexplore.ieee.org/document/5431848

J.SHIRISHA
24RH5A0406
II ECE(A)

E-PAPER

E-paper (Electronic Paper) technology represents a revolutionary display medium that mimics the appearance of traditional ink on paper. Unlike conventional backlit displays such as LCDs and OLEDs, e-paper relies on reflected light, making it easier on the eyes and suitable for prolonged reading. E-paper's energy efficiency is a major advantage, as power is primarily consumed during content updates, while static images do not require continuous power.

This makes it ideal for devices such as e-readers (e.g., Amazon Kindle), electronic price tags, and digital signage. The technology also offers better visibility under direct sunlight, enhancing its use for outdoor applications. However, limitations include slower refresh rates, limited color capabilities, and lower resolution compared to modern LCD or OLED screens.

Ongoing advancements in flexible and color e-paper aim to overcome these challenges, potentially widening its scope to smartphones, wearable devices, and other consumer electronics.In summary, e-paper technology combines the readability of traditional print with the versatility of digital displays, offering an energy-efficient and eye- friendly solution for various applications, especially where content needs to be static for long

Reference link : https://ieeexplore.ieee.org/document/5234383

A. THANUJA
23RH1A0402
II-ECE-A

SPACE MOUSE

The concept of a "space mouse" represents an innovative intersection of technology and space exploration, aiming to address the unique challenges faced by astronauts in extraterrestrial environments. A space mouse is envisioned as a specialized input device designed to enhance human-computer interaction in space missions, particularly in microgravity conditions. Unlike conventional mice, which rely on physical movement on a surface, a space mouse incorporates advanced sensors and gyroscopic technology to track hand gestures and movements in three dimensional space. This allows astronauts to interact with computer systems and spacecraft controls with precision and ease, despite the absence of gravity. The development of the space mouse involves adapting ergonomic design principles to accommodate the confined and varied conditions of space environments. The device's interface is optimized for the reduced tactile feedback experienced in space, and it integrates seamlessly with the spacecraft's existing digital systems

Reference link : https://ieeexplore.ieee.org/document/773977

K. AKSHAYA
23RH1A0459
II-ECE-A

SMART SKIN TECHNOLOGY

Artificial smart skins capable of interacting with people and sensing environmental stimuli have become a research topic in humanoid robotic applications. However, previously reported architectures suffer difficulties in achieving concurrent multi-dimensional sensing in a simple structure with low system costs. To address this issue, in this paper, an artificial smart skin constructed with polyimide/copper/polyvinylidene fluoride (PVDF) is presented for detecting 2D-position, proximity, dynamic force, and humidity via a smart combination of piezoelectric- and capacitive-effects.

Moreover, a follow-up filtering algorithm is proposed to separate and calculate the stimuli associated with capacitance changes (position, proximity, and humidity). The proposed system achieves overall force and capacitive sensitivities of 0.05 N and 7 fF, a humidity responsivity at 0.22%/RH% over a relative humidity range of 10%–90% RH, a spatial resolution of 0.29 mm. This simple-structured device supports multiple functions with low system costs, thus advancing the field of robotics smart skins.

Reference link : https://ieeexplore.ieee.org/document/9336696

S.HARSHITHA

23RH1A04A1

II ECE-B

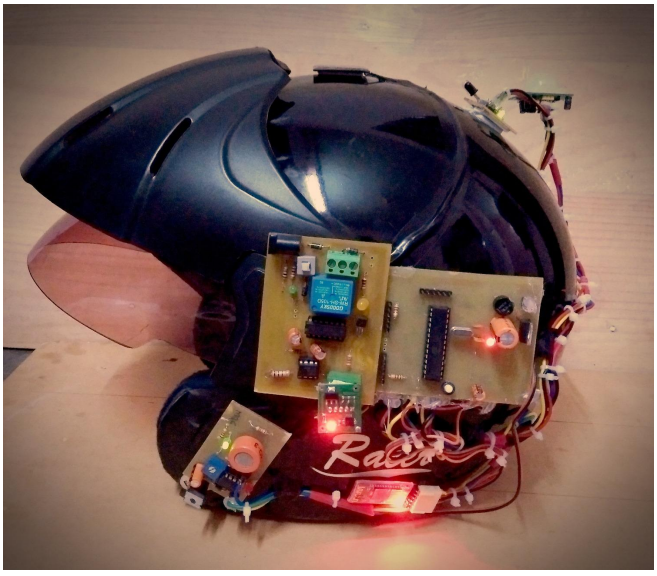
MILITARY SUPPORT AND RESCUE ROBOT

In this era of a politically unstable world, there is a growing demand for the use of military robots to aid the soldiers to perform perilous missions. This paper focuses on the design and build of a semi-autonomous, unmanned robotic system used for various military and rescue operations. Dangerous tasks such as bomb disposal, enemy territory surveillance, search and rescue can be efficiently carried out by the MSRR, Military Support and Rescue Robot.

This reduces the risk of losing the lives of both soldiers and civilians. With the help of live feed from the wireless camera and data analysis of environmental composition by various sensors, of the area under surveillance, the soldiers can better prepare for their missions. Using Arduino and Zigbee technology, the above-mentioned tasks can be achieved. The different sensors and the robotic arm are connected to the Arduino mega which in turn is connected to the Zigbee. Data transmission and receiving are through Zigbee technology. This prototype design overcomes the weakness of the existing models and thus provides better support for military operations.

A. Bhargavi (21RH1A0405)
A. SaiPriya(21RH1A0413)
A. Kumari laxmi varshitha (21RH1A0416)

INTELLIGENT HELMET SYSTEM FOR ACCIDENT PREVENTIONAND BIKE STARTER



The Intelligent Helmet System for Accident Prevention and Bike Starter Control is designed to enhance rider safety by integrating advanced sensors within a helmet and motorcycle. The system ensures that the bike will not start unless the rider is wearing the helmet, detected by a pressure sensor. Additionally, an alcohol sensor checks whether the rider is sober; if alcohol is detected, the bike remains immobilized. This system not only prevents accidents caused by negligence, such as riding without a helmet or under the influence of alcohol, but it can also detect impacts in the event of an accident. Upon detecting a crash, the system can send emergency alerts to pre-registered contacts, providing timely assistance.

This solution promotes responsible riding behavior and contributes to reducing road accidents involving motorcyc lists.The system is controlled by an Arduino microcontroller, which acts as the central processing unit for gathering data from the sensors. It processes the inputs and ensures that the bike's motor, connected through a relay system, remains off unless the safety conditions are met. In addition to preventing the bike from starting under unsafe conditions, the system can also detect crashes or impacts, which can be used to trigger emergency alerts, providing crucial help when needed

B.Sreeja-21RH1A0434
B.Greeshma-21RH1A0437
B.Likhitha-21RH1A0439

ADVANCED SURVEILLANCE ROBOT WITH METALLIC BOMB DETECTION

Evolving security landscape, the need for advanced surveillance and threat detection systems has never been more critical. This paper presents the development of an advanced surveillance robot equipped with metallic bomb detection capabilities. The robot is designed to enhance safety in high-risk environments, such as airports, public transportation hubs, and conflict zones, by autonomously identifying and neutralizing potential threats. Central to its functionality is the metallic bomb detection module, which utilizes advanced electromagnetic sensors to detect the presence of metallic objects that may indicate the presence of explosive devices.

The robot is equipped with machine learning algorithms to differentiate between harmless metallic objects and potential threats based on shape, size, and density analysis. The deployment of such a surveillance robot significantly reduces the risk to human life in bomb detection operations, while also providing a reliable, scalable, and efficient solution for maintaining public safety. This discusses the design, implementation, and testing of the robot, along with its potential applications and limitations. Future work will focus on enhancing the robot's detection accuracy, expanding its sensory capabilities, and improving its adaptability to different environments.

Gayatri. murali
22RH1A0428
III-ECE

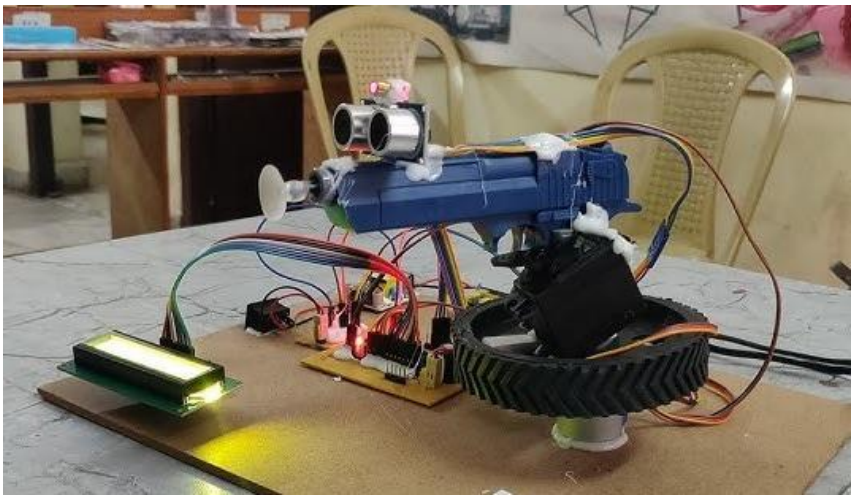
CROP SHIELD SYSTEM

Agriculture has always been the primary and most important sector of the Indian economy. Farmers are the backbone of one's country, Farmers cannot take care of their farms 24x7 so when farmer is far away from the field, he cannot take care of his form so this which cause in the production of the yield when the animals like buffaloes or cows and some animals from nearby forest areas may enter the field and destroy it. There are many loopholes in such ideas and so improvising agricultural security has become a major issue these days.

Thus, this project focuses on proposing a system that detects intruders, monitors any suspicious activity and then reports to the owner of the field with the PIR sensor and Arduino will be activated and buzzer will sound to get rid of animal entering the field simultaneously LED lights will flash and send message to the farm[-[-er within 10 seconds of the detection of the animal. It acts as an adaptable system which is a practicable system to the farmers for ensuring complete safety of their farmlands from any attacks or trespassing activities and additional to it a smoke sensor to identify the smoke produced from the fire and a soil moisture sensor to detect the volumetric water content in the soil.

A.SOWMYA 21RH1A0408B
B. SHRAVYA 21RH1A0430
D. APOORVA 21RH1A0460

Missile Tracking and Auto destruction by using Arduino

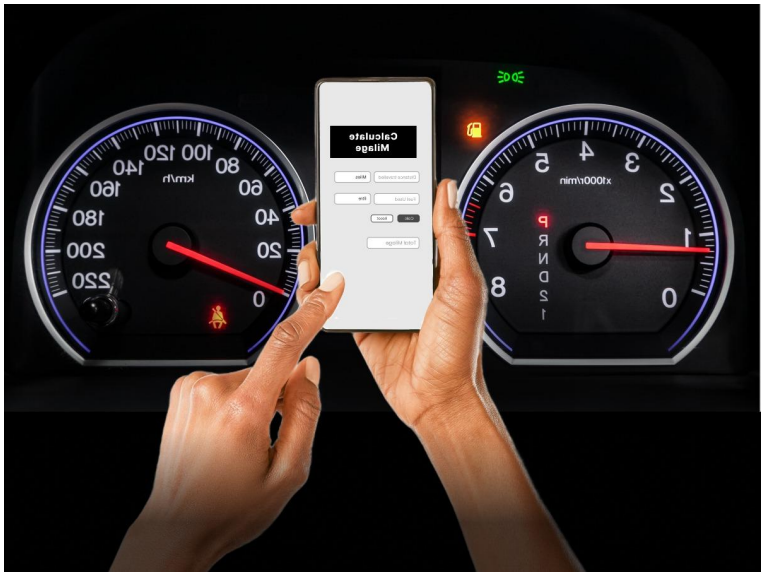


Missile tracking and auto-destruction systems play a critical role in modern defence systems, ensuring the safety of civilians and assets by preventing missile threats. This project aims to develop a simplified missile tracking and auto-destruction system using an Arduino microcontroller. The system is designed to detect and monitor the trajectory of a missile through sensors such as GPS and accelerometers, while utilizing radio communication to relay position and status data in real-time.

The Arduino will serve as the core controller, processing data from sensors to calculate the missile's position, speed, and trajectory. Once a predetermined flight deviation or critical safety parameter is detected (e.g., if the missile is veering off course),the system will trigger an auto-destruction mechanism, ensuring that the missile is neutralizedin a controlled and safe manner. The project involves integrating various components, such as GPS modules, RF communication, and safety protocols, to develop a cost-effective and reliable missile tracking system. By automating the tracking and destruction processes, this solution could potentially reduce the risk of human error in missile defence scenarios, making it a crucial component in both military and civilian defence applications.

A.RENUSRI 21RH1A0402
A.KALYANI 21RH1A0410
D.SHRINIDHI 21RH1A0457
IV – ECE A

VEHICLE SECURITY & FUEL INDICATOR



This project presents an integrated vehicle security and fuel indicator system designed to enhance vehicle safety and provide real-time fuel monitoring. The solution addresses two critical areas: protection against unauthorized access and precise fuel level tracking to prevent unexpected breakdowns due to fuel shortages. The security module incorporates technologies such as RFID, fingerprint sensors, or GSM-based authentication to restrict vehicle access to authorized users only.

In case of unauthorized access attempts, the system triggers an alarm and can notify the vehicle owner via SMS or mobile application, enhancing theft prevention. The fuel indicator module provides accurate real-time monitoring of the fuel level using sensors integrated with the vehicle's dashboard. It displays the remaining fuel quantity and alerts the driver through visual or sound notifications when the level drops below a critical threshold. Advanced versions of the system can also estimate mileage based on fuel consumption patterns, helping users manage fuel usage efficiently.

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A.Meghana 22RH5A0401
B.Sandhya 22RH5A0402
B.Shravani 22RH5A0403

MEMORABLE EVENTS

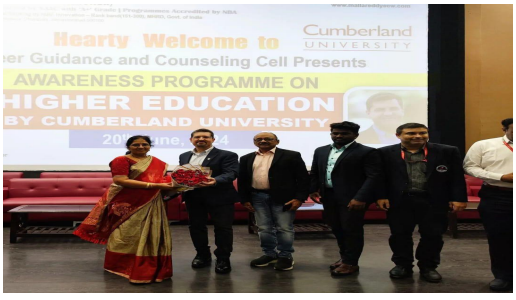
ORIENTATION DAY – 2K24

SMART INDIA HACKTHON(INTERNAL)

EVENTS-PHOTOGRAPHS

GRADUATION DAY – 2K24

AWARENESS ON HIGHER EDUCATION BY CUMBERLAND UNVERSITY



CAMBRIDGE CERTIFICATION-2K24

TEACHER'S DAY CELEBRATIONS

GO GREEN PROGRAMME

GUEST LECTURE ON DESIGN THINKING AND INNOVATION

ENGINEER'S DAY – 2K24

ALUMNI TALK

Placement Experience : Students are eligible for campus placements from 3-2 semesters. Numerous companies, including TCS, Infosys, Wipro, Accenture, and Capgemini, visit our college each year and select large number of students; there is a 100% placement track record at MRECW.

19RH1A04J4
POTRU SAI ASRITHA
B-Tech 2023 Passed out

The campus festivals were a whirlwind of excitement and creativity. I discovered my talent for public speaking while performing at one of the events, which surprised me and increased my confidence.

19RH1A04K5
SANA
B-Tech -2023 Passed Out

"MRECW- my place of learning, loving and living with a lots of happiness"

I owe a lot to the mentorship I received through out college. My professors guided me in shaping my career path, which led to a fantastic job opportunity. Their belief in my potential motivated me to strive for excellence.

19RH1A04N2
THOTA SRI NAVYA
B-Tech -2023 Passed Out

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nirf NATIONAL INSTITUTIONAL RANKING FRAMEWORK Indian Ranking-2020

National Ranking by ARIIA-2021 BAND - EXCELLENT

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