Technical Magazine

Sparkling Innovation

Where Electrical Engineering meets imagination

Pragya

state of wisdom

Department of Electrical & Electronics Engineering

G. NARAYANAMMA INSTITUTE OF TECHNOLOGY AND SCIENCE

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Contents

PRINCIPAL'S MESSAGE

Dr. K . Ramesh Reddy

It is with great pleasure that I extend a warm welcome to you all to the latest edition of our esteemed electrical engineering technical magazine. As we peruse through its pages, we embark on a journey of discovery, innovation, and collaboration that defines the essence of our department.

At the heart of our electrical engineering department lies a steadfast commitment to academic excellence, research prowess, and the relentless pursuit of innovation. This magazine stands as a testament to the remarkable achievements and groundbreaking contributions made by our faculty, students, and researchers.

I wish that this Trigger establishes to be a flint to fire the enthusiasm and excite their minds for many intrusive innovations among the students and inspire passion among the members of the faculty of Electrical and Electronics committee.

As you delve into the pages of this magazine, I encourage you to celebrate the accomplishments of our department, to be inspired by the groundbreaking research being conducted, and to envision the boundless possibilities that lie ahead. Together, let us continue to uphold the highest standards of excellence and to push the boundaries of what is possible in the field of electrical engineering.

I extend my heartfelt gratitude to all those who have contributed to the success of this magazine and commend the editorial team for their dedication and hard work in bringing this publication to fruition.

MESSAGE FROM HEAD OF THE DEPARTMENT

Dr. N. Malla Reddy

Dear Esteemed Readers,

It brings me great pleasure to welcome you to the latest edition of our electrical engineering technical magazine. As we delve into the pages of this publication, we embark on a journey of discovery, innovation, and excellence within our department.

It's with great pleasure that I introduce you to the latest issue of Pragya! As Head of the Electrical and Electronics Engineering department, I'm constantly impressed by the dedication and expertise of our team. But knowledge thrives on exchange, and that's precisely what Pragya facilitates.

This magazine serves as a bridge, connecting the cutting-edge advancements in our field with the passionate minds that drive those advancements forward. Whether you're a seasoned professional or just starting your journey, Pragya offers something for everyone.

In this issue, you'll find insightful technical articles. We've assembled a fantastic roster of contributors, including leading figures from within our own department. Their diverse perspectives ensure the content is both informative and thought-provoking.

This technical magazine isn't just about staying informed; it's about fostering a community of innovation. We encourage you to actively engage with the magazine. So, turn the page, explore the articles, and let your passion for Electrical Engineering ignite!

Warm Regards.

Highlights

- Dr.K.Ramesh Reddy, Professor & Principal- GNITS has published a paper entitled “Performance analysis of PI and fuzzy logic controlled DStatcom for PQ improvement” in International Journal of emerging trends in engineering research which is indexed in Scopus .

- Dr.K.Ramesh Reddy, Professor & Principal- GNITS has published a paper entitled “Anew active power injection scheme using CHB –MLI DSTATCOM for PQ improvement” in International Journal of emerging trends in engineering research, which is indexed in Scopus .

- Dr. N. Malla Reddy, Professor & HOD-EEE has published a paper entitled “Mathematical Analysis and Simulation of Permanent Magnet Synchronous Motor for Electric Vehicle Application” in International Journal of Innovative Technology and Exploring Engineering (IJITEE) which is indexed in Scopus.

- Dr.Himabindu.T, Asst.Prof., has published a paper on “Direct power control for a multilevel inverter fed induction motor drive using predictive torque control” in GRENZE International Journal of Engineering and Technology (GIJET) which is an Elsevier Journal.

- MrsUjwala Gajula, Asst.Prof & Mrs,E.Gouthami Asst.Prof., has published a paper on ‘An attempt to teach basic electrical engineering course through virtual mode using gnomio”, ’ in International journal of multidisciplinary educational Research .

- Mrs.K.V.Dhanalakshmi, Asst.Prof., has published a paper on “Micro-grid Protection schemes and the role of UPFC Controller”, in International Journal of Engineering Research & Technology.

- Mr.R.Nageswara Rao, Associate.Professor, has published a paper on “Effect of particle contamination in a 1-phase Gas Insulated Bus duct under Lightning impulse voltage”, in International Journal of Engineering Research and Applications.

- Mr. S.L.V. Sravan Kumar, Asst.Prof., has published a paper on “Low-Stress and efficient design of Integrated Boost Series Parallel Fly-Back Converters”, in International Information and Engineering Technology Association.

Student Articles

Fastest Finger First: A Real-Time Multiplayer Quiz Game

--- ADAVELLY ASHRITHA REDDY
17251A0262

Fastest Finger First is a dynamic and engaging real-time multiplayer quiz game designed to challenge players' knowledge and reaction times. The game draws inspiration from popular television quiz shows, where contestants race against each other to answer questions correctly and swiftly.

The primary objective of Fastest Finger First is to provide an immersive and competitive gaming experience for players of all ages. The game features a user-friendly interface and intuitive gameplay mechanics, making it accessible to both casual gamers and avid quiz enthusiasts.

Key features of Fastest Finger First include:

1. Real-time Multiplayer Gameplay: Players can compete against each other in real-time matches, testing their speed and accuracy in answering quiz questions.
2. Dynamic Question Database: The game offers a diverse range of quiz questions across various categories, ensuring that each match is unique and engaging.
3. Fast-paced Rounds: Each round of Fastest Finger First is fast-paced and adrenaline-fueled, with players racing against the clock to select the correct answer before their opponents.
4. Leaderboards and Rankings: Players can track their progress and compare their scores with friends and other competitors on global leaderboards.
5. Customizable Settings: The game allows players to customize their gaming experience by adjusting settings such as question difficulty, round duration, and the number of players.
6. Engaging Game Modes: Fastest Finger First offers a variety of game modes to cater to different preferences and playstyles. From classic single-player challenges to intense multiplayer showdowns, players can choose the mode that best suits their gaming mood.
7. Power-ups and Bonuses: To add an extra layer of excitement, Fastest Finger First features power-ups and bonuses that players can unlock and utilize during gameplay. These power-ups may provide advantages such as extra time, hints for difficult questions, or temporary boosts to scoring.
8. Social Integration: Fastest Finger First seamlessly integrates with social media platforms, allowing players to share their achievements, invite friends to play, and join online communities of fellow quiz enthusiasts. Social features enhance the game's competitive spirit and foster a sense of community among players.
9. Continuous Updates and Support: The development team behind Fastest Finger First is committed to delivering regular updates and providing ongoing support to ensure the game remains fresh, relevant, and bug-free. Player feedback is actively solicited and incorporated into future updates to enhance the overall gaming experience.
10. Educational Value: While Fastest Finger First is primarily designed for entertainment purposes, it also offers educational benefits by challenging players' knowledge across a wide range of topics. Players can learn new facts and expand their horizons while enjoying immersive gameplay experiences.
11. Accessibility Features: Fastest Finger First prioritizes accessibility by offering customizable features such as text size options, color contrast adjustments, and keyboard shortcuts for players with diverse needs and preferences. The game strives to be inclusive and welcoming to all players, regardless of their abilities.
12. Community Events and Tournaments: Fastest Finger First hosts regular community events and tournaments where players can compete for prizes, bragging rights, and prestige. These events encourage friendly competition and foster a sense of camaraderie among players from around the world.
13. Fastest Finger First is more than just a game—it's a vibrant and dynamic gaming community where players can test their skills, make new friends, and embark on thrilling quiz adventures. Whether you're a casual gamer looking for some quick fun or a dedicated quiz enthusiast seeking a competitive challenge, Fastest Finger First has something for everyone

Automatic Street Light Controller Using IoT Technology

--- S.THULASI
17251A02B8

The Automatic Street Light Controller using IoT Technology is an innovative solution designed to optimize energy usage and enhance safety in urban environments. Leveraging the power of Internet of Things (IoT) technology, the system automatically controls street lights based on ambient light levels and real-time environmental conditions.

The primary objective of this project is to create an intelligent street lighting system that improves energy efficiency, reduces operational costs, and contributes to environmental sustainability. By integrating sensors, microcontrollers, and wireless communication modules, the system achieves seamless automation and remote monitoring capabilities.

Key features of the Automatic Street Light Controller include:

1. Ambient Light Sensing: The system employs light sensors to continuously monitor ambient light levels in the vicinity. When natural light diminishes below a certain threshold (typically at dusk), the street lights are automatically activated to ensure adequate illumination for pedestrians and vehicles.
2. Adaptive Brightness Control: To further optimize energy usage, the system dynamically adjusts the brightness of the street lights based on real-time conditions such as traffic density, weather conditions, and time of day. Brightness levels can be fine-tuned to balance visibility and energy conservation.
3. Remote Monitoring and Control: Through the integration of IoT technology, the street light controller can be remotely monitored and controlled via a centralized dashboard or mobile application. This enables administrators to access real-time data, configure settings, and troubleshoot issues without the need for physical intervention.
4. Energy Consumption Analytics: The system gathers data on energy consumption patterns and lighting usage metrics, allowing stakeholders to analyze trends, identify inefficiencies, and implement optimization strategies. Insights derived from analytics support informed decision-making and resource allocation.

The Automatic Street Light Controller offers a cost-effective, sustainable, and technologically advanced solution for urban lighting management. By harnessing the power of IoT technology, cities can achieve greater efficiency, safety, and environmental stewardship in their public lighting systems, contributing to the creation of smarter and more livable communities.

Vehicle theft detection and tracking based on GSM and GPS

---GAJJELA SRI DEEPTHI

17251A0272

Vehicle theft is a significant concern worldwide, leading to financial losses and safety risks for individuals and businesses. To address this issue, a system for vehicle theft detection and tracking based on GSM (Global System for Mobile Communications) and GPS (Global Positioning System) technologies is proposed. The system utilizes a combination of hardware and software components to monitor the vehicle's location in real-time and detect unauthorized movement.

1. Geo-fencing: The system allows users to define virtual boundaries, known as geo-fences, on a map. If the vehicle crosses these boundaries without authorization, an alert is triggered, notifying the owner or monitoring center.
2. Remote Immobilization: In the event of theft, the system enables remote immobilization of the vehicle by sending a command to the onboard MCU. This feature prevents the engine from starting or disables the vehicle's movement, aiding in recovery efforts.
3. Tamper Detection: The system includes sensors to detect tampering attempts, such as cutting wires or removing tracking devices. Upon detecting tampering, the system immediately notifies the owner and triggers additional security measures.
4. Battery Backup: To ensure continuous operation, especially in areas with unreliable power supply, the system is equipped with a backup battery. This battery provides power to essential components, such as the GPS and GSM modules, in case of main power failure.
5. Data Encryption: To safeguard sensitive information transmitted between the vehicle and the central server or user's device, the system employs encryption protocols. This prevents unauthorized access to location data and ensures the privacy and security of the vehicle owner.
6. Historical Data Logging: The system records and stores historical location data, allowing users to review the vehicle's past movements and routes. This feature can be valuable for analyzing patterns, optimizing routes, and providing evidence in legal proceedings related to theft or misuse.

By incorporating these advanced features, the proposed vehicle theft detection and tracking system offers a comprehensive solution to mitigate the risks associated with vehicle theft. Its combination of hardware and software capabilities provides robust security measures while offering convenience and ease of use for vehicle owners and fleet managers.

IOT based early flood detection system

--- MADDIPATI SRI SUSHMA

17251A0276

With the increasing frequency and intensity of floods due to climate change, early detection and warning systems have become crucial for minimizing damage and saving lives. In this context, Internet of Things (IoT) technology offers a promising solution by integrating various sensors and communication devices to detect and monitor flood conditions in real-time. This paper proposes an IoT-based early flood detection system designed to provide timely alerts to authorities and residents in flood-prone areas.

The system comprises a network of sensors deployed in key locations susceptible to flooding, such as rivers, streams, and low-lying areas. These sensors continuously monitor water levels, rainfall intensity, soil moisture, and other relevant environmental parameters. Data collected by the sensors are transmitted wirelessly to a central server or cloud platform for analysis and processing.

Machine learning algorithms are employed to analyze the incoming data and predict potential flood events based on historical patterns and predefined thresholds. When abnormal conditions indicative of a flood are detected, the system triggers automated alerts via SMS, email, or mobile applications to notify relevant stakeholders, including emergency responders, local authorities, and residents.

Furthermore, the system allows for remote monitoring and control, enabling authorities to take preemptive measures such as deploying flood barriers, evacuating residents, and diverting traffic routes to mitigate the impact of the impending flood. Additionally, historical data collected by the system can be utilized for further analysis and improvement of flood prediction models.

In conclusion, the proposed IoT-based early flood detection system offers a proactive approach to flood management, leveraging real-time data, and advanced analytics to provide timely warnings and facilitate effective response strategies, ultimately reducing the vulnerability of communities to flood-related disasters.

Smart power system RFID based mobile charging system

--- SAI MADHURI G
17251A0283

In recent years, the proliferation of mobile devices and the increasing dependency on them for communication, entertainment, and productivity have highlighted the need for convenient and accessible charging solutions, especially in environments where traditional power outlets may be scarce or unavailable. This paper proposes a Smart Power System utilizing Radio Frequency Identification (RFID) technology to enable mobile charging in diverse locations.

The system comprises RFID-enabled charging stations strategically deployed in public spaces, transportation hubs, educational institutions, and other high-traffic areas. Each charging station is equipped with RFID readers, power outlets, and a central control unit. Users can access the charging service by presenting RFID-enabled cards or mobile devices containing RFID tags.

Upon presenting their RFID credentials, users gain access to available charging ports, which are equipped with smart charging capabilities compatible with a wide range of mobile devices, including smartphones, tablets, and wearables. The system employs intelligent power management algorithms to optimize charging efficiency and prevent overcharging, ensuring the safety and longevity of connected devices.

Additionally, the Smart Power System incorporates a user-friendly mobile application that allows users to locate nearby charging stations, check availability, and reserve charging slots in advance. The application also provides real-time status updates, including charging progress and estimated completion times, enhancing user convenience and experience.

Furthermore, the system facilitates seamless integration with existing infrastructure and payment systems, enabling monetization through various models such as pay-per-use, subscription-based plans, or sponsored charging services. This flexibility allows for customization according to the preferences of venue owners, service providers, and end-users.

In conclusion, the proposed RFID-based Smart Power System offers a versatile and efficient solution for mobile charging in diverse environments, addressing the growing demand for convenient power access while leveraging RFID technology for secure authentication and user-friendly interaction. By combining innovation with accessibility, the system aims to enhance connectivity and productivity for mobile users while contributing to sustainable and inclusive urban development.

Advancements in Light-Based Data Transfer

--- KURMETI DATHASRI

17251A02A5

The proliferation of digital technologies has led to an unprecedented demand for faster and more efficient data transfer methods. Traditional data transmission technologies, predominantly reliant on electrical signals through copper wires or radio waves through the air, are facing limitations in terms of speed, bandwidth, and susceptibility to interference. As a result, researchers and engineers have been exploring alternative approaches, one of the most promising being data transfer through light.

This abstract provides an overview of recent advancements in light-based data transfer techniques. Light, with its inherent speed and bandwidth capabilities, offers a compelling solution to the challenges posed by conventional transmission methods. The field of light-based data transfer encompasses various technologies, including optical fibers, free-space optical communication, and emerging technologies such as Li-Fi (Light Fidelity).

Optical fibers, composed of thin strands of glass or plastic, have revolutionized long-distance data transmission by efficiently carrying light signals over vast distances with minimal loss. Free-space optical communication extends this concept to wireless data transfer, utilizing lasers or LEDs to transmit data through the air via modulated light beams. These techniques have found applications in telecommunications, aerospace, and even inter-satellite communication.

Li-Fi, a groundbreaking technology, takes advantage of light-emitting diodes (LEDs) to enable high-speed wireless communication by modulating light intensity at speeds imperceptible to the human eye. Li-Fi offers several advantages over traditional Wi-Fi, including higher data rates, increased security, and reduced electromagnetic interference. Moreover, Li-Fi has the potential to revolutionize indoor wireless communication, finding applications in smart homes, offices, and industrial environments.
Despite these advancements, challenges remain in optimizing the efficiency, reliability, and scalability of light-based data transfer systems. Issues such as signal attenuation, interference from environmental factors, and the integration of light-based technologies into existing infrastructure need to be addressed to fully realize the potential of light as a medium for data transfer.

In conclusion, light-based data transfer technologies hold immense promise for meeting the ever-growing demands of modern communication networks. Continued research and development in this field are essential to harnessing the full potential of light as a means of high-speed, high-bandwidth data transmission in various domains, from telecommunications to Internet-of-Things (IoT) applications.

Integrating Power Meter Billing and Load Control via GSM

--- ITIKYALA.MOUNA

17251A0298

With the rise of smart grids and IoT (Internet of Things) technologies, there is an increasing demand for innovative solutions that enhance the efficiency and reliability of electricity distribution systems. This abstract presents an overview of a system that combines power meter billing and load control functionalities using GSM (Global System for Mobile Communications) technology.

The proposed system aims to address several challenges faced by utility companies and consumers alike, including accurate billing, load management, and remote monitoring. At its core, the system utilizes smart power meters equipped with GSM modules, enabling bidirectional communication between the utility provider and the consumer premises.

On the billing front, the system employs advanced metering infrastructure (AMI) capabilities to collect real-time electricity consumption data from individual households or commercial establishments. This data is transmitted securely over the GSM network to the utility company's server, where it is processed for billing purposes. By leveraging GSM communication, the system ensures reliable data transmission regardless of the physical distance between the meter and the utility's infrastructure.

In addition to billing, the system offers load control features that enable utilities to manage electricity demand during peak hours or in response to grid constraints. Through the GSM interface, utility operators can remotely implement load shedding or load shifting strategies, thereby optimizing energy distribution and reducing strain on the grid. Consumers may also benefit from incentives or tariff structures that encourage load reduction during periods of high demand.

Furthermore, the GSM-based architecture facilitates real-time monitoring and diagnostics, allowing utilities to detect and address issues such as power outages, meter tampering, or abnormal consumption patterns promptly. This proactive approach to grid management enhances reliability and reduces operational costs associated with manual meter reading and maintenance.

Overall, the integration of power meter billing and load control functionalities using GSM technology offers a comprehensive solution for modernizing electricity distribution systems. By enabling seamless communication between utility providers and consumers, the system promotes transparency, efficiency, and sustainability in the management of electrical resources. Ongoing research and development in this area are essential to further refine the system's capabilities and accelerate its adoption in both urban and rural settings.

Prototype Development of an Engine Locking System to Prevent Drunken Driving

--- BATTU PRAVALIKA

17251A0294

Drunken driving continues to be a significant cause of road accidents and fatalities worldwide, prompting the need for effective preventive measures. This abstract presents the development of a prototype engine locking system designed to mitigate the risks associated with driving under the influence of alcohol.

The proposed system integrates alcohol detection technology with the vehicle's ignition system to prevent individuals with elevated blood alcohol concentrations from operating the vehicle. The prototype comprises a breathalyzer unit installed within the vehicle's interior, capable of accurately measuring the driver's breath alcohol content.

Upon initiating the vehicle, the driver is prompted to provide a breath sample by blowing into the breathalyzer unit. The system then analyzes the sample to determine the driver's blood alcohol concentration (BAC). If the detected BAC exceeds a predetermined threshold considered unsafe for driving, the system activates an engine locking mechanism, preventing the vehicle from starting.

In addition to the initial screening, the system may incorporate periodic retesting to ensure ongoing sobriety during extended journeys. If the driver fails the retest or attempts to tamper with the system, alerts can be sent to designated authorities or preconfigured contacts, enabling timely intervention.

The prototype's development involves the integration of sensor technology, microcontrollers, and vehicle interfacing components to achieve seamless operation and compatibility with a wide range of vehicle models. Emphasis is placed on user-friendliness, reliability, and cost-effectiveness to facilitate widespread adoption and compliance.

Field testing of the prototype in real-world driving scenarios allows for performance evaluation, refinement of algorithms, and validation of accuracy and responsiveness. User feedback and data analysis contribute to iterative improvements and optimization of the system's functionality and effectiveness.

The proposed engine locking prototype represents a proactive approach to reducing the incidence of drunken driving and its associated societal costs. By leveraging advanced technology and human-centered design principles, the system aims to enhance road safety, save lives, and promote responsible driving behavior. Continued research, development, and collaboration with stakeholders are essential to overcome challenges and realize the full potential of such preventive measures in combating the menace of drunken driving.

Development of an Air Quality Monitoring System using Arduino

--- CHILUKA HEMA KUMARI

18255A0218

Air pollution poses significant health and environmental risks in urban and industrialized areas worldwide, necessitating effective monitoring and mitigation strategies. This abstract presents the development of an air quality monitoring system leveraging Arduino microcontroller technology to provide real-time monitoring of key air pollutants.

The proposed system consists of sensor modules capable of measuring various air quality parameters, including particulate matter (PM), carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), and ozone (O3). These sensors are integrated with an Arduino microcontroller board, which serves as the central processing unit for data acquisition, analysis, and transmission.

The monitoring system is designed to be modular and customizable, allowing for the addition or replacement of sensor modules based on specific monitoring requirements and environmental conditions. Each sensor module interfaces with the Arduino board via analog or digital communication protocols, enabling simultaneous measurement of multiple pollutants.

Data collected by the sensors are processed in real-time by the Arduino microcontroller, which performs calibration, normalization, and data fusion to generate comprehensive air quality metrics. These metrics may include pollutant concentrations, air quality indices (AQI), and trend analysis, providing valuable insights into ambient air quality levels and potential health hazards.

The system incorporates wireless communication capabilities, such as Wi-Fi or Bluetooth, to facilitate remote monitoring and data transmission to a centralized server or cloud-based platform. This enables stakeholders, including policymakers, environmental agencies, and the general public, to access real-time air quality information and make informed decisions regarding pollution control measures and public health interventions.

Furthermore, the low-cost and open-source nature of Arduino technology make the air quality monitoring system accessible to a wide range of users, including researchers, educators, and community organizations. By promoting citizen science initiatives and community engagement, the system fosters awareness and empowerment in addressing air pollution issues at the local level.

Field deployment and validation of the monitoring system in diverse urban and industrial settings allow for performance evaluation, calibration, and optimization of sensor accuracy and reliability. Continuous feedback and iteration contribute to the refinement of the system's capabilities and its effectiveness in supporting evidence-based decision-making and environmental stewardship.

In conclusion, the development of an air quality monitoring system using Arduino represents a scalable and cost-effective solution for addressing air pollution challenges in both developed and developing regions. By harnessing the power of open-source hardware and collaborative innovation, the system empowers communities to monitor and mitigate air pollution effectively, ultimately contributing to improved public health and environmental sustainability.

Development of a Health Monitoring System using Arduino

--- BURAGONI NIKHILA

17251A0296

The advent of wearable technology and IoT (Internet of Things) has revolutionized healthcare by enabling continuous and remote monitoring of vital signs and health parameters. This abstract presents the development of a health monitoring system utilizing Arduino microcontroller technology to facilitate real-time monitoring of physiological parameters and wellness indicators.

The proposed system comprises wearable sensor modules capable of measuring a range of vital signs, including heart rate, blood oxygen saturation (SpO2), body temperature, and activity level. These sensor modules are integrated with an Arduino microcontroller board, which serves as the central processing unit for data acquisition, analysis, and transmission.

Key features of the health monitoring system include modularity, scalability, and versatility, allowing for the integration of additional sensors or functionalities to cater to diverse monitoring needs and user preferences. Each sensor module interfaces with the Arduino board via analog or digital communication protocols, enabling seamless integration and synchronization of data streams.

Data collected by the sensors are processed in real-time by the Arduino microcontroller, which performs signal processing, feature extraction, and data fusion to derive meaningful insights into the user's health status and wellness trends. These insights may include heart rate variability (HRV), sleep quality metrics, stress levels, and activity patterns, providing valuable feedback for personalized health management and preventive care.

The system incorporates wireless communication capabilities, such as Bluetooth or Wi-Fi, to enable seamless connectivity with mobile devices or cloud-based platforms. This facilitates remote monitoring and data transmission, empowering users and healthcare providers to access real-time health information and receive timely alerts or notifications.

Furthermore, the low-cost and open-source nature of Arduino technology make the health monitoring system accessible to a wide range of users, including individuals, caregivers, and healthcare professionals. By promoting self-monitoring and proactive health management, the system fosters early detection of health issues, adherence to wellness goals, and improved health outcomes.
Field testing and validation of the health monitoring system in clinical or real-world settings allow for performance evaluation, calibration, and optimization of sensor accuracy and reliability. Continuous feedback and iteration contribute to the refinement of the system's capabilities and its effectiveness in supporting preventive healthcare and remote patient monitoring.

In conclusion, the development of a health monitoring system using Arduino represents a promising approach to personalized and proactive healthcare delivery. By leveraging wearable technology and IoT connectivity, the system empowers individuals to take charge of their health and well-being, paving the way for a more accessible, efficient, and patient-centered healthcare paradigm.

Enabling Remote Control of Electrical Loads through IoT Technology

---YEDLA NAVYASRI

18255A0213

The Internet of Things (IoT) has revolutionized the way we interact with and manage devices in our environment, offering unprecedented levels of connectivity and control. This abstract presents the development of a system that enables the remote triggering of electrical loads using IoT technology, facilitating efficient and convenient management of power consumption in various applications.

The proposed system integrates IoT-enabled devices, such as microcontrollers and wireless communication modules, with electrical appliances and power outlets to enable remote control and automation of electrical loads. Key components of the system include IoT platforms, sensors, actuators, and communication protocols, which work together to provide seamless connectivity and interoperability.

Users interact with the system through a user interface, which may include smartphone applications, web portals, or voice-activated assistants. Through these interfaces, users can monitor the status of electrical loads, schedule operations, and remotely trigger on/off commands from anywhere with an internet connection.
The IoT-enabled devices act as intermediaries between the user interface and the electrical loads, relaying commands and feedback in real-time. Advanced features such as scheduling, timers, and conditional triggers allow for personalized automation and energy management strategies tailored to the user's preferences and requirements.

Furthermore, the system may incorporate sensors for environmental monitoring, energy consumption tracking, and occupancy detection, enabling data-driven decision-making and optimization of energy usage. Integration with smart meters and energy management systems provides additional insights and control over electricity consumption at the household or enterprise level.

Security and privacy considerations are paramount in IoT-enabled systems, and as such, the proposed system implements robust authentication, encryption, and access control mechanisms to safeguard sensitive data and prevent unauthorized access or tampering.

Field deployment and validation of the IoT-enabled system in residential, commercial, or industrial settings allow for performance evaluation, optimization, and refinement based on real-world usage patterns and feedback from users. Continuous updates and improvements ensure the system remains reliable, scalable, and adaptable to evolving needs and technological advancements.

In conclusion, the development of a system for remote triggering of electrical loads using IoT technology represents a significant step towards creating smarter, more efficient, and sustainable environments. By leveraging the power of connectivity and automation, the system empowers users to optimize energy usage, enhance convenience, and reduce environmental impact, paving the way for a more connected and intelligent future.

Design and Implementation of a Sun Tracking Solar Panel System

---CHANDA RAJA RAJESHWARI

17251A0267

Solar energy has emerged as a promising renewable energy source for mitigating climate change and reducing reliance on fossil fuels. To maximize the efficiency of solar photovoltaic (PV) systems, it is crucial to optimize the orientation of solar panels relative to the sun's position throughout the day. This abstract presents the design and implementation of a sun tracking solar panel system aimed at enhancing the energy harvesting capabilities of solar installations.

The proposed system incorporates a sun tracking mechanism that continuously adjusts the orientation of solar panels to maximize solar irradiance reception. Key components of the system include light sensors, actuators, microcontrollers, and software algorithms, which work in concert to accurately track the sun's position and adjust the tilt and azimuth angles of the solar panels accordingly.

Light sensors measure the intensity and direction of sunlight, providing real-time feedback to the control system. Microcontrollers process sensor data and execute control algorithms to determine the optimal positioning of the solar panels based on the sun's position relative to the geographical location and time of day.

The sun tracking mechanism employs actuators, such as motors or servos, to physically adjust the orientation of solar panels in response to control signals from the microcontroller. By dynamically aligning the panels to face the sun's rays perpendicular, the system maximizes solar energy absorption and enhances overall system efficiency. Integration with weather forecasting data and predictive algorithms allows the system to anticipate changes in solar conditions, such as cloud cover or atmospheric haze, and adjust panel orientation preemptively to optimize energy capture.

Field testing and validation of the sun tracking solar panel system in diverse environmental conditions enable performance evaluation and optimization of tracking algorithms and mechanical components. Data logging and analysis provide insights into energy yield improvements and validate the system's effectiveness in comparison to fixed-tilt solar installations.

The sun tracking solar panel system offers several advantages, including increased energy generation, improved system reliability, and enhanced return on investment for solar PV installations. Furthermore, by maximizing energy capture from renewable sources, the system contributes to the transition towards a sustainable and carbon-neutral energy future.

In conclusion, the design and implementation of a sun tracking solar panel system represent a significant advancement in solar energy technology, offering a practical and scalable solution for optimizing solar energy harvesting in various applications, from residential rooftops to utility-scale solar farms. Continued research and innovation in this field are essential to further enhance the efficiency, affordability, and widespread adoption of solar energy solutions.

Design and Implementation of a DTMF-Based Home Automation System

---ANASI NIKITHA

17251A0264

Home automation systems have gained popularity for their ability to enhance convenience, security, and energy efficiency in modern households. This abstract presents the design and implementation of a Dual-Tone Multi-Frequency (DTMF) based home automation system, offering remote control and monitoring of household appliances and systems using standard telephone keypad inputs.

The proposed system utilizes DTMF signaling, a method commonly used in telecommunications, to transmit control commands over standard telephone lines or mobile networks. Key components of the system include a central control unit, DTMF decoder, relay modules, and connected appliances or devices.

Users interact with the home automation system by dialing into a designated phone number associated with the system. Upon connection, users input command sequences using the keypad of their telephone, with each key press generating a unique combination of two audible tones representing specific commands or actions.

The DTMF decoder interprets the received tones and decodes them into digital signals, which are then processed by the central control unit. Based on the decoded commands, the control unit activates or deactivates relay modules connected to various household appliances or systems, such as lights, fans, air conditioners, or security cameras.

Additionally, the system may incorporate feedback mechanisms to provide users with real-time status updates or confirmation of executed commands. For example, status indicators or voice prompts may be used to indicate successful activation or deactivation of appliances.

Security features, such as PIN authentication or call authentication, can be implemented to prevent unauthorized access and ensure the integrity of the system. Furthermore, logging and monitoring capabilities enable tracking of user interactions and system events for audit and analysis purposes.

Field deployment and validation of the DTMF-based home automation system in residential settings allow for performance evaluation and optimization based on real-world usage scenarios and user feedback. Continuous updates and enhancements ensure compatibility with evolving telecommunications standards and user preferences.

In conclusion, the design and implementation of a DTMF-based home automation system offer a cost-effective and accessible solution for remote control and monitoring of household appliances and systems. By leveraging existing telephone infrastructure and familiar user interfaces, the system enhances convenience and flexibility in managing home environments, ultimately improving the quality of life for homeowners and occupants. Continued innovation in this field holds the potential to further expand the capabilities and adoption of home automation technologies in diverse applications.

Development of a Driver Anti-Sleep Device

---KANKATI SAI CHARITHA

17251A02A0

Drowsy driving poses a significant risk to road safety, contributing to numerous accidents and fatalities worldwide. This abstract presents the development of a Driver Anti-Sleep Device (DASD), designed to mitigate the dangers associated with driver fatigue by detecting early signs of drowsiness and alerting the driver to take necessary precautions.

The proposed DASD integrates a variety of sensors and algorithms to monitor the driver's physiological and behavioral indicators of alertness. Key components include infrared cameras, electroencephalography (EEG) sensors, heart rate monitors, and accelerometers, which collectively capture data related to eye movements, brain activity, heart rate variability, and physical motion.

Real-time data processing and analysis algorithms assess the driver's alertness level based on patterns and deviations from baseline measurements. Early indicators of drowsiness, such as drooping eyelids, decreased blink rate, or changes in EEG patterns indicative of drowsy states, trigger the activation of alert mechanisms.

Alert mechanisms incorporated into the DASD include audible alarms, haptic feedback, visual cues, and even seat vibrations, aimed at alerting the driver and eliciting a response to prevent potential accidents. The intensity and frequency of alerts may be adjusted based on the severity of detected drowsiness and driving conditions.

The DASD system also offers connectivity features, enabling integration with vehicle telematics systems or smartphone applications for data logging, analysis, and remote monitoring. Aggregated data on driver alertness levels and fatigue patterns can provide valuable insights for fleet managers, transportation authorities, and researchers to identify high-risk situations and implement preventive measures.

User acceptance and usability are paramount considerations in the design and deployment of the DASD. Human-centered design principles inform the development of ergonomic and non-intrusive alert mechanisms, ensuring effective communication with the driver while minimizing distractions or discomfort.

Field testing and validation of the DASD in real-world driving scenarios allow for performance evaluation and refinement of algorithms and alert mechanisms. User feedback and data analysis contribute to continuous improvement and optimization of the device's effectiveness in reducing the incidence of drowsy driving-related accidents.

In conclusion, the development of a Driver Anti-Sleep Device represents a proactive approach to addressing the dangers of drowsy driving and enhancing road safety. By leveraging advanced sensor technologies and data analytics, the DASD aims to empower drivers with timely alerts and interventions to prevent accidents caused by driver fatigue, ultimately saving lives and reducing societal costs associated with road traffic injuries. Continued research and collaboration are essential to further enhance the effectiveness and adoption of such devices in diverse driving environments and user populations.

Development of a Smart Traffic Signaling System

---DUMPETI SAI HARSHITHA

17251A0205

Traffic congestion and inefficiencies in urban road networks are major challenges faced by modern cities, leading to increased travel times, fuel consumption, and environmental pollution. This abstract presents the development of a Smart Traffic Signaling System (STSS), designed to optimize traffic flow and reduce congestion through intelligent control algorithms and real-time data analysis.

The proposed STSS integrates a network of sensors, communication infrastructure, and control algorithms to monitor traffic conditions and adjust signal timings dynamically. Key components include vehicle detectors, cameras, environmental sensors, and microcontrollers, which work together to collect and process data on vehicle movements, pedestrian activity, weather conditions, and road surface conditions.

Real-time traffic data, including vehicle counts, speeds, and occupancy levels, are analyzed using advanced algorithms to identify traffic patterns, bottlenecks, and congestion hotspots. Machine learning techniques may be employed to predict traffic flow and anticipate changes in demand based on historical data and current trends.

Based on the analysis of traffic data, the STSS dynamically adjusts signal timings and prioritizes traffic flow along arterial roads, intersections, and transit corridors. Adaptive control strategies, such as traffic-responsive signal coordination and adaptive signal phasing, optimize signal operations to minimize delays and improve overall network efficiency.
Furthermore, the STSS offers connectivity features, allowing for integration with centralized traffic management systems, vehicle-to-infrastructure (V2I) communication platforms, and mobile applications for real-time monitoring and control. This enables traffic engineers and operators to remotely monitor traffic conditions, adjust signal timings, and respond to incidents or emergencies in a timely manner.

The STSS also incorporates features to enhance safety and accessibility, including pedestrian crossing detection, emergency vehicle preemption, and prioritization of vulnerable road users such as cyclists and pedestrians. User-friendly interfaces and accessibility options cater to diverse user needs and preferences, promoting inclusivity and equitable access to transportation resources.

Field deployment and validation of the STSS in urban road networks allow for performance evaluation and refinement of control algorithms and optimization strategies. Continuous monitoring and feedback loops enable iterative improvements and adaptation to changing traffic patterns and infrastructure conditions.

In conclusion, the development of a Smart Traffic Signaling System represents a proactive approach to addressing traffic congestion and improving mobility in urban areas. By leveraging data-driven insights and intelligent control algorithms, the STSS aims to optimize traffic flow, reduce delays, and enhance safety for all road users, ultimately contributing to a more sustainable and livable urban environment. Continued research and collaboration are essential to further enhance the effectiveness and scalability of smart traffic management solutions in diverse urban contexts.

Design and Development of an Automatic Floor Cleaner

---INDRALA ANJALI

17251A0241

Maintaining cleanliness and hygiene in indoor environments is essential for health and well-being. This abstract presents the design and development of an Automatic Floor Cleaner (AFC), a robotic device aimed at autonomously cleaning floors in residential, commercial, and industrial settings.

The proposed AFC integrates a combination of sensors, actuators, navigation algorithms, and cleaning mechanisms to effectively remove dirt, dust, and debris from various floor surfaces. Key components include ultrasonic sensors, infrared sensors, wheel encoders, microcontrollers, and cleaning attachments such as brushes or vacuum systems.
Upon activation, the AFC engages its sensor suite to perceive the surrounding environment and identify obstacles, furniture, and floor boundaries. Using sensor fusion techniques, the device generates a map of the cleaning area and plans an optimal cleaning path to cover the entire floor surface efficiently.

Navigation algorithms enable the AFC to navigate obstacles, maneuver around furniture, and adapt to changes in the environment in real-time. Path planning strategies, such as random walk, grid-based mapping, or SLAM (Simultaneous Localization and Mapping), facilitate smooth and systematic coverage of the cleaning area.
Cleaning mechanisms integrated into the AFC, such as rotating brushes, suction systems, or mopping pads, effectively remove dirt and debris from different floor types, including hardwood, tile, carpet, and linoleum. Adjustable settings and interchangeable cleaning attachments cater to diverse cleaning requirements and surface conditions.

The AFC offers user-friendly features, including scheduling capabilities, remote control options, and autonomous docking and charging functions. Connectivity features enable integration with smartphone applications or home automation systems, allowing users to monitor cleaning progress, adjust settings, and receive notifications remotely.
Safety features, such as collision detection sensors, anti-drop sensors, and obstacle avoidance algorithms, ensure the AFC operates safely in indoor environments and avoids damaging furniture or causing accidents.

Field testing and validation of the AFC in real-world cleaning scenarios allow for performance evaluation and refinement of navigation algorithms, cleaning mechanisms, and user interfaces. Continuous feedback and iteration contribute to the improvement of the device's effectiveness, reliability, and user satisfaction.

In conclusion, the development of an Automatic Floor Cleaner represents a significant advancement in household and commercial cleaning technology, offering a convenient and efficient solution for maintaining clean and hygienic indoor environments. By automating floor cleaning tasks, the AFC enhances convenience, productivity, and quality of life for users, ultimately promoting a healthier and more comfortable living and working environment. Continued research and innovation in this field are essential to further enhance the capabilities and adoption of autonomous cleaning solutions in diverse applications

Network-Based Fire Detection for Industrial and Home Appliances

---JAMMULA TULASINAGADEEPIKA

17251A0242

Fire incidents pose significant risks to both industrial facilities and residential properties, leading to property damage, injury, and loss of life. This abstract presents the development of a Network-Based Fire Detection System (NBFDS) designed to enhance fire detection capabilities for industrial and home appliances by leveraging interconnected sensors and advanced data analytics.

The proposed NBFDS integrates a network of fire detection sensors, communication infrastructure, and data processing algorithms to provide early detection and rapid response to fire events. Key components include smoke detectors, heat sensors, gas sensors, microcontrollers, and wireless communication modules.

Upon activation, the NBFDS sensors continuously monitor environmental conditions for signs of fire, including smoke, elevated temperatures, and hazardous gases. Sensor data is transmitted wirelessly to a centralized control unit or cloud-based platform for real-time analysis and decision-making.

Advanced data analytics algorithms process sensor data to identify patterns indicative of fire events, distinguish between false alarms and genuine threats, and localize the source of the fire. Machine learning techniques may be employed to improve the system's accuracy and reliability over time through continuous learning and adaptation.
The NBFDS offers scalability and flexibility, allowing for seamless integration with existing fire detection systems, building automation systems, and IoT (Internet of Things) devices. Connectivity features enable interoperability with emergency response systems, enabling automatic alerts and notifications to designated authorities or users.

In industrial settings, the NBFDS provides comprehensive coverage of manufacturing facilities, warehouses, and production lines, enabling early detection of fire hazards and proactive mitigation measures to minimize disruption and damage.

In residential applications, the NBFDS enhances home safety by providing reliable fire detection capabilities for kitchen appliances, heating systems, and electrical circuits. Integration with smart home platforms enables remote monitoring and control, empowering homeowners to take timely action in the event of a fire emergency.
Safety and reliability are paramount considerations in the design and deployment of the NBFDS, with redundant sensor systems, self-diagnostic routines, and fail-safe mechanisms ensuring continuous operation and accurate detection of fire threats.

Design and Implementation of a Solar-Powered Water Surface Cleaning Boat

---CHIKKA SUPRITHA

18255A0201

Water bodies face increasing pollution challenges, including the accumulation of debris and floating waste, which pose threats to aquatic ecosystems and human health. This abstract presents the design and implementation of a Solar-Powered Water Surface Cleaning Boat (SPWSCB) aimed at addressing these challenges by autonomously collecting and removing debris from water surfaces.

The proposed SPWSCB integrates solar photovoltaic (PV) panels, propulsion systems, debris collection mechanisms, and navigation control algorithms to enable efficient and sustainable water surface cleaning operations. Key components include solar panels, electric motors, batteries, sensors, and a debris collection conveyor system.

The SPWSCB is powered by solar energy captured through onboard PV panels, providing clean and renewable energy for propulsion and operation. Energy storage systems, such as lithium-ion batteries, store excess energy generated during daylight hours to ensure continuous operation during periods of low solar irradiance or at night. Navigation control algorithms enable autonomous operation of the SPWSCB, allowing it to navigate water bodies and cover large surface areas efficiently. Using GPS positioning and obstacle detection sensors, the boat follows predefined cleaning routes, avoiding collisions with obstacles and adjusting its trajectory based on real-time environmental conditions.

Debris collection mechanisms, such as conveyor belts or scoop systems, are deployed to capture and remove floating waste from the water surface. Collected debris is transferred to onboard storage compartments or containers for later disposal or recycling, minimizing environmental impact and preventing further pollution.
The SPWSCB offers connectivity features, enabling remote monitoring and control via satellite communication or terrestrial networks. This allows operators to track the boat's location, monitor cleaning progress, and receive alerts or notifications in case of operational issues or emergencies.

Field testing and validation of the SPWSCB in real-world water bodies allow for performance evaluation and refinement of navigation algorithms, debris collection mechanisms, and energy management strategies. Continuous feedback and iteration contribute to the improvement of the boat's efficiency, reliability, and effectiveness in cleaning water surfaces.

In conclusion, the development of a Solar-Powered Water Surface Cleaning Boat represents a sustainable and innovative approach to addressing water pollution challenges. By harnessing solar energy and autonomous navigation technologies, the SPWSCB offers a cost-effective and environmentally friendly solution for maintaining clean and healthy water ecosystems. Continued research and collaboration are essential to further enhance the capabilities and adoption of solar-powered water surface cleaning solutions in diverse aquatic environments.

Design and Development of a Smart Manure Bin

---MEDA SRAVANI REDDY

17251A0247

The management of livestock waste, such as manure, is essential for environmental sustainability and agricultural productivity. This abstract presents the design and development of a Smart Manure Bin (SMB), equipped with sensors and IoT (Internet of Things) technology to optimize the collection, storage, and utilization of manure resources.

The proposed SMB integrates a range of sensors, actuators, communication modules, and data analytics algorithms to enable real-time monitoring and management of manure storage facilities. Key components include level sensors, temperature sensors, moisture sensors, gas sensors, microcontrollers, and wireless connectivity modules.

Upon installation, the SMB sensors continuously monitor key parameters of manure storage, including fill level, temperature, moisture content, and gas emissions. Real-time data is transmitted wirelessly to a centralized control system or cloud-based platform for analysis and decision-making.

Advanced data analytics algorithms process sensor data to assess manure quality, predict decomposition rates, and identify potential issues such as odor emissions or nutrient loss. Machine learning techniques may be employed to optimize manure management practices and maximize the value of manure as a resource.

The SMB offers smart features such as automated filling notifications, remote monitoring and control, and predictive maintenance alerts. This allows farmers and agricultural operators to optimize manure collection schedules, prevent overfilling or spillage, and minimize environmental impact.

Connectivity features enable integration with farm management systems, nutrient management plans, and regulatory compliance platforms. This facilitates data sharing, reporting, and traceability, ensuring compliance with environmental regulations and promoting sustainable agricultural practices.

Safety features, such as gas detection sensors and ventilation control systems, ensure safe operation of manure storage facilities and protect workers and livestock from harmful gases or conditions.
Field testing and validation of the SMB in agricultural settings allow for performance evaluation and refinement of sensor algorithms and control strategies. Continuous feedback and iteration contribute to the improvement of the system's effectiveness, reliability, and user satisfaction.

In conclusion, the development of a Smart Manure Bin represents a proactive approach to sustainable agriculture, offering enhanced monitoring, management, and utilization of livestock waste resources. By leveraging IoT technology and data analytics, the SMB enables farmers to optimize manure management practices, improve environmental stewardship, and enhance farm productivity. Continued research and collaboration are essential to further enhance the capabilities and adoption of smart manure management solutions in diverse agricultural operations.

Development of a Solar-Based Lawn Mower

---THALAKOKKULA NAGASRI

17251A0257

Maintaining lawns and green spaces is essential for landscaping and environmental aesthetics, but traditional lawn mowers contribute to carbon emissions and noise pollution. This abstract presents the design and development of a Solar-Based Lawn Mower (SBLM), offering a sustainable and eco-friendly solution for grass cutting operations.

The proposed SBLM integrates solar photovoltaic (PV) panels, electric motors, battery storage, and cutting blades to create a clean and efficient lawn mowing system. Key components include high-efficiency solar panels, rechargeable batteries, brushless electric motors, and cutting blades optimized for grass cutting efficiency.
Solar energy captured by the PV panels is converted into electrical power and stored in onboard batteries, providing the energy needed to drive the mower's electric motors and operate the cutting blades. Excess energy generated during daylight hours is stored for use during cloudy conditions or at night, ensuring continuous operation.

The SBLM is equipped with intelligent control systems that optimize energy usage and cutting performance. Variable speed control algorithms adjust motor speeds based on grass density and terrain conditions, maximizing cutting efficiency while minimizing energy consumption.

Safety features, such as obstacle detection sensors and automatic shut-off mechanisms, ensure safe operation and prevent accidents or damage to the mower and surrounding objects. User-friendly interfaces and controls enable intuitive operation and customization of cutting settings.

Connectivity features allow for remote monitoring and control of the SBLM via smartphone applications or web interfaces. This enables users to schedule mowing sessions, monitor battery levels, and receive notifications or alerts in case of issues or maintenance requirements.

Field testing and validation of the SBLM in real-world lawn mowing scenarios allow for performance evaluation and refinement of cutting algorithms, energy management strategies, and user interfaces. Continuous feedback and iteration contribute to the improvement of the mower's efficiency, reliability, and user satisfaction.

In conclusion, the development of a Solar-Based Lawn Mower represents a sustainable and environmentally friendly approach to lawn care, offering reduced carbon emissions, noise pollution, and reliance on fossil fuels. By harnessing solar energy and electric propulsion, the SBLM provides an eco-conscious alternative to traditional gas-powered mowers, promoting greener landscaping practices and healthier outdoor environments. Continued research and innovation in this field are essential to further enhance the capabilities and adoption of solar-powered lawn mowing solutions in residential, commercial, and municipal settings.

Department of Electrical and Electronics Engineering

Vision

To impart quality education in Electrical and Electronics Engineering for women empowerment

Mission

The vision can be accomplished by

1. Imparting fundamental knowledge in Electrical and Electronics Engineering through well-qualified faculty

2. Providing exposure to current technologies

3. Providing hands-on experience to meet the expectations of the industry

4. Facilitating individual and team activities to enhance personality and soft skills

Program Educational Objectives (PEOs)

PEO1: To Excel in chosen career

PEO2: To work effectively as an individual and as a team member, keeping in mind the high importance currently being given to sustainability and emerging Green Energy Technologies in the current scenario

PEO3: To contribute to the community/society development through acquired knowledge and skills

PEO4: Continuous up gradation of knowledge and skills