ICIRIST 2K25

INTERNATIONAL CONFERENCE

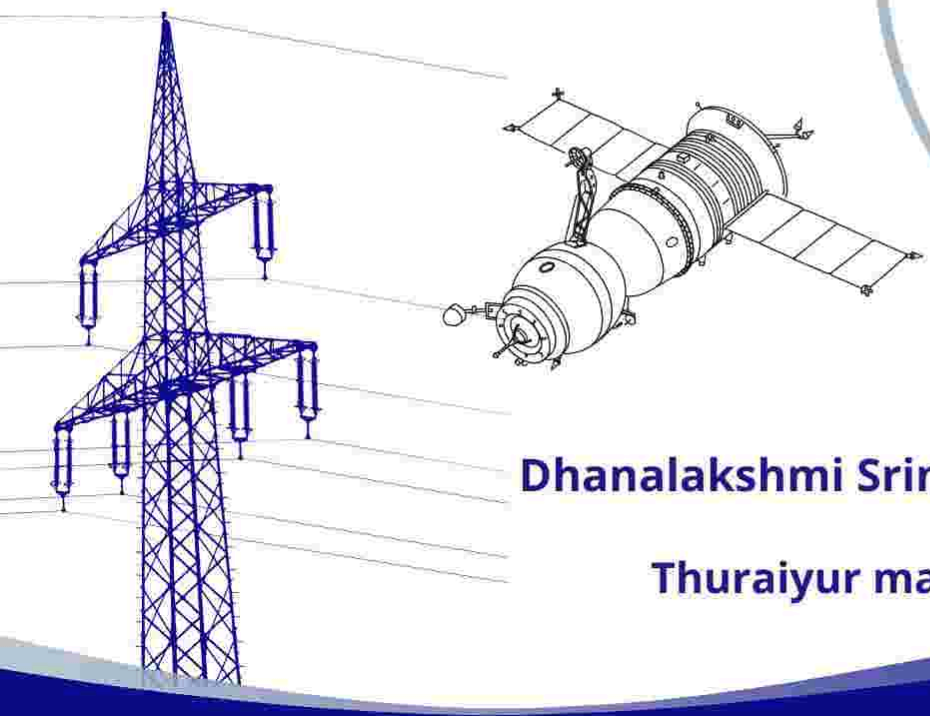
ON

POWER SYSTEMS & COMMUNICATION ENGINEERING

Organized by

ECE & EEE

In Association with



Editor

Dr.P.Rajeswari

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ISBN NO : 978-93-342-8222-1

Publisher	: Dhanalakshmi Srinivasan Engineering College (Autonomous) Thuraiyur Road, Perambalur – 621 212, Tamil Nadu, India
Imprint	: Dhanalakshmi Srinivasan Engineering College (Autonomous) Thuraiyur Road, Perambalur – 621 212, Tamil Nadu, India
Contact	: +91 **99943 34681**
Email	: dsec.office@gmail.com
Website	: www.dsengg.ac.in
Editor	: Dr. P. Rajeswari
Book Title	: International Conference on Power Systems and Communication Engineering
ISBN NO	: 978-93-342-8222-1
Month & Year	: April 2025

FOREWORD

It gives us immense pleasure to present the proceedings of the International Conference on Power Systems and Communication Engineering, held on 25th April 2025 at Dhanalakshmi Srinivasan Engineering College (Autonomous), Perambalur, Tamil Nadu. This conference, organized jointly by the Departments of Electronics and Communication Engineering, Electrical and Electronics Engineering, serves as a platform to bring together academic minds, industry professionals, research scholars, and students to explore innovations in engineering and technology.

The aim of the International Conference on Innovations in Research and Intelligent Systems Technologies (ICIRIST 2025) is to provide a dynamic platform for emerging researchers, academicians, and industry professionals to disseminate their latest innovations and research outcomes in the fields of intelligent systems, electronics, communication, and allied technologies. The conference also seeks to underscore the practical applications of these technologies in addressing contemporary challenges across various domains. ICIRIST 2025 is expected to bring together participants from various institutions across the nation and internationally, fostering a global community of innovation and research. It aims to establish expert networks for collaboration and knowledge sharing, encouraging a multidisciplinary approach to solving real-world problems. Participants will be empowered to exchange their best research practices and form lasting professional connections that extend beyond the conference

We extend our heartfelt gratitude to all contributors, reviewers, session chairs, and participants whose active involvement and enthusiasm made this conference a resounding success. A special acknowledgment is due to the organizing committee, whose tireless efforts ensured the seamless execution of the event. We hope that the ideas exchanged, and the collaborations initiated through this platform will inspire future innovations and contribute meaningfully to the creation of a smarter, greener world.

DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE(AUTONOMOUS)

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Re-Accredited with "A" Grade by NAAC, Accredited by TCS.
Re-Accredited by NBA (BME, ECE, EEE,), Accredited by NBA (CSE, IT, MECH & AERO,)
PERAMBALUR - 621 212. TAMIL NADU

PROCEEDINGS

of

"INTERNATIONAL CONFERENCE ON POWER SYSTEM AND COMMUNICATION ENGINEERING"

ICIRIST'25

April'25, 2025

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(Ministry of HRD Initiative)

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Department of Electrical and Electronics Engine ering

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MESSAGE

I am delighted to know that the Research & Development Cell of Dhanalakshmi Srinivasan Engineering College is hosting the **"International Conference on Integrating Recent Innovations in Science and Technology: Shaping the Future" (ICIRIST-2025).** The event is scheduled to take place on April 25 ,2025 at Dhanalakshmi Srinivasan University in Perambalur, Tamil Nadu. The event is scheduled to take place on April 25, 2025, at Dhanalakshmi Srinivasan University in Perambalur, Tamil Nadu.

The constant emergence of innovative inventions in Science, Engineering, and Technology is a promising trend. The decision to organize an international conference on **"Power Systems & Communication Engineering"** is commendable. The primary objective of these conferences is to provide a substantial platform for intellectual exchange. Researchers, industrialists, and students can come together to share their findings and insights in the realm of **'Innovative Research',** contributing to the enhancement of human life on both global and local scales.

It is anticipated that the conference will serve as a catalyst for fostering a deeper understanding of various recent innovations from a broader perspective. I extend my best wishes to the organizing committee of ICIRIST-2025, hoping for the success of the event. May the academic deliberation sessions with esteemed scientists be fruitful and contribute significantly to the advancement of knowledge.

Dr. D. Shanmugasundaram
Principal
Dhanalakshmi Srinivasan Engineering College (Autonomous)
Perambalur-621212

It is with immense pride and honour that I present the International Conferences on **Integrating Recent Innovations in Science and Technology**: Shaping the Future (ICIRIST-2025), a landmark event hosted by our institution. As the Principal, I am both humbled and inspired to witness such a grand confluence of scholars, researchers, innovators, and academicians from across the nation and the globe.

The theme of this year's conference, **"Integrating Innovations for Shaping a Sustainable Future,"** is not only timely but also pivotal in guiding the trajectory of future research and development. The five co-located conferences under the ICIRIST-2025 umbrella embody a multidisciplinary spirit, encouraging collaboration across diverse yet interconnected fields of Science, Engineering, and Technology.

I commend the Organizing Committee, faculty, and student volunteers whose tireless efforts have culminated in the successful realization of this prestigious event. The publication of dedicated Proceedings volumes for each conference further enhances the scholarly value of this initiative, serving as a beacon for continued exploration and intellectual growth.

I extend my heartfelt wishes to all participants and contributors. May ICIRIST-2025 spark new ideas, foster partnerships, and contribute significantly to the global pursuit of knowledge and innovation.

Dr. D. Shanmugasundaram

Principal

Dr. T. Sivaraman

Dean – Research

Dhanalakshmi Srinivasan Engineering College (Autonomous)

Perambalur-621212

As a representative of the organizing committee for the **International Conferences on Integrating Recent Innovations in Science and Technology: Shaping the Future (ICIRIST-2025)**, it is with great pride and pleasure that I extend a warm welcome to all participants from esteemed institutions across India and around the world. I am particularly delighted to note that this prestigious event encompasses **five co-located conferences**, all unified under the central theme: **"Integrating Innovations for Shaping a Sustainable Future. "** This thematic focus underscores the conference's commitment to fostering impactful collaboration.

Each conference is marked by the release of a dedicated **Proceedings volume**, which not only commemorates the occasion but also serves as a valuable repository of insights, perspectives, and emerging trends. These contributions are expected to stimulate further research and practical applications across the dynamic domains of **Science, Engineering, and Technology**.

On this significant occasion, I convey my heartfelt greetings to the **Organizing Committee** of each conference and all participants of **ICIRIST-2025**. I wish the conference resounding success and hope it becomes a catalyst for meaningful innovation, collaboration, and advancement in global research.

Dr. T. Sivaraman

Dean – Research

DR. S. S. KARTHIKEYAN

PROFESSOR, DEPARTMENT OF ECE

NATIONAL INSTITUTE OF TECHNOLOGY, TRICHY

It is an honor to join you at the International Conference on Power System and Communication Engineering (ICIRIST – 2025). I sincerely thank the organizers for inviting me as the Chief Guest and extend warm greetings to all participants, faculty, researchers, and students from across the globe.

This conference, themed "Integrating Innovations for Shaping a Sustainable Future," arrives at a pivotal time, as power systems and communication engineering evolve rapidly with emerging technologies and sustainability goals. The knowledge shared here will surely help address real-world challenges and foster interdisciplinary innovation.

I am heartened by the vibrant participation, reflecting a strong commitment from academia and industry to shape a better future. May this conference serve as both a hub for academic excellence and a launchpad for transformative solutions.

Kudos to the organizers for their efforts and for compiling the conference Proceedings. I wish everyone a fruitful and inspiring experience.

Thank you.

Warm regards,

Dr. S. S. Karthikeyan
Professor, Department of ECE
National Institute of Technology, Trichy

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13.	Discipline Committee	All Class Incharge	All Class Incharge

INSTITUTION PROFILE

ABOUT THE COLLEGE

Our Dhanalakshmi Srinivasan Engineering College (An Autonomous Institution) has 22 years of enchanting Education, as established in the year of 2001 at Perambalur, Tamil Nadu. Our Institution is accredited with 'A Grade' by NAAC in the year of 2015 and further it is Re-Accredited with the same Grade till 2025. Our Institute is conferred with Autonomous status from UGC and Anna university for a period of ten years. Our college is accredited by TCS. Departments of AERO, BME, CSE, ECE, EEE, IT and MECH are accredited by NBA. Our Institution is run by the Silver Jubilee celebrated Group of Dhanalakshmi Srinivasan Charitable and Educational Trust, Perambalur, Tamil Nadu.

Our endowed educational trust started the college with motto of promoting Engineering Technical Education to the Students in rural area of the backward Districts of Tamil Nadu. Our Institution offer 16 UG Programme and 6 PG Programme.

The aspirants of the Institution both the Faculty and Students are vibrant in congregating the cutting-edge technologies in their respective fields. This motto is aided by the regular Professional Society and Club Activities. The College offers a good scope for Service – oriented Programme organized by NSS, Fine Arts Association and Student Care Centre. The Rainwater Harvesting units are also built with a societal impact in our college premises. The Human Resource Development Centre focuses on the full fledged placements for all department Students.

As now with another great Milestone of receiving Autonomy we are working together with a hope of consequential development of the students in all aspects. We have

introduced Skill based Module which helps our students to mould themselves with variety of Skill based Learning. These Courses are designed to groom budding Engineers, become Employable and a responsible Citizen of the Nation.

Regarding infrastructure, our campus is lush green campus and has well equipped laboratories and smart classrooms. Separate hostel facility is available for both boys and girls with multi cuisine food. 24 hours Wi Fi facility is available in our institution and also, we have specialized central auditorium with fully air-conditioned facility and having the seating capacity of 2500 with state of art facilities.

Highly Competent faculty with Industry and Academic experience caters the needs of students on curriculum which helps them to meet the global challenges and the needs of employers. Project based learning is incorporated to equip Research skills among the students. Various activities are performed by our institution in a student centric basis such as Continuous assessment, Assignment strategies, Student initiative Material, Virtual Lab, Project Monitoring Committee, etc. Regarding Training and Placement, Personality Development program classes are arranged to ensure the transformation of students as campus to corporate level and nearly 85% of students were placed in reputed industries each and every year. Major recruiters are TCS, HCL, Urjitha Electronics, Suthernland and so on.

Moreover, we encourage the spirit of entrepreneurship and empower students to share ideas and develop creativity through Project Based Learning. We provide the scope for the students to participate in various level of extension activities such as NSS, Fine arts, Sports, Club activities, etc rather than academic competency. Each and every year we organize Student Enrichment Programme through professional societies such as IEEE, ISTE, BMSI and so on. National and International symposium and conference were also arranged to enrich the technical competency of the student. We have a regular practice of applying a proposal to funding agencies, in which we have received fund on MODROBS, SPDC, Organizing Symposium, conference and so on.

ELECTRONICS & COMMUNICATION ENGINEERING

DEPARTMENT PROFILE

The department of Electronics and Communication Engineering was established in the year 2001 during which the undergraduate programme was introduced. Post graduate programme was established in the year 2007 and it offers communication systems.

Under the UG programme, the total sanctioned student strength is 60 and now it is increased 120 to 180 in the Academic Year (2012-2013). Under the PG programme, the total sanctioned student strength is 18 and now it is increased to 36. The department is accredited by NBA and received an AICTE fund of Rs: 1, 25, 000 in the academic year of 2009-2010 and Rs: 5, 00, 000 in the academic year of 2011-2012 for MODROBS.

The department has highly qualified, committed and research-oriented faculty members and supported by trained technical non-teaching staff. The department enjoys the privilege of having spacious and well-equipped laboratories that provide students, the industrial environment much needed for real life training.

The department has very close interaction with many leading industries in the country and research laboratories. Guest lectures, workshops, Industrial Visits, In-plant training, seminars, symposia, in-house projects in collaboration with well-established companies and other personality development that cater to the quest of today's society as well as student professionals.

The department shares the mission and vision of the institution, in imparting high-quality education to the students.

Vision

To be a centre of repute for higher learning and research to cater the knowledge in Electronics and Communication field to the ever-growing needs of industries and to facilitate the transformation of students into good human beings.

Mission

- M1: Develop life-long learning skills that allow them to be adaptive and responsive to changes in society, technology and the environment, as well as career demands.

- M2: Promote a research activity through constant interaction with research organizations and industries.
- M3: Instigate our students to become responsible citizens and competent professionals with high ethical values.
- M4: Enable students to develop skills to solve complex technological problems of time and also provide a framework for promoting collaborative and multidisciplinary activities.

ELECTRICAL & ELECTRONICS ENGINEERING

DEPARTMENT PROFILE

The department of Electrical and Electronics Engineering was established in the year 2001-2002 and affiliated to ANNA UNIVERSITY, Chennai. The department shares the mission and vision of the institution, in imparting the high-quality education to the students. It offers B. E (EEE), M. E (Power Electronics & Drives) accredited by NBA, NAAC with A Grade by the highly qualified, committed and research-oriented faculty members. The department has a very close interaction with many leading research-oriented industries.

The main objective of the department is to provide industrial environment to the learners with help of spacious and well-equipped laboratories. The department offers various seminars, workshops, symposium, entrepreneurship development and IEEE Chapter programmes for the students to help them keep pace with the rapid changes and future technologies in the field of Electrical Engineering and Technology.

Vision

To infuse technical competencies of Electrical and Electronics Engineering and provide research ambience with values.

Mission

- M1: To impart quality education and training in Electrical and Electronics Engineering with an overall background suitable for making a successful Engineer in industry and research or higher education.
- M2: To develop life-long learning skills that allows them to be adaptive and responsive to changes in society, technology and the environment, as well as career demands.
- M3: To provide an accredited dynamic scholarly environment wherein students learn to develop communications and leadership abilities to blossom as a professional.
- M4: To ensure that every graduate is aware of the roles and responsibilities of the professional engineer in society through exposure to ethics, equity, safety and health considerations.

Time	Event	Speaker/Responsibility
10:00 am	Tamizhthaai Vaazhthu	
10:05 am	Lighting of Kuthuvilakku	
10:10 am	Welcome Address	Dr. M. Parameswari
10:25 am	Release of Proceeding Hard Copy Received by	Dignitaries
		Dr. S. S. Karthikeyan
10:30 am	Felicitation Address	Principal
10:45 am	Introduction to Chief Guest	Mr. T. Boopathy
11:00 am	Inaugural Address	Dr. S. S. Karthikeyan
11:10 am	TEA BREAK	
11:30 am	Invited Talk	Dr. S. S. Karthikeyan
12:00 Noon	Paper Presentation (Venue: College Premises)	
01:00 pm	LUNCH BREAK	
03:55 pm	Valediction	
04:25 pm	Vote of Thanks	Mrs. S. Sasikala
04:30 pm	National Anthem	By Students

SCOPE OF ICIRIST 2025

Objectives:

The aim of the *International Conference on Innovations in Research and Intelligent Systems Technologies (ICIRIST 2025)* is to provide a dynamic platform for emerging researchers, academicians, and industry professionals to disseminate their latest innovations and research outcomes in the fields of intelligent systems, electronics, communication, and allied technologies. The conference also seeks to underscore the practical applications of these technologies in addressing contemporary challenges across various domains.

Benefits for Faculty/Students:

Faculty members and students will gain immense benefits from the sessions and interactions facilitated during the conference. Expert keynote speakers and invited talks from leading professionals will offer participants a deep insight into recent trends, research methodologies, and innovations. The event provides an ideal environment to foster intellectual discussions, strengthen technical acumen, and inspire collaborative efforts across diverse specializations.

Expected Outcome:

ICIRIST 2025 is expected to bring together participants from various institutions across the nation and internationally, fostering a global community of innovation and research. It aims to establish expert networks for collaboration and knowledge sharing, encouraging a multidisciplinary approach to solving real-world problems. Participants will be empowered to exchange their best research practices and form lasting professional connections that extend beyond the conference.

CONTENTS

1. POWER QUALITY CORRECTION IN ELECTRIC VEHICLE CHARGING STATION USING GRID CONNECTED SOLAR PV SYSTEM

Mrs. R. Megaladevi. A. P/EEE

M. A. M College of Engineering,

ABSTRACT:

Currently, the world moving towards to electric vehicles (EV) owing to the environmental hazards in fossil fuels. The EV are influence on the battery operation that is energized by power-generating units. PV-connected EV charging is an emerging technology due to the reduction of cost and emissions. Power quality (PQ) is an important consideration in grid-connected charging stations. However, the non- linear nature of EV chargers introduces harmonics into the system, also efficiency improves and is more stable in the dynamic stage in case of a direct connected DC storage supply in place of AC from the grid directly. . . In order to meet the power requirement from the EV, the maximum power point tracking (MPPT) controllers are adopted with the SPV. The integration of EV chargers with the SPV and grid has brought some impacts on the system such as an increment in reactive power and power losses. Due to these impacts, the power system stability will be reduced, it also affects the power flow to the EV system. Which controllers control. The unidirectional and bi-directional converters have played a crucial role in delivering power to the EV, although it depends upon which topology we used to connect power to EV. Furthermore, the integration of EV in the distribution system injects the harmonics in the system hence, the power quality (PQ) gets reduced. The impacts of improper battery scheduling, unbalanced power flow and lower system stability affect the PQ of the system. On the other hand, reactive power compensation is an important area for improving the power flow as well as PQ in the grid-connected system. By concerning all these factors, this paper has proposed different approaches to adopt with the different system conditions. This paper will bring an effective way to enhance power generation and an optimum solution to feed the EV based on its requirement. Keywords: Electric Vehicle, EV Charging Station, EV Charger, Smart Grid, Photovoltaic, Grid, Power Quality.

2. HIGH THROUGHPUT BILINEAR PAIRING PROCESSOR SERVER-SIDE FPGA APPLICATION

A. Archana, S. Anitha, Dr. A. Nallathambi

Abstract

Accelerating cryptographic pairing processes on field-programmable gate arrays (FPGAs) for server-side applications is the main goal of this study. Prior research on FPGA pairing implementations concentrated on embedded devices' area efficiency, aiming to maximize performance while using the fewest possible circuit resources. For server-side applications, where optimal performance is the main goal once FPGA resources are depleted, these topologies are probably inefficient. Their low operation frequency and low digital signal processor (DSP) use make their architectures inefficient. In this work, we fully use DSPs by proposing high-throughput paired processor architecture for server-side FPGAs. First, we provide a server-side FPGA-compatible loop-unrolled modular multiplication method. When compared to algorithms from earlier research, the algorithm exhibits the highest throughput and area efficiency. Second, by incorporating the suggested modular multiplier into a pairing processor architecture, we are able to maintain its high throughput by allowing for interleaved executions and redundant adders. The results of our study of the BN254 and BLS12_381 pairs on the suggested processor architecture demonstrate that it achieves a good throughput that is roughly two and five times quicker than that of earlier research, respectively.

3. ELECTRIC VEHICLE AI-POWERED PREDICTIVE MAINTENANCE IN BATTERY MANAGEMENT SYSTEM

Mr. R. Ramanathan, Dr. K. Pandiyarajan,

Mount Zion College of Engineering and Technology,

Abstract:

The rapid adoption of electric vehicles (EVs) has driven the need for advanced systems to enhance vehicle performance, safety, and longevity. Battery management systems (BMS) are integral to ensuring the efficient operation of EV batteries, yet their reliability is often challenged by wear and environmental conditions. This paper explores the application of AI-powered predictive maintenance in BMS, aiming to proactively identify and mitigate potential issues before they impact vehicle performance. By leveraging machine learning (ML) algorithms, real-time data analytics, and historical performance patterns, this approach offers a proactive maintenance strategy. Predictive maintenance models use data from various vehicle sensors to forecast battery health, detect degradation, and predict failures, thus optimizing battery lifespan and reducing operational costs. The integration of AI enhances decision-making processes, enabling better resource allocation and minimizing downtime. The proposed model not only improves battery performance but also contributes to the overall sustainability and efficiency of EV operations. This study presents an innovative methodology for intelligent maintenance within the electric vehicle industry, highlighting its potential to revolutionize EV maintenance practices and extend the operational lifespan of batteries.

4. ANOMALY DETECTION IN POWER ELECTRONICS-DOMINATED GRIDS

Mr. R. Ramanathan, Dr. K. Pandiyarajan
Mount Zion College of Engineering and Technology

ABSTRACT:
As power electronics play an increasingly critical role in modern power grids, their integration introduces new challenges in grid operation and stability. Power electronics-based systems, such as inverters, converters, and battery storage units, often replace traditional electromechanical components, which results in different failure modes and dynamic behaviors. This paper proposes an advanced anomaly detection framework tailored for power electronics-dominated grids. By leveraging machine learning (ML) and digital twin technologies, the system can detect abnormal operating conditions in real-time by analyzing both historical and real-time data from grid components. The proposed method focuses on identifying patterns and deviations in power flow, voltage regulation, and device-specific parameters that may indicate system malfunctions or impending failures. A key feature of this approach is its ability to learn from the normal operating behavior of the system and detect subtle anomalies without the need for predefined failure models. Experimental results demonstrate that the model can accurately identify faults, predict potential failures, and enhance grid reliability by enabling proactive maintenance and fault mitigation. The framework's scalability ensures it can be applied to a wide range of grid configurations, from small microgrids to large-scale national grids. This paper highlights the critical need for robust anomaly detection in the evolving landscape of power electronics-based grids, which is essential for improving grid resilience, security, and operational efficiency.

5. IOT-BASED SOLDIER SAFETY ENHANCING SYSTEM USING LORA TECHNOLOGY

Rajeshkanna P, Abinesh B, Vishnupriyan K
Periyar Maniammai Institute of Science and Technology

ABSTRACT:
In modern warfare, the safety of soldiers is a critical concern, and the development of systems that can enhance their safety is essential. This paper presents an Internet of Things (IoT)-based soldier safety-enhancing system using LoRa (Long Range) technology, which integrates multiple sensors to monitor and transmit vital health and location data in real time. The system incorporates various sensors, including a GPS for location tracking, an ADXL sensor for monitoring the soldier's movements and detecting falls, a thermistor for measuring body temperature, and pulse rate sensors for tracking heart rate. The data collected from these sensors is wirelessly transmitted via LoRa technology, ensuring long-range and low-power communication. The system is also integrated with a PC or laptop keyboard interface for easy configuration and monitoring. The proposed system aims to provide timely alerts and information to commanders or medical teams in the event of distress, abnormal health conditions, or location-specific emergencies. This system enhances soldier safety by enabling proactive response actions based on real-time data, ensuring better situational awareness, and potentially saving lives in critical situations.

6. HIGH GAIN BIDIRECTIONAL CONVERTER TO ENHANCE EFFICIENCY AND SUSTAINABILITY IN ELECTRIC VEHICLES

Abimani. M, Hassan Khan. S, Rohith. T, Hassan Khan

Periyar Maniammai Institute Of Science & Technology

ABSTRACT:

High gain bidirectional converter designed to enhance the efficiency and performance of battery charging and discharging processes in electric vehicles (EVs). The proposed converter integrates bidirectional DC-DC conversion capabilities with advanced PID controllers to regulate the reference currents for battery charging and discharging. Through extensive simulation studies, the converter's effectiveness in managing state-of-charge, battery current, voltage, and power characteristics is demonstrated. The project presents comprehensive results showcasing the converter's ability to accurately control the charging and discharging currents, ensuring optimal battery operation and prolonged lifespan. Additionally, the converter facilitates precise power calculation, enabling efficient utilization of energy from the source battery and seamless delivery to the vehicle load. This innovative solution promises significant advancements in EV power management systems, paving the way for enhanced performance, reliability, and sustainability in electric transportation.

Keywords: DC-DC bidirectional converter, Battery charging, Battery discharging, PID controller, Electric vehicles, State-of-charge, Power calculation, Energy efficiency.

7. 'T' Slot Microstrip Patch Antenna Performance for a Realistic Wireless Local Area Network (WLAN) Application

Seenivasan M, Dr. M. Paranthaman, Ph. D, Mrs. K. Yazhini, M. E, (Ph. D),
Kongunadu College of Engineering and Technology (Autonomous)

ABSTRACT:

A T-slot microstrip patch antenna designed for Wireless Local Area Network (WLAN) applications is examined in this research. By contrasting the T-slot design with conventional microstrip antennas, the study assesses important factors such as return loss, bandwidth, radiation patterns, gain, and efficiency. The findings demonstrate that the T-slot design is appropriate for WLAN frequency bands such as 2. 4 GHz, since it increases bandwidth and improves impedance matching. These results demonstrate how T-slot antennas can optimize WLAN performance and offer small and effective solutions for contemporary wireless communication.

Keywords: T-slot Microstrip Patch Antenna, CST suite, WLAN Application, Transmission Line, Antenna Design.

8. REAL-TIME ATTENDANCE TRACKING SYSTEM USING ESP32-AI CAM AND IOT

Vijayabalaji M, Dr. M. Dharmalingam,
Kongunadu College of Engineering and Technology (Autonomous)

ABSTRACT:

The integration of artificial intelligence (AI) has reshaped numerous industries, and attendance management is no exception. A significant advancement in this area is the use of AI-powered cameras, such as the ESP32-CAM, which leverage facial recognition technology to automate attendance tracking. This system captures images of attendees, identifies their faces, and compares them with pre-stored data. Once a match is detected, it logs the individual's name and check-in time to ensure accurate record-keeping. These attendance records can then be stored in a real-time database, uploaded to a cloud server, or saved locally on an SD card for easy access. This research explores the hardware, software, and practical implementation of the ESP32-CAM-based attendance system, emphasizing its scalability and potential upgrades, including cloud storage integration, instant notifications, and automated report generation. Designed to be cost-effective and efficient, this solution offers a modern and reliable alternative to traditional attendance tracking methods across various industries.

Keywords:

- Enhanced automation for attendance tracking, reducing the need for manual supervision and minimizing human effort
- Higher accuracy compared to traditional methods like card scanning or manual roll calls, ensuring precise record-keeping
- Scalable for various environments, making it suitable for workplaces, educational institutions, and other organizational settings

9. IOT-BASED ONLINE TRANSFORMER MONITORING

Annie Femila. L, M. Anbarasu, R. Aswin Dr. G. Malathi, Dr. A. Senthilkumar

ABSTRACT

Accurate load forecasting is essential for the robust operation and planning of smart power systems. With the rapid increase in population and expansion of energy infrastructure, the demand for electricity continues to grow. In modern industries, computers and microcontrollers play a vital role in minimizing human error and increasing productivity.

This project focuses on monitoring the parameters of a substation transformer using a microcontroller and Internet of Things (IoT) technology, allowing for automated control under abnormal conditions. Various electrical parameters of the transformer are monitored using dedicated sensors: voltage and current are sensed by potential and current transformers respectively, temperature is monitored using a temperature sensor, and the condition of silica gel is detected using a color sensor.

These analog signals are converted into digital data via an ADC (Analog-to-Digital Converter) and are fed to the microcontroller. Additionally, the oil level in the transformer is monitored. If any of the measured values exceed their threshold levels, the system updates the data to a cloud server via an IoT module. Based on this data, the transformer load can be managed and controlled remotely through the cloud, enhancing the safety and efficiency of power system operations.

10. Intelligent Energy Meter

J. Mohamed Basith S. Basith Kumar M. Ganesh Kumar Dr. A. Senthilkumar, Dr. G. Malathi,

M. A. M. School of Engineering (Autonomous)

ABSTRACT

This paper presents an IoT-based smart energy meter designed to automatically track the energy consumption of residential loads. The system is capable of sending consumption data to both the consumer and the electricity supplier. Readings are taken using the HLW8012 energy metering sensor, and the total bill is calculated over a selected time interval using the ESP32 microcontroller.

The calculated bill is then updated to the user's smartphone through an IoT network. This eliminates the need for manual meter reading and data entry, streamlining the billing process. Users can monitor the number of energy units consumed at any time using their mobile device.

In the future, this concept can be extended to implement prepaid metering, which could significantly improve the revenue collection of electricity distribution companies. The ESP32 microcontroller is used for its built-in Wi-Fi and Bluetooth capabilities, making it ideal for IoT-based applications. The system uses the Virtuino Android app as the cloud platform interface, displaying real-time data such as voltage, current, power, and energy units consumed directly on the user's mobile screen.

11. IoT-Based Smart Garbage Monitoring System

Jenny. M, Dr. Senthilkumar. A, Susmitha. K, Vignesh. M, Sivaprakash. S

M. A. M. School of Engineering (Autonomous)

ABSTRACT

One of the major problems the world is facing today is waste management. Most of the time, it is observed that waste spills over the bins and accumulates nearby. This leads to the spread of deadly diseases in the surrounding environment. It also creates inconvenience for people passing by. These issues arise mainly due to a lack of coordination and communication among the garbage management teams.

Studies have revealed that waste management can be more efficient if garbage is segregated at the source and disposed of separately in designated dumping grounds. Considering these issues, this paper proposes a system aimed at significantly reducing these problems.

The system segregates the waste initially and then monitors the garbage level in bins using IoT. The data related to bin levels is transmitted to a server via the Internet, where real-time data is processed and alerts are raised for timely waste collection. The proposed system also supports long-term goals such as identifying patterns of waste generation in various localities. The data collected can be used to plan and implement more effective waste management strategies, ultimately contributing to a cleaner environment.

12. POWER GRID FAILURE DETECTION USING IOT

Gayathri. S, Jenny. M, Dr. Senthilkumar. A, Balamurugan. B, Govintha Prakash. V, Sivanesan. S, Dhanabalan. B

M. A. M. School of Engineering (Autonomous)

ABSTRACT

Power grid reliability is crucial for ensuring the smooth functioning of modern infrastructure. Unexpected power grid failures can lead to widespread disruptions, economic losses, and safety hazards. This project proposes a robust solution for real-time power grid failure detection by monitoring voltage and frequency variations using Internet of Things (IoT) technology.

The system consists of voltage and frequency sensors connected to an Arduino microcontroller that continuously monitors the grid's electrical parameters. Any significant deviation from predefined voltage or frequency thresholds indicates potential faults such as overvoltage, undervoltage, frequency instability, or complete grid failure.

The Arduino processes this data and, through IoT-based communication, sends real-time alerts to stakeholders. In normal operation, the system functions with a voltage of 230V and a frequency of 50Hz. When the voltage or frequency is varied using a potentiometer, the Arduino Uno detects under/over voltage or high/low frequency. The condition is then displayed on an LCD, and the relay responds by opening the switch, which turns off the connected bulb or LED, effectively simulating a fault response.

13. A Household of Coupled Inductor Voltage- Multiplying Boost Converter

R. Ravichandaran, M. Jenny, Dr. A. Senthilkumar, S. Nandhakumar, R. Nivetha, G. Sathish

M. A. M. School of Engineering (Autonomous)

Abstract:

With the increasing maturity of new energy power generation technology, the need of boost link in the system are also acquiring higher and higher. Here in this work, a new coupling inductor voltage multiplier is projected, series it with several boost converters, which can get a family of coupled inductor voltage-multiplying boost converters. The voltage gain is significantly improved, the voltage stress of the device is also significantly reduced, and the leakage inductance generated by the coupling inductor can be absorbed, which can restrain the voltage spike of power switch, reduce electromagnetic interference (EMI). This project analyzes the working principle, steady-state characteristics, parasitic resistance, system stability and other aspects of the converter in detail. Finally, taking one of the converter topologies as an example, its good performance is verified by the experimental results based on a 100W experiment prototype.

14. COST EFFECTIVE SOLAR BASED TRIKE ELECTRIC HOVER SCOOTER

MANOJ KUMAR. M, DHARUN SHARMA. P, ABIRATHNAM. B

Abstract

The project focuses on developing an innovative, eco-friendly, and affordable personal transportation solution. The increasing demand for sustainable mobility options due to rising environmental concerns has led to the exploration of renewable energy-powered vehicles. This project addresses the challenge by combining solar energy with efficient electric drive traintechnology to create a versatile hover scooter capable of meeting modern transportation needs. The proposed vehicle integrates a solar panel system to harness renewable energy, reducing dependency on grid power and enhancing perational cost efficiency. The trike design ensures stability and comfort, making it accessible to a wide range of users, including those with limited mobility. Advanced energy management systems are incorporated to optimize battery usage, while lightweight materials ensure portability and performance. This hover scooter is equipped with a compact yet powerful motor, providing sufficient torque and speed for urban commuting. Features like regenerative braking and a user-friendly control interface add to the vehicle's efficiency and ease of use. The design prioritizes affordability without compromising functionality, ensuring it remains a viable option for a broader demographic. By leveraging solar energy and innovative engineering, the Solar-Based Trike Electric Hover Scooter contributes to reducing greenhouse gas emissions, promoting renewable energy utilization, and providing a practical solution for personal transportation in both urban and semi-urban areas. This project holds the potential to revolutionize last-mile connectivity and set a benchmark in sustainable transportation.

KEYWORDS: Solar Energy, Electric Scooter, Trike Design, Renewable energy

15. Arduino-Based Upper Limb Prosthetic Wrist for Wrist Amputees

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Periyar Maniammai Institute of Science and Technology

Abstract

This paper presents the design and development of an advanced multi-fingered prosthetic hand with enhanced grasping capabilities. While existing prosthetic solutions provide basic functionality, they often lack the dexterity and adaptability needed for complex object manipulation. Our design focuses on improving mechanical performance through optimized finger kinematics, lightweight materials, and efficient actuation systems. The prototype incorporates five independently movable fingers capable of conforming to various object shapes, enabling more natural and secure grasps. Key design considerations include range of motion, grip strength, and durability. Preliminary tests demonstrate the hand's ability to perform fundamental grasping patterns with improved stability compared to conventional prosthetics. By addressing limitations in current prosthetic technology, this work contributes to the development of more functional and accessible assistive devices. The proposed design offers a cost-effective solution with potential for further enhancements in control systems and sensory feedback integration. Future research will focus on refining the actuation mechanism and implementing user-friendly control interfaces.

Keywords: Prosthetic hand, adaptive grasp, multi-fingered design, assistive technology, bio mechatronics.

16. Intelligent Multi-Port Converters for Enhanced Power Supervision System

John De Britto C

Saveetha Engineering College

Abstract-

This research proposal summarizes power electronics technology, its important role in empowering renewable energy systems for climate mitigation, and why enhancing power efficiency, reducing unwanted emissions, and compatibility in grids with various renewable energy sources place power electronics central to sustainable energy solutions. Its central theme ought to be centered on the core design considerations, merits, and demerits of various power converters.

The principal performance parameters include efficiency, reliability, conformity to grid standards, control measures, and environmental concerns. Efficiency is extremely important as the operating characteristics of power converters under differing conditions impact the overall economy of a renewable power system. The converters should also comply with all the grid laws to transfer quality power with all the specifications in place. Reliability is also critical in the sense that a down time in a power electronic system can lead to interruptions in the supply of power, which can be very costly to the economy. PEDG research provides a broad spectrum of viewpoints, particularly when coupled with ML-based methods which are among the most innovative sources. Therefore, in this paper, we suggest a future-oriented roadmap of ML uses in PEDG, now at the frontier advancements in this regard.

A dual port multi-port converter with a single AC and two DC ports can provide the flexibility to accommodate any number of DC and AC sources of power depending on the application needs. Depending on the requirements of the application, it can be configured as a DC-DC converter, DC-AC inverter, or any combinations of DC-DC/AC converter. The paper is an explanation of the general design idea, steady-state voltage analysis, and flexible mode of operation of such converters. Power electronics can efficiently integrate renewable energy into the power grid with less emission and improved grid integration.

Major hurdles in the development of such a versatile converter which can operate in various modes are reliability, grid code compliance, and compatibility. Future development in the domain will depend upon machine learning.

17. AI-Power Precision Brain Tumor Detection and Segmentation using Deep Learning Techniques

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ABSTRACT

Brain tumors have remained one of the most daunting challenges facing neurological health, and timeous and accurate diagnosis is perfectly aligned to effective treatment and better prognosis. Conventional diagnostic techniques usually hinge upon a radiologist manually evaluating an instrumental MRI scan; a labor-intensive, subjective, and error-prone procedure. To counter this, the project introduces a deep learning approach based on U-Net architecture for automatic brain tumor detection and segmentation. By training the model on a labeled dataset of MRI images to distinguish between Tumor and No Tumor categories, the system learns to identify key features and draw accurate tumor boundaries and thereby improve reliability and efficiency of diagnosis. Data preprocessing techniques, including normalization, contrast enhancement, and augmentation, improve the model's generalization capability. Segmentation methods developed in this research makes use of a deep neural network architecture modelled on U-Net, a classical method that has proven to be successful in analyzing medical image data. This model displayed more accurate results than thresholding and manual segmentation in localizing tumor spaces. In order to expand its usability scope, the applications have been used on a web-based platform built with Flask. The application interface allows users to upload MRI images and immediately get analysis results from it. The design is really focusing on the clinical end users and providing such easy access for users to have an AI-assisted analysis into their routine practices. This way of advanced neural networks for detecting different kinds of abnormalities in brain scans will favor quick medical care, improve diagnostic reliability, and thus help better patient outcomes.

Index Terms **-** Tumor Classification, Segmentation, MRI, Deep Learning, U-Net, Early Diagnosis.

18. A Novel Approach for Breast Cancer Detection using Residual Attention-based Convolutional Neural Network with Parametric Rectified Linear Unit

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K Ramakrishnan College of Technology

Abstract

Background: In recent years, breast cancer has been one of the leading causes of mortality worldwide, and it affects numerous individuals. Moreover, it is necessary to detect breast cancer accurately and quickly by examining medical data. Proposed Method: This paper proposed a Residual Attention-based Convolutional Neural Network (CNN) with Parametric Rectified Linear Unit (PReLU) for breast cancer detection to enhance the detection accuracy. Methodology: The normalization and data sampling are utilized for data preprocessing, and a fully connected CNN is used for the segmentation process. Then, the shape, color, spatial, and ResNet-50-based feature extractions are utilized. Hybrid Grey Wolf and Sunflower Optimization (HGWSFO) is applied for hyperparameter optimization. At last, the Residual Attention-based CNN with PReLU is used for classification. Results: This model attains better results on the DBT mammography image dataset by utilizing performance metrics like accuracy, precision, recall, specificity, F1-score, and AUC values of about 0. 983, 0. 971, 0. 976, 0. 978, 0. 963, and 0. 967, respectively. Conclusion: This model ensures early and accurate detection of breast cancer compared with existing techniques like ResNet50, BSNet, and Graph Convolutional Neural Network (GCNN). It overcomes the neurons' dead issues by allowing negative values for some neurons and minimizing the probability of inactive neurons.

Keywords: Convolutional Neural Network, Mammography Images, Parametric Rectified Linear Unit, Residual Attention Module, Hybrid Grey Wolf, and Sunflower Optimization. **Additional Keywords** — Breast cancer, Breast anatomy & Breast cancer types, medical imaging modalities, Deep-learning, convolutional neural network, Transfer-learning.

19. Compact Metamaterial Based Antenna for 5G Applications

M. Noorjahan[1], B. Deepika[2], M. Anisha[3], N. Gayathri

Dhanalakshmi Srinivasan Engineering College, (Autonomous),

Abstract:

This research paper presents the design and analysis of a compact antenna used for 5G applications using complementary split-ring resonator (CSRR) metamaterials. The antenna design uses FR4 epoxy substrate. Initially, a rectangular patch antenna with dimensions of 7. 5 mm × 5. 7 mm was designed, which exhibited resonance at 12 GHz. Subsequently, optimizations were made to the patch design, resulting in resonance at 5. 88 GHz. Next, complementary split-ring resonator (CSRR) metamaterial was designed and integrated into the ground plane of the antenna. Following the introduction of the CSRR, the resonant frequency of the antenna was further reduced to 3. 5 GHz. The simulated results show that the antenna has a compact size of 12 × 12 × 1 mm^3 and operates at a frequency of 3. 5 GHz with a bandwidth of 200 MHz, a return loss of -20. 41 dB, and a gain of -3. 7 dBi. The compactness achieved from its usual size was up to 92% after redesigning the patch and introducing the CSRR metamaterial. In conclusion, the proposed antenna design offers a compact and efficient solution for 5G communication systems using CSRR metamaterials. The results of this study can be used for the development of low-cost, compact, and high-performance 5G antennas for various applications in the future.

Keywords: Compact Antenna, Metamaterials, CSRR, 5G Applications, Frequency Resonance, Return Loss, Gain.

20. DESIGN AND PERFORMANCE ANALYSIS OF RECONFIGURABLE ANTENNA IN WBAN Applications

M. Noorjahan, K. Sarathy, L. Manikandan, S. Srikanth, T. Sanjay

Dhanalakshmi Srinivasan Engineering College, (Autonomous)

Abstract:

The paper proposes the design of a reconfigurable antenna and its implementation for Wireless Body Area Network (WBAN) applications. Reconfigurable antennas reconfigure to resonate at multiple frequencies to provide support to a variety of functions. Such antennas provide remarkable benefits, such as reliability and compact design. Properties such as polarization, radiation pattern, and frequency are altered in such antennas as per changing ecological conditions or fluctuating system requirements in a restricted manner, making them best suited for usage in WBAN applications. A reconfigurable microstrip patch antenna operating at two frequencies is designed in this paper. The concept of switching the lumping element, i. e., pin diode between ON and OFF state, to save energy and reduce power consumption is introduced in the antenna. The proposed antenna incorporates advantages like multifunctional operation of the microstrip patch antenna and symmetry of radiation pattern on reconfiguring it at the two frequencies in ON and OFF state. The performance of the antenna is assessed based on S11 and the gain of the antenna for ISM and UWB in ON and OFF states. The desired resonant frequency in ON state is 2. 45 GHz (ISM band), achieved with a return loss of -20 dB, and for OFF state, it is at 4. 8 GHz, which lies in the safe Ultra-Wide Band (UWB) range and is achieved with a return loss of -14 dB. The gain obtained in ON state is 5. 203 dB, and in OFF state is 3. 679 dB.

Keywords: Reconfigurable Antenna, WBAN Applications, Microstrip Patch Antenna, ISM Band, UWB, Energy Efficiency, Return Loss, Gain.

21. INTEGRATED HELMET COMPLIANCE AND ALCOHOL DETECTION WITH IGNITION Control for Two-Wheeler

T. Boopathy, C. Yuvaraj, G. M. Sivaparthasarathy, R. Dishor Immanuvel, G. Vignesh
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Abstract:

Motorcycle accidents are a leading cause of road fatalities, with Tamil Nadu recording 8, 113 two-wheeler accident deaths in 2023, accounting for approximately 44. 22% of total road fatalities. Notably, 29. 90% of these deaths were due to riders not wearing helmets. Many of these accidents are linked to driving under the influence of alcohol and excessive speeding. Addressing these critical issues, this project proposes a dual-layered alcohol detection and ignition control system integrated with speed regulation features. In the first layer, an MQ-3 alcohol sensor, coupled with an STM32F103C6T6 microcontroller and an ESP32 module for connectivity, evaluates the rider's Blood Alcohol Concentration (BAC) by converting sensor analog signals into digital data. If the BAC exceeds a preset threshold, the microcontroller disables the motorcycle's ignition, ensuring intoxicated individuals cannot start the vehicle. The second layer enhances safety during motion by embedding another MQ-3 sensor in the rider's helmet. Connected to a separate ESP32 module, this sensor continuously monitors the rider's BAC. If elevated BAC levels are detected mid-ride, the system alerts the STM32, triggering an engine shutdown mechanism. Additionally, a GPS module tracks the vehicle's location, transmitting real-time alerts and location details via a GSM module to designated contacts in cases of high BAC detection. Further, the GPS module not only monitors the rider's location but also tracks the vehicle's speed. If the rider exceeds the speed limit in predefined slow-speed zones based on geolocation, the microcontroller automatically intervenes to limit the vehicle's speed. This integrated approach, combining alcohol detection, speed regulation, and real-time monitoring, offers a practical and scalable solution to mitigate road accidents, particularly those caused by driving under the influence and reckless driving. By leveraging affordable and efficient technologies, this system aligns with the vision of creating safer roads and reducing the prevalence of DUI-related incidents.

22. SMART SOLUTIONS FOR EARLY GAS LEAK DETECTION AND PREVENTION

R. Gayathri[1], Praveen M. V[2], Mohammed Faisal S[3], Sabariselvan T[4], Mohanan R[5]
Dhanalakshmi Srinivasan Engineering College (Autonomous), Perambalur, Tamil Nadu

Abstract:

Gas leaks are a significant safety concern in both residential and industrial settings, potentially leading to fires, explosions, health risks, and even fatalities. Undetected gas leaks can also result in property damage, environmental harm, and costly financial consequences. Given these risks, the development of an efficient and reliable gas leak detection system is critical.

This project introduces a smart gas leak detection system that provides real-time monitoring and immediate alerts to ensure the safety of people and property. The system uses a gas sensor, such as the MQ-2, MQ-5, or MQ-135, to detect the presence of hazardous gases like methane, natural gas, and carbon monoxide. The sensor continuously monitors the environment and sends data to the system's microcontroller, such as the ESP8266 or ESP32. These microcontrollers process the sensor data and compare it to predefined safety thresholds.

When the gas concentration surpasses safe levels, the microcontroller activates the alert mechanism. The alert system consists of a buzzer that produces a loud sound to immediately warn users. Additionally, LED indicators—a red LED for danger and a green LED for safety—provide visual cues about the situation. This two-tier alert system ensures that users can quickly recognize the status of their environment.

Furthermore, the system integrates with an IoT platform like Blynk, enabling remote monitoring of gas levels. Users can receive real-time alerts on their smartphones, allowing them to take necessary action, even if they are not present at the location. Compact, cost-effective, and easy to install, this gas leak detection system offers a practical solution for improving safety. It can be deployed in homes, kitchens, factories, and other environments, enhancing overall protection against the dangers posed by gas leaks.

23. AN ADVANCED DEEP LEARNING FRAMEWORK FOR BRAIN TUMOR DETECTION USING MULTI-MODAL MRI, CNN-TRANSFORMER FUSION, AND AUTOMATED SEGMENTATION

Dinesh Kumar B, Arularasu A, Elamurugan E, Hemanath V

Abstract

Accurate detection and classification of brain tumors are vital for early diagnosis and treatment planning. This study presents a novel deep learning framework that combines Convolutional Neural Networks (CNNs), Vision Transformers (ViT), and DeepMed3D to perform multi-modal MRI-based tumor recognition. The proposed approach tackles three core tasks: tumor classification, segmentation, and MRI analysis. EfficientNetV2 is used for feature extraction and classification, while ViT enhances feature attention. Swin Transformer-based UNET is adopted for precise segmentation, achieving high accuracy in distinguishing tumor regions from normal tissues with a Dice Score of over 90%. For multi-modal MRI processing, DeepMed3D integrates T1, T2, and FLAIR sequences to ensure robust feature fusion and clinical applicability. The hybrid approach outperforms conventional models, achieving over 98% accuracy in classification and 90. 5% Dice Score in segmentation. By integrating CNN and Transformer architectures, the model demonstrates superior accuracy, generalization, and segmentation quality, establishing itself as a promising tool for brain tumor diagnosis using medical imaging.

24. LI-FI BASED COMMUNICATION SYSTEM SYSTEM

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ABSTRACT

With the growing demand for faster and more secure wireless communication, traditional Wi-Fi faces limitations such as limited bandwidth, electromagnetic interference, and potential security risks. To overcome these challenges, Li-Fi (Light Fidelity) has emerged as an innovative solution that uses visible light for data transmission. This technology offers significant benefits, including a wider bandwidth spectrum, minimal interference, and increased security due to its confined line-of-sight operation. This project presents a cost-effective, Arduino-based Li-Fi text communication system. It uses two LEDs on the transmitter side to represent binary '1' and '0', which are controlled by an Arduino that encodes the text input. On the receiver side, two LDRs detect the light signals, and another Arduino decodes the data and displays the message on an LCD. The simplicity of the circuit and components makes it ideal for experimentation and demonstrates Li-Fi's potential in secure, short-range communication scenarios.

KEY WORDS – Li-Fi, Light Communication, Arduino, LED, LDR, Wireless Communication.

25. DEEP LEARNING BASED OBJECT DETECTION FOR STREET LIGHT CONTROL WITH ENERGY MANAGEMENT AND FAULT DETECTION USING IOT

Mrs. M. Bhuvaneswari, R. Mukeshkrishna, B. Dhanasekar, S. Abishiek, T. Loganathan

Dhanalakshmi Srinivasan Engineering College (Autonomous),

Abstract

In the pursuit of safer and more sustainable urban environments, the correlation between city street lamps, safety, and energy conservation has become increasingly evident. To address existing challenges, this project proposes the implementation of a Smart Street Lamp (SSL) system, leveraging decentralized computing for smart city infrastructure. The envisioned SSL system integrates object detection capabilities with dynamic brightness adjustment, aiming to enhance both safety and energy efficiency across urban landscapes.

The core functionality of the proposed SSL system revolves around dynamic brightness adjustment, enabling adaptive illumination levels based on real-time conditions. By intelligently adjusting brightness levels, the SSL system optimizes energy usage while ensuring adequate lighting for pedestrians and motorists. Additionally, the system incorporates autonomous alarm features to detect and report abnormal states, such as light or camera faults, enhancing maintenance efficiency and overall system reliability.

Experimental evaluations of the proposed SSL system demonstrate its potential to significantly improve energy efficiency and mitigate safety risks. Through empirical testing, the system showcases its ability to reduce energy consumption without compromising on safety standards. Furthermore, the autonomous alarm capabilities prove instrumental in promptly identifying and addressing system malfunctions, thereby enhancing the overall reliability and effectiveness of urban lighting infrastructure. The proposed SSL system represents a promising advancement in the realm of smart city initiatives, offering tangible benefits in terms of safety enhancement, energy conservation, and operational efficiency. As cities continue to embrace digital transformation, the integration of decentralized computing and intelligent lighting solutions holds considerable promise for creating more livable and sustainable urban environments.

26. FIRE DETECTION SYSTEM USING ARDUINO

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Abstract

This project presents the design and implementation of a low-cost and efficient fire detection system using an Arduino microcontroller. The system utilizes flame and smoke sensors to detect the presence of fire and hazardous smoke levels in real-time. When fire or smoke is detected, the Arduino triggers an immediate alert through a buzzer and an LED indicator.

Additionally, the system can be enhanced to send notifications via SMS or IoT-based platforms for remote monitoring. The goal is to provide a simple yet reliable early warning system to help prevent fire-related accidents and property damage. The compact design and affordability make it suitable for homes, small offices, and industrial environments.

27. IOT BASED BUS IDENTIFICATION SYSTEM FOR BLIND AND DEAF

Ms. Parimala, M. Dheepika, M. Harini, I. G. Lakshitha, C. Diana
Dhanalakshmi Srinivasan Engineering College (Autonomous),

Abstract

The "IoT-Based Bus Identification System for Blind and Deaf" is an advanced solution developed to assist individuals with visual and auditory impairments in navigating public transportation. Utilizing Internet of Things (IoT) technology, the system provides real-time updates and notifications to enhance communication and mobility.

IoT sensors and communication devices installed on buses transmit crucial data to a centralized platform accessible through a dedicated mobile application. For visually impaired users, the app delivers audio cues and voice prompts regarding bus arrival times, routes, and stops. For hearing-impaired users, the interface incorporates visual alerts and vibration feedback to communicate the same information in an accessible format.

The primary goal of this system is to improve the accessibility, safety, and independence of individuals with sensory disabilities. By integrating tailored auditory and visual feedback through smartphones or wearable technology, users can confidently identify buses and travel independently. This innovation contributes to a more inclusive public transportation system and promotes equal access for all members of society.

28. SMART CROP PROTECTION SYSTEM USING IOT

A. Parimala, A. Avanthitha, P. Deepa, R. Dhanusri
Dhanalakshmi Srinivasan Engineering College (Autonomous)

Abstract

Farms often face crop damage due to intrusion by local animals such as buffaloes, cows, goats, and birds, resulting in significant losses for farmers. Continuous monitoring of farmlands is not feasible for farmers, and fencing large fields is costly. To address this, a smart crop protection system using IoT and Arduino is proposed.

This system integrates various sensors—IR sensor, LDR sensor, and ultrasonic sensor—to detect animal movement and environmental conditions. The ultrasonic sensor (HC-SR04) continuously measures the distance to detect obstacles, triggering a buzzer alert upon intrusion. The IR sensor detects nearby objects, while the LDR sensor identifies ambient light levels.

The system processes sensor inputs using an Arduino microcontroller and responds with outputs such as buzzer alarms, LED indicators, and GSM-based notifications to alert guardians or farmers remotely. The regulated power supply steps down 12V DC to 5V DC to power the system efficiently. This automation enhances farm protection, reduces human effort, and minimizes crop loss through timely alerts and deterrents.

29. REAL-TIME COAL MINE HEALTH AND SAFETY MONITORING USING LORAWAN

Mrs. S. Sasikala, N. Roja, E. Sanjeevini, K. Shanmathy, M. Sharmila
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Abstract

Coal mining environments are prone to hazardous conditions such as the presence of toxic gases, high temperatures, fire risks, and low humidity, which pose serious threats to the safety of miners. This project presents an IoT-based **Coal Mine Health and Safety Monitoring System** utilizing **LoRaWAN (Long Range Wide Area Network)** technology to enable real-time and long-distance data transmission from underground mining sites.

The system is built around the **Arduino UNO (ATmega328P)** microcontroller and incorporates multiple sensors—**gas sensor**, **temperature sensor**, **fire sensor**, and **moisture sensor**—to continuously monitor key environmental conditions. Sensor data is displayed locally on an LCD screen and simultaneously transmitted wirelessly via LoRaWAN to a central monitoring unit for remote observation.

A buzzer alert system is also included to provide immediate warnings in the event of abnormal readings, facilitating quick response to potential dangers. The LoRaWAN module enables **low-power, long-range communication**, making the system suitable for deep and remote mining operations. This solution is a cost-effective, energy-efficient, and scalable approach to improving safety and hazard management in coal mines.

30. Fast Image Edge Detection Using Hybrid Ripple-Carry Adder

Dr. P. Rajeswari, M. Nitheeshwari, G. Sneha, K. Varsha
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Abstract

This project presents the design and implementation of a **32-bit Ripple-Ling Hybrid Carry Adder (RHCA)** for edge detection in image processing applications. Traditional edge detection techniques often rely on matrix multiplication and addition, which are computationally expensive and time-consuming.

To improve performance, this work integrates a custom-designed hybrid adder that replaces conventional adders in the matrix operation stage, thereby optimizing the overall computational speed and efficiency. The **RHCA** merges the features of both ripple-carry and look-ahead carry adder techniques, achieving a balance between high-speed processing and efficient hardware utilization.

The hybrid adder is developed using **Verilog HDL**, simulated with **ModelSim**, and synthesized using **Xilinx** tools for hardware deployment. Results indicate that the proposed RHCA improves arithmetic computation speed, which significantly accelerates edge detection processes in digital image processing systems.

This approach emphasizes the potential of using optimized arithmetic units to enhance real-time image processing applications, especially where performance and power consumption are critical.

31. ENHANCED LUNG CANCER DETECTION USING HYBRID GORILLA TROOPS OPTIMIZATION AND DEEP CAPSULE NETWORKS

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Abstract

Lung cancer remains one of the most common and fatal cancers globally, making early and precise detection crucial for improving survival rates. Traditional diagnostic methods often lack the accuracy and speed necessary for effective early detection, emphasizing the need for advanced computational solutions. This study proposes an enhanced framework for lung cancer detection by integrating **Deep Capsule Networks (DCN)** with **Hybrid Gorilla Troops Optimization (HGTO)**. The **HGTO** algorithm, inspired by the social intelligence and adaptive behavior of gorillas, is utilized to optimize key parameters and improve feature selection, thereby enhancing the learning model's precision and effectiveness. Meanwhile, **Deep Capsule Networks** are employed for their superior ability to preserve part-to-whole relationships and spatial hierarchies, particularly in complex medical imaging tasks such as analyzing lung tissues. The combination of HGTO and DCN significantly reduces false positives and false negatives, improving the accuracy, precision, and robustness of lung cancer diagnosis. Experimental results on benchmark lung cancer datasets demonstrate that the proposed hybrid model outperforms conventional **Convolutional Neural Networks (CNNs)** and other metaheuristic techniques in terms of diagnostic performance. This research highlights the potential of bio-inspired algorithms and deep learning architectures to revolutionize healthcare, offering more accurate, timely, and efficient methods for lung cancer detection.

32. PERFORMANCE ANALYSIS OF A HEXAGONAL SHAPED WEARABLE PATCH ANTENNA FOR DEFENSE APPLICATIONS

Pradeep K, Mohammed Javith A, Muthuselvan, Praveen Kumar S.

Abstract

This paper presents the design and performance analysis of a compact, dual-band, wearable hexagonal-shaped patch antenna specifically tailored for defense applications. The unique design features two hexagonal shapes separated by a gap and connected to form a cohesive unit, enabling dual-band functionality. The antenna is constructed using both a rigid FR4-Epoxy substrate and a flexible leather substrate, which contributes to its compact and adaptable structure, making it ideal for wearable devices in limited spaces.

The antenna resonates at two key frequencies, 2. 45 GHz and 5. 64 GHz, with bandwidths of 360 MHz and 370 MHz, respectively. The compact dimensions of 45mm x 15mm x 1mm for the 2. 45 GHz band make it particularly suitable for wearable applications. Notable gain measurements of 4. 04 dB at 2. 45 GHz and 5. 02 dB at 5. 64 GHz, along with maximum efficiency exceeding 95% at both frequencies, highlight the antenna's efficient radiation patterns.

For comparison, a non-flexible version of the antenna resonates at 2. 4 GHz and 5 GHz, with bandwidths of 350 MHz and similar high efficiency. Specific Absorption Rate (SAR) analysis confirms that the antenna complies with the standards set by the FCC and ICNIRP, ensuring its safety for wearable use.

Due to its low-profile structure, compact design, and reliable performance, this antenna is an excellent candidate for various wearable communication and high-data-rate applications, including those in the ISM band and WBAN (Wireless Body Area Network). Its dual-band functionality enables it to serve a broad range of use cases in defense and health-monitoring wearable devices. This work demonstrates the potential of wearable antennas in next-generation wearable technologies, especially in the fields of defense and communication.

33. VLSI IMPLEMENTATION OF AES IP CORE FOR SECURE DATA TRANSMISSION

ABINAYA. K, JUNO SHERIBA. L, LINCY JOSEPHINA. A, Mrs. S. Sasikala,

Dhanalakshmi Srinivasan Engineering College (Autonomous),

Abstract

This project focuses on the area-efficient design of the Advanced Encryption Standard (AES), specifically tailored for image cryptography and intended for field-programmable gate array (FPGA) implementations. The primary goal is to optimize key components, particularly the Sub Bytes and Mix Columns operations, which have significant impacts on the hardware area.

By employing a pipelined design technique, the project enhances processing speed while carefully analyzing the trade-offs between area and clock cycles through various data path configurations. The proposed design presents a lightweight AES architecture suitable for resource-constrained embedded systems. The 128-bit AES algorithm is implemented in Verilog HDL and simulated using ModelSim 6. 4c and MATLAB.

Performance metrics are evaluated using Xilinx synthesis tools to measure efficiency in terms of area, processing speed, and the effectiveness of the image encryption and decryption capabilities. The results highlight the suitability of the proposed AES implementation for secure data transmission in embedded systems with limited resources.

34. USING LOW-COST WIRELESS SENSOR NETWORKS FOR INTELLIGENT IRRIGATION SCHEDULING IN SUSTAINABLE PRECISION AGRICULTURE

Abinaya. R, Abitha. T, Gobika. K, Kalki Aishwarya. B, Jeeva. M

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Abstract

In the pursuit of increasing crop output while reducing water usage, agricultural irrigation systems need significant improvements. Traditional irrigation methods, due to ineffective scheduling, often lead to excessive water consumption and higher energy costs. This study proposes an intelligent irrigation scheduling system based on fuzzy logic, leveraging a low-cost Wireless Sensor Network (WSN).

The system dynamically schedules irrigation by integrating data on crop and soil conditions to enhance sustainability and precision. Plant water status is evaluated using the Crop Water Stress Index (CWSI), which considers environmental factors such as canopy temperature, solar radiation, and vapor pressure deficit. Additionally, a capacitive sensor is employed to measure soil moisture, enabling more accurate watering decisions. These variables are incorporated into a fuzzy logic-based system to optimize water use.

Experimental validation of the proposed system shows significant improvements over traditional irrigation methods. Results indicate a 22. 58% increase in crop output, a 67. 53% reduction in electrical energy consumption, and a 59. 61% decrease in water usage. These findings underscore the system's potential for supporting precision farming and enhancing resource efficiency. Furthermore, a cost-benefit analysis confirms the economic feasibility of the proposed solution.

35. IOT CLOUD-BASED SMART FARM MONITORING SYSTEM WITH MOBILE APP

Yogeshwaran. A, Suriya Prakash T, Nandha Kumar R, Srimaan Ragavendra A, Tamilarasu P

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Abstract

Agriculture forms the backbone of the global economy, and achieving increased production and sustainability requires technological advancements. This paper presents an IoT-based smart farm monitoring system that automates and continuously monitors various agricultural metrics in real time. By leveraging the Internet of Things (IoT), this system enhances agricultural productivity through a seamless integration of sensors, microcontrollers, wireless connectivity, cloud computing, and data analytics.

The system continuously monitors essential environmental parameters such as soil moisture, temperature, humidity, and pH levels using embedded sensors. The ESP32 microcontroller, connected to these sensors, processes the data and transmits it to a cloud-based platform via Wi-Fi. The data is then accessible to farmers through a mobile app, such as Adafruit, enabling real-time monitoring and informed decision-making from anywhere.

An automatic irrigation system is integrated into the setup, using the collected sensor data to optimize water usage, reduce waste, and improve crop yields. This system not only aids in better resource optimization but also minimizes manual labor and reduces the environmental impact of agriculture.

In conclusion, the IoT-based smart farm monitoring system offers data-driven insights that empower farmers to improve productivity, achieve cost savings, and adopt sustainable farming practices.

36. INTELLIGENT WIRELESS POWER TRANSFER SYSTEM FOR ELECTRIC VEHICLES USING AI

Mr. N. Khadar Basha, S. Sivaranjani, B. Sridevikala, P. Swetha, P. Yogeshwari
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Abstract

Wireless power transfer enables efficient, contactless electric vehicle (EV) charging using inductive coupling between primary and receiving coils. Solar panels provide renewable energy, stored in batteries, ensuring sustainable, continuous power for inductive charging systems. The **Arduino microcontroller** manages power switching, charge monitoring, and efficient energy transfer via high-frequency magnetic fields.

Artificial Intelligence (AI) optimizes charging efficiency, predicts maintenance, and dynamically adjusts power delivery based on the vehicle battery status. Additionally, **IoT** enhances remote monitoring, control, and safety through real-time data tracking and foreign object detection features. **LCD displays** provide charging status, energy usage, and solar contribution, enhancing user experience and system transparency.

Keywords

MOSFET, Arduino Uno, Atmega328, Voltage sensor, Liquid Crystal Display, L293D Pin Configuration, DC Motor, Geared DC Motor, Proteus

37. ENHANCED LUNG CANCER DETECTION USING HYBRID GORILLA TROOPS OPTIMIZATION AND DEEP CAPSULE NETWORKS

B. Sujitha, Abimanyu, M. Abinash, R. Inbarasan S, Manoranjan M
Dhanalakshmi Srinivasan Engineering College (Autonomous),

Abstract

Lung cancer remains one of the most common and fatal cancers globally, making early and precise detection crucial for improving survival rates. Traditional diagnostic methods often lack the accuracy and speed necessary for effective early detection, emphasizing the need for advanced computational solutions. This study proposes an enhanced framework for lung cancer detection by integrating **Deep Capsule Networks (DCN)** with **Hybrid Gorilla Troops Optimization (HGTO)**.

The **HGTO algorithm**, inspired by the social intelligence and adaptive behavior of gorillas, is utilized to optimize key parameters and improve feature selection, thereby enhancing the learning model's precision and effectiveness. Meanwhile, **Deep Capsule Networks** are employed for their superior ability to preserve part-to-whole relationships and spatial hierarchies, particularly in complex medical imaging tasks such as analyzing lung tissues.

The combination of **HGTO** and **DCN** significantly reduces false positives and false negatives, improving the accuracy, precision, and robustness of lung cancer diagnosis. Experimental results on benchmark lung cancer datasets demonstrate that the proposed hybrid model outperforms conventional **Convolutional Neural Networks (CNNs)** and other metaheuristic techniques in terms of diagnostic performance. This research highlights the potential of bio-inspired algorithms and deep learning architectures to revolutionize healthcare, offering more accurate, timely, and efficient methods for lung cancer detection.

38. SMART LOT BASED MEDICINE REMINDER SYSTEM

Boopathi B, Dhinesh S, Karthik V, Madhesh R, MS. M. Saritha,

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Abstract

The project aims to develop a smart medicine box for individuals who need to take medicine regularly. This system is especially beneficial for elderly individuals who suffer from chronic diseases such as diabetes, blood pressure, cancer, heart problems, and various other health issues. The smart medicine box is designed to be connected to a mobile application that provides multiple notifications when the medication is about to run out. It also alerts caregivers if the patient fails to take the medication on time.

The system addresses the issue of patients mistakenly taking the wrong medication, which can lead to serious, lifelong health consequences. To prevent such mistakes, a medication reminder system is essential. This system will help people take their medications on time by providing timely reminders.

The proposed system consists of an IoT-enabled embedded device and an Android application. The primary focus is on patients with permanent diseases, although it is beneficial to all users. The application will send notifications to remind users when it's time to take their medicine. Additionally, it will keep a record of medicine details and manage the medication schedule.

An IoT-enabled Arduino device is used to monitor the system, which can sense whether the patient has taken the medicine or not using an infrared (IR) sensor.

39. EARTH QUAKE DETECTOR USING ARDUINO

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ABSTRACT

Earthquakes are unpredictable natural disasters that can cause significant damage to life and property. This project presents an Earthquake Detector System using Arduino, designed to detect seismic activity and provide early warnings. The system utilizes a vibration sensor (such as an accelerometer or piezoelectric sensor) to measure ground movement. When abnormal vibrations are detected, the Arduino processes the data and triggers an alarm system, including a buzzer, LED indicators, or an SMS alert (using a GSM module) to notify users.

This system offers a cost-effective and real-time monitoring solution that can be implemented in homes, schools, and offices to enhance preparedness and reduce disaster impact. By integrating IoT capabilities, the system can also send alerts to mobile devices, making it a valuable tool for earthquake-prone regions. The proposed system is efficient, reliable, and easy to implement, contributing to improved safety and disaster management.

KEYWORDS

Arduino Uno, MPU6050, Accelerometer, Earthquake Detector, I2C LCD, Buzzer Alarm, Seismic Monitoring, Real-Time Alert, Motion Detection, Early Warning System

40. SMART ENTRANCE ANALYTICS USING INTERNET OF THINGS TECHNOLOGY

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ABSTRACT :

The Smart Entrance Analytics is a smart system designed to track and monitor the number of people entering or exiting a specific location in real-time. This system utilizes IOT technology, sensors, and cloud computing to automate visitor counting, improve security, and enhance data analytics for various applications, including malls, offices, educational institutions, and public spaces. In today's smart world, monitoring visitor flow in public and private spaces is crucial for security, space management, and resource optimization. Traditional methods of counting visitors, such as manual counting or CCTV monitoring, are inefficient, prone to errors, and require human intervention. The Smart Entrance Analytics system automates the process by utilizing sensors, microcontrollers, cloud technology, and real-time data analytics to accurately count and track people entering and exiting a location.

41. SMART ALARM SYSTEM USING IOT BASED PERSON DETECTOR

B. Sujitha, A. Anu Bharathi, M. P. Harinisri, M. Gayathri,
Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

A Door Alarm Notification System is designed to enhance security by detecting unauthorized access and providing real-time alerts. The system integrates sensors, microcontrollers, and communication modules to monitor door activity efficiently. When the door is opened without authorization, the system triggers an alarm and sends instant notifications to designated users via mobile alerts, emails, or SMS.

This solution is ideal for homes, offices, and restricted areas, offering a proactive approach to security. With features like remote monitoring, battery backup, and customizable alert settings, the system ensures reliable protection against intrusions and unauthorized access.

42. WATER TANK MONITORING SYSTEM USING ARDUINO

Dr. P. Rajeshwari, R. Aadhithyan, J. Dhesingu Rajan, G. Karthikeyan

ABSTRACT

This project presents the design and implementation of a Smart Water Tank Monitoring System using Arduino. The system aims to provide an efficient, low-cost, and real-time solution for monitoring water levels in storage tanks to prevent overflow, optimize water usage, and ensure timely refilling.

Utilizing an ultrasonic sensor, the system accurately measures the water level and transmits the data to an Arduino microcontroller. The collected data is displayed on an LCD screen and can be further transmitted to a mobile application or web interface via a Wi-Fi module (e. g., ESP8266). Additionally, the system includes an alert mechanism using buzzers or LEDs to notify users when water levels reach critical thresholds.

This project demonstrates how microcontroller-based automation can improve water resource management, reduce wastage, and promote sustainable practices.

43. SMART DOOR LOCK SYSTEM USING RFID

B. Sujitha, R. Janagabalan, M. Haris, R. Karnabalaji
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ABSTRACT

With the growing need for enhanced security and automation, traditional key-based locking mechanisms are increasingly being replaced by more sophisticated systems. This project introduces a Smart Door Lock System utilizing Radio Frequency Identification (RFID) technology, designed to provide secure and convenient access control.

The system comprises an Arduino Uno microcontroller, an RFID reader module (RC522), a servo motor for actuating the lock, LEDs for visual feedback, and a buzzer for auditory alerts. By employing pre-registered RFID tags, the system ensures that only authorized individuals can gain entry. This cost-effective and user-friendly solution is suitable for various applications, including residential homes, offices, and secure storage facilities.

The project aims to enhance security by eliminating the vulnerabilities associated with traditional keys, reducing unauthorized access, and offering potential integrations with additional security measures such as tamper alerts and Internet of Things (IoT) based remote access.

Keywords:
Smart Door Lock, RFID-based Access Control, Arduino Uno, RC522 RFID Module, Servo Motor Lock System, Electronic Lock, Home Automation, Secure Entry System, IoT Smart Lock, RFID Security System, Buzzer Alert System, LED Status Indicators.

44. RADAR SYSTEM USING ARDUINO UNO

R. Abinaya, S. Vijay Prasad, M. Sanjai Kumar, L. Santhosh Kumar, S. Sivakumaran

Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

Radar system using Arduino is an educational project that involves detecting objects and visualizing their position through a display interface, such as Processing or an OLED screen. This project presents the development of a simple radar system using an Arduino Uno microcontroller, an ultrasonic sensor (HC-SR04), and a servo motor to detect objects within a specified range.

The system simulates a real radar by continuously scanning the surroundings and displaying detected objects on a graphical interface. The ultrasonic sensor emits sound waves and measures the time taken for the echo to return, determining the distance of nearby objects. The servo motor rotates the sensor at regular intervals, allowing a 180-degree sweep of the environment.

The collected data is processed using the Arduino microcontroller and visualized on a computer using the Processing IDE, mimicking traditional radar displays. This system is useful for applications such as obstacle detection, surveillance, and automation, serving as a cost-effective learning platform for understanding radar principles and embedded systems.

Future enhancements may include RF-based radar, IoT integration, or machine learning techniques for improved detection and analysis. The system effectively demonstrates the practicality and educational value of combining microcontroller technology with basic electronics and programming to create an accessible prototype of radar systems commonly used in security, automotive, and robotics applications.

45. DESIGN AND SIMULATION OF MOBILE SIGNAL JAMMER CIRCUIT

R. Kulandhai Mani, B. Abishekraj, S. Anbuvel
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ABSTRACT

In an era of rapid technological advancements, wireless communication plays a crucial role across various sectors, including defense, security, and personal privacy. This mini-project focuses on the design and simulation of a mobile signal jammer circuit aimed at disrupting wireless signals within a specific frequency range.

The primary objective is to understand the principles of signal interference, explore various jamming techniques, and examine their real-world applications. The project involves generating radio frequency (RF) signals that interfere with communication devices such as mobile phones, Wi-Fi routers, and GPS systems. The jammer circuit comprises essential components like an oscillator, amplifier, and antenna to effectively block signals within a defined radius.

Different jamming methodologies—including constant jamming, sweep jamming, and reactive jamming—are studied to evaluate their performance and impact. While signal jammers have potential use in enhancing security, their unauthorized deployment can lead to legal consequences. As such, this project also addresses the ethical and legal considerations surrounding the use of jamming devices.

The project outcome offers practical insights into the functioning of RF jammers and highlights their influence on modern wireless communication infrastructure.

46. DETECT AND MEASURE DISTANCE OF OBJECT USING RADAR SYSTEM:

Dr. A. Yogeshwaran, P. Gokulnath, M. Ashok, S. Abdul Kader Nafeel

Dhanalakshmi Srinivasan Engineering College (Autonomous),

Abstract:

The ability to detect objects and accurately measure their distance is critical across a wide range of applications, from automotive safety systems to aerospace navigation. This project focuses on the design and implementation of a radar-based system capable of detecting objects and determining their distance from the radar unit. Utilizing radio frequency (RF) signals, the system transmits electromagnetic waves that reflect off objects, and the returning echoes are analyzed to extract key information. By measuring the time delay between transmission and reception of the signals, the system calculates the distance to the detected object with high precision. The project explores various radar techniques, including continuous wave (CW) and pulsed radar methods, and addresses key challenges such as signal processing, noise reduction, and environmental interference. The developed radar system demonstrates effective object detection and distance measurement capabilities, offering potential for integration into a variety of real-world application

47. DESIGNING A LOW-PROFILE MICROSTRIP ANTENNA TO IMPROVE COMMUNICATION IN THE FUTURE

Yogeshwaran A., Divyabharathi S., Harisha K., Jeevitha S., Madhurambika S.

Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

In this study, we present a novel low-profile microstrip antenna design aimed at enhancing the performance of fifth-generation (5G) wireless communication systems. With the exponential growth in data traffic and the increasing demand for high-speed, reliable wireless communication, there is a critical need for innovative antenna designs that meet the stringent requirements of 5G networks.

Our research introduces a microstrip antenna featuring a triangular-shaped radiator integrated with a polygonal structure to achieve superior performance metrics. The design leverages the core principles of microstrip antenna theory, including low profile, ease of fabrication, and seamless integration with existing circuit technologies. This unique configuration provides key advantages such as enhanced bandwidth, higher gain, and improved radiation efficiency—attributes essential for the high-frequency demands and advanced modulation schemes of 5G communication.

A significant innovation in our design is the integration of metamaterials—artificially engineered materials with electromagnetic properties not found in nature, such as negative permittivity and permeability. These metamaterials are strategically embedded within the polygonal structure, enhancing resonance characteristics and increasing the effective aperture size, resulting in higher gain and broader bandwidth.

The antenna was fabricated using a standard printed circuit board (PCB) process, ensuring compatibility with conventional manufacturing techniques. Its compact and low-profile nature makes it ideal for integration into modern 5G devices, including smartphones, tablets, and IoT modules. Additionally, the design's simplicity supports cost-effective mass production—crucial for widespread deployment in consumer electronics.

Beyond mobile communications, this compact antenna solution is well-suited for diverse applications such as vehicle-to-everything (V2X) communication, smart city infrastructure, and advanced sensor networks—where compactness, efficiency, and high performance are paramount.

48. TEMPERATURE AND HUMIDITY MONITORING USING INTERNET OF THINGS

S. Sasikala, S. Ajitha, C. Dhivya, M. Mahalakshmi

Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

This paper presents the design and implementation of an Internet of Things (IoT)-based system for real-time monitoring of temperature and humidity levels. The proposed system uses low-cost environmental sensors such as the DHT11 or DHT22 to measure ambient temperature and humidity. These values are collected and transmitted wirelessly to a cloud platform via Wi-Fi using an ESP8266 or ESP32 microcontroller.

The gathered data is visualized using either a web-based dashboard or a mobile application, allowing users to monitor and analyze environmental conditions remotely. The system includes functionality to generate real-time alerts when temperature or humidity values exceed pre-set thresholds, thereby ensuring timely responses in critical scenarios.

This solution is particularly suitable for applications in agriculture, smart homes, greenhouses, and industrial environments, where maintaining optimal climate conditions is essential. By leveraging IoT technology, the system offers scalable, efficient, and cost-effective environmental monitoring, enabling better decision-making based on accurate real-time data.

49. VEHICLE SPEED DETECTOR USING ESP32

Ms. R. Abinaya, A. Ananth, C. R. Chinnappa, F. Haroon Aseem
Dhanalakshmi Srinivasan Engineering College (Autonomous)

ABSTRACT

This mini-project presents the design and implementation of a **Vehicle Speed Detector** using the **ESP32** microcontroller. The system is developed to measure the speed of a moving vehicle or object by employing two **infrared (IR) sensors** placed at a known fixed distance. When a vehicle passes the first sensor, the ESP32 initiates a timer; as it crosses the second sensor, the timer stops. The system calculates the vehicle's speed using the basic formula: **Speed = Distance / Time**.

The ESP32's fast processing speed and built-in **Wi-Fi/Bluetooth** capabilities allow accurate time measurement and efficient data handling. The calculated speed is displayed either on an **OLED display** or through the **serial monitor** via the Arduino IDE.

This **cost-effective** and **real-time** speed detection system can be effectively used in **traffic monitoring**, **speed regulation**, and **automated small-scale systems**. The project exemplifies sensor-microcontroller integration for real-world applications and offers valuable insights into **embedded system design**, **IoT**, and **automation technologies**.

KEYWORDS: ESP32, Vehicle Speed Detection, IR Sensors, Embedded Systems, Speed Calculation, Microcontroller, Real-Time Monitoring, Distance-Time Formula, IoT Applications, Arduino IDE

50. DRONE AND IMPROVED DETECTION METHOD OF HUMAN TARGET AT SEA USING RASPBERRY PI PICO

Dhanasekaran P, Rajeshkannan S, Abishek A, Sridhar K
The Kavery Engineering College, India

ABSTRACT

This paper presents an innovative approach to enhancing **human target detection at sea** using a **Raspberry Pi Pico**-based drone system. Traditional **search and rescue** operations often struggle due to the vastness of the ocean and the small, often hard-to-detect size of human targets in maritime environments. To address these challenges, we propose a lightweight drone integrated with a **Raspberry Pi Pico**, **camera module**, **GPS**, and **GSM modules**.

The drone utilizes an improved **YOLOv3** deep learning algorithm, incorporating enhancements such as **residual modules with channel attention**, a **bottom-up feature pyramid network**, **CIoU loss function**, and **linear transformation of anchor boxes**. This improved architecture achieves a **detection accuracy of 72. 17%**, significantly outperforming the standard YOLOv3 model.

The system is capable of capturing **real-time video**, processing it for **human detection**, and transmitting **alerts with GPS location data** to rescue teams via GSM. Additionally, **Wi-Fi-based video streaming** allows continuous monitoring from control centers.

Experimental results confirm the system's effectiveness in improving detection performance, thereby supporting faster and more accurate rescue missions in maritime environments.

KEYWORDS: Raspberry Pi Pico, Drone, Human Detection, Sea Rescue, YOLOv3, Deep Learning, GPS, GSM, Real-Time Video Processing, Search and Rescue

51. HOME AUTOMATION USING IoT

N. Khadar Basha, D. Hemath, A. Aravind Kumar, M. Abivarman

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ABSTRACT

Home automation is an advanced technology that enhances **convenience, security,** and **energy efficiency** by enabling users to remotely control household appliances. This project presents a smart home automation system utilizing the **ESP32 microcontroller** and a **5V 4-channel relay module** to control electrical appliances such as **lights and fans**.

The system is managed via a **mobile application**, allowing users to toggle devices ON/OFF from anywhere within the network. The ESP32, equipped with **Wi-Fi connectivity**, acts as the central controller. It receives user commands from the mobile app and processes them to operate the relay module, which in turn controls the connected appliances.

By reducing the need for manual operation, this smart system improves everyday comfort and energy use, making it an ideal solution for modern home automation.

KEYWORDS:

Smart Home, ESP32 Microcontroller, 5V 4-Channel Relay Module, Mobile App Control, Wi-Fi Connectivity, Remote Appliance Control, Energy Efficiency, Smart Lighting, Fan Automation, IoT Applications

52. AUTOMATIC STREET LIGHT CONTROLLER

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ABSTRACT

The **Automatic Street Light Controller** is a smart system designed to automate the operation of street lights based on ambient light levels. The primary goal of this project is to conserve **energy** by ensuring that street lights are activated only when needed—typically during **nighttime** or in **low-light conditions**—and turned off when daylight is present.

The system utilizes a **Light Dependent Resistor (LDR)** to detect ambient light intensity, with a **microcontroller** processing the data and controlling the lights based on the input received. By automating the switching process, this project minimizes manual intervention, reduces **electricity wastage**, and contributes to creating smarter, more sustainable urban infrastructure.

This design is **cost-effective**, easy to implement, and scalable for **real-world applications**, making it a suitable solution for smart city initiatives.

KEYWORDS:
Automatic Street Light, Light Dependent Resistor (LDR), Energy Conservation, Smart Lighting System, Light Sensor, Microcontroller, Automation, Power Saving, Ambient Light Detection, Intelligent Lighting, Day/Night Sensor, Street Light Automation, Arduino (if applicable), IoT (if applicable), Smart City Technology

53. SMART PEOPLE COUNTER USING MOTION SENSOR

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Dhanalakshmi Srinivasan Engineering College (Autonomous)

ABSTRACT

The **Smart People Counter using Motion Sensor** is an innovative system designed to automatically count the number of people entering or exiting a specific area, such as a room, hall, or building. The system utilizes motion sensors, typically **infrared (IR)** or **ultrasonic** sensors, to detect human movement and determine the direction, thereby enabling accurate real-time occupancy tracking.

By strategically placing the sensors at entry and exit points, the system can differentiate between incoming and outgoing traffic through sequential sensor triggers and logical conditions. The count is updated and displayed on a digital interface, such as an **LCD screen**, or through a connected mobile app or web interface.

This system can also be integrated with **IoT platforms** for remote monitoring and data analytics. It is particularly useful for automated room occupancy management, energy-efficient control of lighting or HVAC systems based on real-time presence, and security or crowd monitoring in both public and private spaces.

The solution is **cost-effective**, **scalable**, and contributes significantly to **smart infrastructure development**, providing actionable data for better space utilization and energy management.

KEYWORDS:
Smart People Counter, Motion Sensor, Infrared Sensor, Ultrasonic Sensor, Room Occupancy Management, Energy Efficiency, HVAC Control, IoT, Smart Infrastructure, Crowd Monitoring

54. SMART STREET LIGHT USING LDR AND IR SENSOR

Mrs. S. Susidra, K. Shanmugananthan, K. Prabhakaran, S. Saran, P. Prakash
Dhanalakshmi Srinivasan Engineering College (Autonomous)

ABSTRACT

The **Smart Street Light Using LDR and IR Sensor** system leverages **Infrared (IR)** sensors to detect motion, ensuring efficient street lighting. When a vehicle or person passes by, the IR sensor detects movement and sends a signal to the microcontroller, activating the street light. If no motion is detected for a predetermined period, the system automatically turns off or dims the street light, depending on the design.

This automation ensures that street lights remain active only when needed, leading to significant **energy savings** and reduced **operational costs**. The smart lighting system is **cost-effective**, **energy-efficient**, and easy to implement, making it ideal for use in **urban** and **semi-urban** areas. Additionally, the system contributes to **reducing light pollution** and promotes **sustainable living** by optimizing energy consumption.

KEYWORDS:
Smart Street Light, LDR Sensor, IR Sensor, Energy Efficiency, Motion Detection, Sustainable Living, Light Pollution Reduction, Urban and Semi-Urban Areas, Cost-Effective Lighting Solution.

55. DESIGN AND IMPLEMENTATION OF DRIVER DROWSINESS DETECTION USING AI

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ABSTRACT

Driver drowsiness is a critical factor contributing to road accidents, necessitating an effective solution to detect and prevent such incidents. This project introduces a **real-time driver drowsiness detection system** that integrates **Artificial Intelligence (AI)**, particularly **Convolutional Neural Networks (CNN)**, to analyze a live video feed of the driver's face. The system processes facial landmarks to monitor **eye closure**, **blink patterns**, and **yawning behavior**, indicators of drowsiness. If drowsiness is detected, the system triggers an **alarm** to alert the driver and simulates vehicle stoppage by halting a connected motor.

The proposed solution combines **deep learning** and **computer vision** with embedded system technologies, offering an innovative way to improve **road safety**. This approach is designed to be cost-effective, providing real-time monitoring and alerting the driver before the drowsiness leads to an accident.

56. INTELLIGENT TRAFFIC CONTROL SYSTEM USING YOLO AND REINFORCEMENT LEARNING FOR REAL-TIME ADAPTATION

A. Parimala, V. Praveen, S. Pradeep Kumar, S. Vishwa, B. Prakash,

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ABSTRACT

Efficient traffic management in urban areas is increasingly challenging due to the growing vehicle density, congestion, and heightened risks of accidents. Traditional traffic control systems often fail to adapt dynamically to real-time conditions, leading to inefficiencies. This paper proposes an **AI-driven traffic monitoring and control system** that integrates **YOLO (You Only Look Once)** for real-time object detection and **reinforcement learning** for adaptive decision-making. The system captures real-time traffic video feeds to detect vehicles and pedestrians, analyzes traffic patterns, and optimizes traffic signal timings accordingly to reduce congestion and improve road safety.

Reinforcement learning is employed to continuously adapt traffic signals in response to real-time traffic conditions, maximizing the efficiency of traffic flow. The intelligent control system not only enhances urban mobility but also makes transportation networks more responsive and efficient in real-time, offering a sustainable solution to modern traffic management challenges.

KEYWORDS:

Intelligent Traffic Control System, YOLO (You Only Look Once), Reinforcement Learning, Real-Time Adaptation, Traffic Management, Smart Traffic Signals, Object Detection, Machine Learning, Adaptive Traffic Control, Traffic Flow Prediction, Signal Control, Urban Mobility.

57. WIRELESS LIGHT CONTROL SYSTEM USING BLUETOOTH AND ARDUINO

Dr. P. Rajeswari, V. Manokanisha, M. Srimathi, S. Varsha,

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ABSTRACT

This project presents a **wireless light control system** that uses **Bluetooth technology** and an **Arduino microcontroller** to remotely control the operation of lighting systems. The core objective is to allow users to control various light functions, such as turning the lights on/off and adjusting brightness levels, using a smartphone application. This solution is ideal for smart home automation and **Internet of Things (IoT)** applications, offering both convenience and energy efficiency.

The system consists of an **Arduino board**, a **Bluetooth module (HC-05)**, and a connected lighting system. The **HC-05 Bluetooth module** establishes a wireless communication link between the Arduino and the user's smartphone. Once paired, the smartphone sends commands over Bluetooth, which are interpreted by the Arduino's pre-programmed code. Based on the received commands, the Arduino either switches the light on/off or adjusts the brightness via **PWM (Pulse Width Modulation)** signals.

This Bluetooth-based light control system is a significant step toward creating **smart living environments**. It combines mobile technology accessibility with the flexibility of Arduino, enabling efficient and seamless management of home lighting. The system not only reduces energy consumption but also contributes to creating a more **connected home ecosystem**. As the demand for smart home solutions continues to rise, this project demonstrates the potential of integrating wireless communication and embedded systems into daily applications.

58. BLUETOOTH CONTROLLED CAR USING ARDUINO

Mrs. Parimala, G. Rajasri, S. Priyanka, S. Suruthika, R. Sahana,

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ABSTRACT

The **Bluetooth-controlled car using Arduino** is an innovative educational project that integrates electronics, programming, and wireless communication to create a robotic vehicle that can be operated remotely via Bluetooth. This system uses an **Arduino microcontroller** (typically Arduino Uno or Nano), a **Bluetooth module (HC-05)**, a **motor driver** (like L298N), **DC gear motors**, **wheels**, **chassis**, and a **power supply** (usually batteries).

The car is programmed using the **Arduino IDE**, where the microcontroller processes commands received from the Bluetooth module and converts them into motion signals for the motors. These commands allow basic movements such as **forward**, **backward**, **left**, **right**, and **stop**.

A smartphone is paired with the Bluetooth module, and a mobile application (either a custom Android app or a generic Bluetooth terminal) is used to send control signals. Upon receiving a command from the app, the Bluetooth module forwards it to the Arduino, which then activates the motor driver to power the motors in the desired direction.

This project demonstrates the practical application of Bluetooth communication and embedded systems in building a remote-controlled car, offering insights into robotics, wireless communication, and embedded programming.

59. VOICE CONTROLLED WHEEL CHAIR

Dr. A. Yogeshwaran, N. Nishanthi, S. Shalini, S. Swetha, R. Pavithra

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ABSTRACT:

This project presents an innovative Speech-Based Control System for motorized wheelchairs, transforming individual accessibility with mobility impairments. The integrated system leverages advanced technologies such as natural language processing, speech recognition, and hardware integration to allow users to effortlessly command wheelchair movements through natural speech. Managed through a user-friendly Android application, the Voice Controlled Wheelchair System responds to intuitive voice commands for providing a smooth and accessible means of mobility. The technology prioritizes user-friendliness and efficiency, ensuring a user-centric and an inclusive environment for people who vary in technical expertise. Via the assimilation of essential hardware components, including Sensors and the HC-05 Bluetooth module, the system guarantees efficient voice command recognition and safe wheelchair operation. With a remarkable response time of mere seconds, both systems hold the promise of enhancing independence and mobility for individuals facing motor challenges. This innovative assistive technology represents a significant leap forward within the domain, offering a novel and inclusive approach to wheelchair mobility. The presented Speech-Based Control System participates in a more accessible and empowering future for people with motor disabilities.

60. FOOT STEP POWER GENERATION USING PIEZOELECTRIC PLATE

Madrsuitha, Mtmralidharan, Brithik Rsanjaydshbariraj
Dhanalakshmi Srinivasan Engineering College (Autonomous)

ABSTRACT:

In the modern era of sustainable energy solutions, the concept of harvesting power from everyday human activities has gained significant attention. One such innovative approach is footstep power generation using piezoelectric plates, which utilizes the mechanical pressure exerted by walking to generate electricity. This paper explores the design, working principle, and potential applications of a system that converts kinetic energy from footfalls into usable electrical energy using piezoelectric materials. Piezoelectric materials possess the unique property of generating an electric charge in response to applied mechanical stress. In the proposed system, piezoelectric plates are embedded beneath a walking surface, such as a pavement, staircase, or floor mat. When a person steps on these surfaces, the pressure applied causes the piezoelectric plates to deform slightly, generating a small voltage. This energy is then captured, regulated, and stored in rechargeable batteries or capacitors for later use. A rectifier circuit is employed to convert the generated AC voltage into DC, which is more suitable for powering electronic devices or lighting systems.

This method of energy harvesting presents a promising solution for powering low-energy applications such as LED streetlights, mobile phone charging stations, or sensors in smart cities. The system is environmentally friendly, requires minimal maintenance, and functions best in areas with high foot traffic, such as railway stations, shopping malls, airports, and stadiums. Additionally, the integration of such systems into urban infrastructure can promote awareness about renewable energy and encourage public participation in sustainable practices. However, the efficiency of energy conversion is currently a challenge, as the power generated per step is relatively low. Therefore, the system is more effective when used in high-density pedestrian zones or when combined with energy storage units and smart controllers to optimize energy usage. Continued research and development in piezoelectric materials and system integration are essential to enhance the scalability and affordability of this technology.

In conclusion, footstep power generation using piezoelectric plates is an innovative and sustainable energy harvesting technique with considerable potential for future urban applications. It provides an eco-friendly alternative to conventional energy sources and represents a step forward in utilizing human activity as a means of producing clean energy. As cities evolve towards smarter and greener infrastructure, such technologies can play a crucial role in supporting decentralized and renewable energy systems.

61. SMART IRRIGATION SYSTEM BY USING ARDUINO

Mrs. S. Sasikala, Yogeshwaran J, Sivanesh R, Sivabalan P, Venkadeshwaran P
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ABSTRACT

Water scarcity and the need for sustainable agricultural practices have become major global concerns. Traditional irrigation methods often lead to inefficient water usage, which can negatively impact both crop productivity and environmental sustainability. This project introduces a Smart Irrigation System designed to automate the irrigation process by utilizing real-time soil moisture data. The aim is to optimize water consumption while ensuring that crops receive adequate hydration based on actual soil conditions. The system is centered around an Arduino microcontroller, which acts as the brain of the operation. It interfaces with a soil moisture sensor, a relay module, and a water pump. The soil moisture sensor is embedded into the ground to continuously monitor the moisture content of the soil. When the moisture level drops below a predetermined threshold, the Arduino processes the sensor data and activates the water pump through the relay module. This automated activation allows water to be supplied directly to the crops as needed. Once the moisture level reaches the desired range, the pump is turned off automatically, preventing over-irrigation and water wastage. This approach offers several key advantages. First, it reduces the need for manual intervention, allowing farmers and gardeners to focus on other tasks. Second, it promotes efficient water usage, which is critical in areas facing water scarcity or irregular rainfall patterns. Third, the system is both cost-effective and scalable, making it accessible for small-scale farmers, home gardeners, and educational purposes. By using low-cost components like the Arduino board and basic sensors, the system can be deployed without significant investment. Moreover, the Smart Irrigation System is adaptable and can be enhanced with additional features such as temperature and humidity sensors, solar power integration, or even wireless communication modules for remote monitoring. However, even in its basic form, it demonstrates how embedded systems and sensors can be effectively applied in agriculture to enhance productivity and sustainability. In conclusion, this project showcases a practical and efficient solution to modern agricultural challenges. It highlights the potential of simple automation techniques in addressing real-world problems. By conserving water, improving crop health, and reducing labor, the Smart Irrigation System stands as a valuable tool in the movement toward smart and sustainable farming practices.

62. REAL TIME WATER TANK MONITORING SYSTEM

Mrs. M. SARITHA, M. NITHISH, S. SAKTHI, T. THIRUVARASAN

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Abstract

Water scarcity and contamination are growing concerns, necessitating efficient monitoring and management of water resources. This project presents an IoT-based Real-Time Water Tank Monitoring System designed to ensure an adequate supply of clean water while preventing wastage. The system integrates TDS (Total Dissolved Solids) and ultrasonic sensors with an ESP32 microcontroller to provide real-time data on water quality and level. The TDS sensor continuously measures the concentration of dissolved solids in the water, indicating pollution levels and ensuring safe consumption. The ultrasonic sensor monitors the water level, preventing overflow and alerting users about shortages. The collected data is transmitted wirelessly to a cloud platform such as Firebase or AWS IoT, where users can access real-time insights via a mobile app or web dashboard. This enables remote monitoring, reducing the need for manual inspections.

Additionally, the system can trigger alerts when water contamination exceeds safety thresholds or when the water level reaches critical points. These alerts can be delivered via push notifications, SMS, or email, ensuring immediate corrective actions. The proposed solution is designed to be energy-efficient, with the potential for integration with solar power for sustainable operation.

This system is particularly beneficial for households, apartment complexes, industrial facilities, and municipal water management. By providing automated, real-time monitoring, it eliminates human errors in water quality assessment and reduces resource wastage. The ability to detect contamination early helps prevent waterborne diseases, ensuring public health safety. Furthermore, the system's scalability allows it to be implemented in smart city initiatives, contributing to efficient water conservation and sustainable urban development.

63. AUTOMATED NIGHT LIGHTING SYSTEM

Dr. A. Yogeshwaran, Praveen Kumar S, Mohamed Amsathkhan A, Vignesh M, Pasa Priyan C

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ABSTRACT

The integration of solar energy systems into electric vehicle (EV) infrastructure has emerged as a promising approach to addressing the dual challenges of energy sustainability and environmental impact. This paper presents a comprehensive study on the development and deployment of a solar-powered electric vehicle charging station. The design integrates photovoltaic (PV) technology with efficient energy storage and management systems to ensure reliable and renewable energy supply for EVs. The proposed system incorporates key components including solar panels, charge controllers, battery banks, and EV chargers. The solar panels convert solar irradiance into electrical energy, which is regulated and stored in batteries through a charge controller to optimize efficiency and prolong battery life. The stored energy is then supplied to EVs through standard charging ports. The system is designed to operate autonomously, with a focus on energy efficiency, scalability, and environmental benefits. To evaluate system performance, real-time data acquisition was conducted, capturing solar irradiance, battery state-of-charge, and charging output. Results indicate that the solar charging station is capable of significantly reducing grid dependency and fossil fuel consumption, thus contributing to lower greenhouse gas emissions. Moreover, the cost analysis demonstrates long-term economic benefits due to reduced operational costs and reliance on renewable energy sources. The research also addresses the challenges associated with varying solar input, energy storage limitations, and load management. Solutions such as maximum power point tracking (MPPT) and smart energy distribution algorithms were explored to optimize the charging process under fluctuating environmental conditions. This project highlights the feasibility and practicality of implementing solar-powered EV charging stations as a sustainable infrastructure solution.

64. SERVER SIDE FPGA APPLICATION

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Roever Engineering College

ABSTRACT

Accelerating cryptographic pairing processes on field-programmable gate arrays (FPGAs) for server-side applications is the main goal of this study. Prior research on FPGA pairing implementations concentrated on embedded devices' area efficiency, aiming to maximize performance while using the fewest possible circuit resources. For server-side applications, where optimal performance is the main goal once FPGA resources are depleted, these topologies are probably inefficient. Their low operation frequency and low digital signal processor (DSP) use make their architectures inefficient. In this work, we fully use DSPs by proposing high-throughput paired processor architecture for server-side FPGAs. First, we provide a server-side FPGA-compatible loop-unrolled modular multiplication method. When compared to algorithms from earlier research, the algorithm exhibits the highest throughput and area efficiency. Second, by incorporating the suggested modular multiplier into a pairing processor architecture, we are able to maintain its high throughput by allowing for interleaved executions and redundant adders. The results of our study of the BN254 and BLS12_381 pairs on the suggested processor architecture demonstrate that it achieves a good throughput that is roughly two and five times quicker than that of earlier research, respectively.

KEYWORDS: field-programmable gate arrays (FPGAs), Digital signal processor (DSP), Barreto-Naehrig (BN), Barreto-Lynn-Scott curve (BLS).

65. SOLAR BASED FULL BRIDGE RESONANT CONVERTER FOR EV

Mrs. M. Bhuvaneswari, Abdul Kalam M, Rubin Raj N, Sameer S, Sanjay P

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ABSTRACT

The growing global shift towards electric vehicles (EVs) necessitates the development of efficient and sustainable charging solutions. One promising approach is the integration of a solar-based full-bridge resonant converter (FBRC), which offers advantages such as high efficiency, reduced electromagnetic interference (EMI), and enhanced power conversion performance. This paper presents a comprehensive study on the design and implementation of a solar-powered FBRC for EV battery charging applications. The FBRC topology is particularly well-suited for photovoltaic (PV) energy integration due to its inherent ability to achieve soft-switching (zero-voltage switching, ZVS), which minimizes switching losses and thermal stress on power devices, thus improving overall efficiency. The proposed converter design incorporates a resonant circuit to enable high-frequency operation, allowing for smaller passive components and reduced converter size, a key benefit for space-constrained EV charging systems. Additionally, the FBRC design includes a maximum power point tracking (MPPT) algorithm to ensure optimal power extraction from the solar array under varying irradiance and temperature conditions, thus maximizing the energy harvested from the PV system. The converter is capable of delivering regulated DC output to charge the EV battery, with an efficient energy transfer process that minimizes power losses over a wide range of input voltages and load conditions. Simulation and experimental results demonstrate the effectiveness of the solar-based FBRC in achieving high efficiency, stable operation, and robust performance, even in dynamic environmental conditions. The system's ability to handle varying solar inputs, coupled with its energy-efficient conversion process, makes it an ideal candidate for renewable energy-powered EV charging stations.

66. SMART CAR PARKING SYSTEM

Dr. A. Rajeshwari, Mohan Pandi Sp, Purushoth S, Sarweshwaran N, Pugalendi Praveen M

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ABSTRACT

The rapid increase in urbanization has led to a growing number of vehicles, creating a significant challenge for parking management in cities. Traditional parking methods often result in long search times, congestion, increased fuel consumption, and a negative environmental impact. To address these issues, this project proposes a Smart Car Parking System that utilizes real-time data and automation to improve parking efficiency. The system is based on Infrared (IR) sensors installed at each parking slot, which detect the presence or absence of vehicles. These sensors continuously send data to a microcontroller (e. g., Arduino UNO or ESP32), which processes the information and updates the status of each parking slot. The system then displays the real-time availability of parking spaces on a 16x2 or 20x4 LCD screen located at the parking lot entrance, helping drivers quickly find vacant spots. Additionally, LED indicators (green for available and red for occupied) are used to signal the status of each parking slot, providing immediate visual guidance to drivers. This setup reduces the time spent searching for a parking space, easing congestion within the lot and optimizing space usage. For enhanced functionality, the system can be integrated with an IoT platform like Blynk or ThingSpeak, allowing users to monitor parking availability remotely via a smartphone app. This IoT integration ensures that drivers can check parking availability before arriving at the location, saving time and improving convenience. The system is compact, cost-effective, and easy to install, making it suitable for use in shopping malls, airports, hospitals, residential complexes, and other high-traffic areas. By reducing search time, improving space utilization, and contributing to a more efficient urban environment, the Smart Car Parking System provides a sustainable and practical solution to modern parking challenges.

67. EFFICIENT THERMOELECTRIC ENERGY HARVESTING THROUGH SOLAR ENERGY

Ms. Thamijunisha. A, Uma Maheswari S, Shivashree R, Vaishnavi P

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ABSTRACT:

This project presents an efficient boost converter integrated with time-domain Maximum Power Point Tracking (MPPT) and digital self-tracking Zero-Crossing Detection (ZCD) for enhanced thermoelectric energy harvesting. The converter is specifically designed to optimize energy extraction from Thermoelectric Generators (TEGs) and convert low-power, variable energy sources into stable, usable power for electronic devices. The integration of time-domain MPPT ensures optimal energy extraction by continuously adjusting the duty cycle of the converter based on real-time fluctuations in input power. Additionally, the implementation of digital self-tracking ZCD improves the switching performance by precisely detecting zero-crossing points, reducing switching losses, and enhancing system efficiency. Experimental validation demonstrates high conversion efficiency, minimal losses, and stable operation under varying input power levels. This design offers a reliable solution for powering low-energy devices in energy management systems and provides a robust platform for future integration into renewable energy applications such as smart grids, IoT devices, and portable power supplies.

68. POWER QUALITY IMPROVEMENT WITH RENEWABLE ENERGY BASED SYSTEM USING UPQC-FLC TECHNIQUES

Mrs. Thenmozhi T, Sobiya R, Susmitha R, Vishpriya M

Dhanalakshmi Srinivasan Engineering College (Autonomous)

ABSTRACT:

The power enhancement of grid-connected solar photovoltaic and wind energy (PV-WE) systems combined with electric vehicles (EVs) and energy storage systems (ESS) is the main objective of the proposed work. Only PV, PV-ESS, WE, and WE-ESS are highlighted in the research studies that are currently available in the literature. In the current literature, power enhancement techniques like Unified Power Flow Controller (UPFC), Generalized UPFC (GUPFC), and Static Var Compensator (SVC) as well as AI-based techniques like Fuzzy Logic Controller (FLC)-UPFC and Unified Power Quality Conditioner (UPQC)-FLC have been viewed. With FLC's assistance, the power grid is managed from source to load and between sources. The economical use of power during peak and off-peak loads is determined by the FLC. In this proposed study, UPQC is used to address the problem of reduced power quality at the load side, which is caused by randomly varying loads. Based on the results, it is evident that the FLC-based maximum power point tracking (MPPT) technique helps PV and WE systems reach their maximum power. Additionally, the MPPT algorithm is developed using the artificial neural network (ANN)-based technique, which is then used to validate the suggested method. The two voltage source converters that make up the UPQC-PV system are connected in series via an injecting device and in parallel at the point of common coupling for load compensation. The best-performing technique is chosen by comparing the outputs of the two methods. One important finding from the analysis and results is that FLC-based MPPT produces higher power output than ANN-based MPPT.

69. IoT BASED SMART CIRCUIT BREAKER USING PASSWORD AND GSM

Dr. M. Parameswari, Janani S, Aswini S, Nithya R

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ABSTRACT:

The proposed system aims to reduce electrical accidents and improve safety for linemen. A circuit breaker is an automatically operated electrical switch designed to protect an electrical circuit from damage caused by overload or short circuit. Its basic function is to detect a fault condition and interrupt current flow. Unlike a fuse, which operates once and must be replaced, a circuit breaker can be reset manually or automatically to resume normal operation. When operated manually, fatal electrical accidents are often observed. Since linemen frequently come into contact with live wires, there is a high risk of electrical accidents. Recent surveys indicate that electrical accidents involving linemen are increasing every year, especially during maintenance when there is no proper communication and coordination between the maintenance staff and the electric substation staff. To prevent such accidents, an Arduino-based system is proposed that implements password protection in the circuit breaker. A password is entered by the specific person each time they want to repair the electric line or perform maintenance work. There is also a provision to change the password using a special character on the keypad to ensure greater safety for the person in charge and facilitate maintenance work without inconvenience in the absence of specific maintenance staff. A 4x4 matrix keypad is used to enter the password, and a relay is used to open or close the circuit breaker, which is indicated through an LED or lamp. The process is also displayed on an LCD at every instant. A GSM modem is employed to send an SMS to the registered mobile number of the substation head about the password entry and the status of the circuit breaker. It is also used to receive commands from the substation head to ensure proper operation of the circuit breaker, as the password-changing provision could lead to unauthorized access.

70. PREDICTION OF CROP YIELD IN AGRICULTURE USING MACHINE LEARNING

Gayathri. R Aravindh, Jeevanatham, Kabilan, Manoj Kumar

Dhanalakshmi Srinivasan Engineering College (Autonomous)

ABSTRACT:

Agriculture, the cultivation of food and goods through farming, contributes significantly to the world's food supply and is critical to the Indian economy and its GDP. However, challenges such as resource degradation, rapid population growth, climate change, diseases, and labor shortages have periodically threatened food security. One vital task in agriculture is seed recommendation, which involves suggesting the most suitable seed varieties based on environmental factors like soil type, weather conditions, and other parameters.

Machine learning, particularly RNN (Recurrent Neural Network) algorithms, plays a pivotal role in optimizing this process. This study proposes an efficient, low-cost, and low-power Internet of Things (IoT) solution leveraging a Wireless Sensor Network (WSN) with NodeMCU (ESP8266), USB-to-UART converter, driver relays, and sensors such as DHT11 for temperature and humidity and soil moisture sensors for soil quality assessment.

The system collects real-time environmental data and uses machine learning to predict optimal crop varieties for sowing based on land suitability. Additionally, it aids in monitoring soil quality and detecting leaf diseases using advanced data analytics and machine learning techniques. The collected data is stored in a local PC-hosted database and monitored via a user-friendly mobile application, the Blynk app, which provides remote access for farmers. This IoT-driven approach enhances decision-making and reduces costly agricultural errors.

71. VOICE CONTROL ELEVATOR SYSTEM USING BLUETOOTH

V. Vinodhini, M. Akash, R. Aparna, R. Sanjairaj

University College of Engineering Ariyalur

ABSTRACT

The Development and implementation of a voice-controlled elevator system that leverages Bluetooth technology to enable contactless, hands-free operation. The primary objective is to enhance accessibility for individuals with mobility impairments and improve hygiene by minimizing physical interaction with elevator buttons—an important consideration in modern smart building systems. The system employs a Bluetooth-enabled smart phone application to capture voice commands, which are then processed and transmitted wirelessly to a microcontroller. The microcontroller, integrated with the elevator's control circuitry, interprets the received commands and actuates the corresponding mechanisms to move the elevator to the desired floor. Key hardware components include an HC-05 Bluetooth module, an Arduino microcontroller, and a relay module for motor control. The voice recognition functionality is achieved using built-in mobile speech processing APIs, ensuring compatibility and ease of use without the need for additional voice processing hardware. Extensive testing was conducted to evaluate the system's responsiveness, accuracy, and reliability in various scenarios and environmental conditions. Results indicate high command recognition accuracy within a 10-meter range, with minimal latency in command execution. The system demonstrated stable performance across multiple floors and maintained safety protocols such as door control and emergency stop integration. This voice-activated elevator model represents a scalable and cost-effective solution for integration into residential, commercial, and healthcare facilities. Future enhancements may include multi- language support, integration with IoT platforms, and biometric security features. Overall, the proposed system provides a practical approach to modernizing elevator control systems with user-centered, smart technology.

KEYWORDS

Voice Control. Elevator System. Bluetooth Communication, Arduino Microcontroller, HC-05 Module, Voice Recognition, Smart Building, Accessibility.

72. AVOID FIRE ACCIDENTS IN EV WITH MULTIPLE FAULT DETECTION USING AI AND IOT

V. Vinodhini, D. Varshini, V. Sathana, S. Kamalesh, V. M. Siva Prasath

University College of Engineering Ariyalur

ABSTRACT

Electric Vehicles (EVs) are transforming the transportation industry with their temperature, voltage fluctuations, current flow, and ambient conditions in real-time. Data collected is continuously analyzed using AI algorithms to detect anomalies and predict potential faults before they escalate into hazardous situations. A multi-layered detection model is used to ensure high accuracy and minimal false positives, while a cloud-based dashboard provides real-time alerts and predictive maintenance recommendations to users and service providers. Experimental results demonstrate improved early fault detection, reduced response time, and enhanced vehicle safety. This approach not only safeguards passengers and assets but also builds trust in EV technology by addressing one of its critical safety challenges. environmental and economic benefits. However, the increasing adoption of EVs has also raised concerns over safety, particularly the risk of fire accidents caused by battery malfunctions, overheating, or electrical faults. This paper proposes an intelligent fault detection system integrating Artificial Intelligence (AI) and Internet of Things (IoT) technologies to prevent fire-related incidents in EVs. The system employs a network of IoT sensors to monitor key parameters such as battery

KEYWORDS

Voice Control. Elevator System. Bluetooth Communication, Arduino Microcontroller, HC-05 Module, Voice Recognition, Smart Building, Accessibility.

73. DRONE AND IMPROVED DETECTION METHOD OF HUMAN TARGET AT SEA USING RASPBERRYPI PICO

Dhanasekaran P, Rajeshkannan S, Abishek A, Sridhar k

The Kavery Engineering College

ABSTRACT

This paper presents an innovative approach to enhancing human target detection at sea using a Raspberry Pi Pico-based drone system. Traditional search and rescue operations often face challenges due to the vastness of the search area and the small size of human targets in maritime environments. To address these issues, we propose the integration of a lightweight drone equipped with a Raspberry Pi Pico, camera module, GPS, and GSM modules. The drone utilizes an improved YOLOv3 deep learning algorithm, incorporating residual modules with channel attention, a bottom-up feature pyramid network, CIoU loss function, and linear transformation of anchor boxes. This enhancement achieves a detection accuracy of 72. 17%, significantly improving over standard YOLOv3 implementations. The system is designed to capture real-time video, process it for human detection, and transmit alerts with location details to rescue teams via GSM. Additionally, Wi-Fi streaming allows for continuous monitoring by control rooms. Experimental results demonstrate the effectiveness of this approach in improving detection performance and facilitating timely rescue operations.

Keywords: Raspberry Pi Pico, drone, human detection, sea, YOLOv3, deep learning, search and rescue, GPS, GSM, real-time video processing.

74. SECURE AND REMOTE NFC-BASED HOME AUTOMATION SYSTEM USING RASPBERRY PI PICO W AND FIREBASE INTEGRATION

Krishna Murthy B, Monamukil S. S, Laxmanprasath L, Monisha Selvaraj

Abstract

The rapid progress of smart home automation using IoT technologies has not replaced traditional local network connections because these systems lack flexibility. The project designs an affordable automatic home control system through the integration of a Raspberry Pi Pico combined with an RC522 RFID reader and dual relay module. The system enables appliance control through either NFC-enabled phones or RFID cards at local locations and Firebase control from any device while omitting Wi-Fi network requirements. The system adopts Firebase functionality to guarantee real-time safe updates while users can access it securely from any location. Home automation control through this method provides a practical solution particularly for developing countries such as India.

Keywords

Home Automation, NFC, Raspberry Pi Pico W, Firebase, RFID, IoT, Secure Access

75. SMART MEDICINE REMINDER SYSTEM USING ARDUINO

Sudharasanan M, Vijay V. S, Viahwa G, Keerthana G

Abstract

With the increasing need for medication management among the elderly and patients with chronic illnesses, a smart medicine reminder system is an essential solution. This paper presents an Arduino-based Smart Medicine Reminder System that alerts users to take medicine on time through a buzzer sound, LED indicators for specific tablets, and an LED display showing the remaining quantity of each tablet. The system ensures timely medication intake, reducing the chances of missed doses and improving patient adherence. The proposed system is cost-effective, easy to use, and can be customized according to the user's needs.

Keywords

Arduino, Medicine Reminder, LED Display, Buzzer Alert, Healthcare Technology, IoT, Embedded Systems

76. DESIGN OF HARMONIC FILTERS FOR SUPRAHARMONICS SUPPRESSION IN POWER ELECTRONICS DOMINATED POWER SYSTEM

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ABSTRACT

Designing harmonic power filters for **supraharmonic suppression** in power electronics-dominated systems involves creating mechanisms that effectively mitigate high-frequency noise resulting from modern electronic devices. Supraharmonics—frequencies that lie beyond the traditional harmonic range—present a growing challenge in such systems, often causing interference and reduced performance.

This paper introduces a comprehensive approach to filter design that targets these issues by proposing a **hybrid filter**. The system combines **Active Power Filters (APFs)** and **Passive Power Filters (PPFs)** to provide a dynamic and efficient solution. Active filters, using advanced control strategies, can adapt in real time to changing supraharmonic frequencies, ensuring accurate compensation. Passive filters, made of inductors, capacitors, and resistors, are tuned to specific frequency bands to deliver stable filtering performance.

The integration of these filtering methods results in a robust system capable of suppressing supraharmonics and improving the overall quality and reliability of power in modern electrical networks.

77. OPTIMIZED MAXIMUM EFFICIENCY POINT TRACKING FOR BIDIRECTIONAL NON-INVERTING BUCK-BOOST CONVERTER USING POWER ELECTRONICS

Mrs. T. Durga, M. Ramaraj J. Gokul K. Ranjith S. Logesh
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ABSTRACT

This project presents a novel approach for **online tracking of the Maximum Efficiency Point (MEP)** of a **bidirectional non-inverting buck–boost converter** across a wide power range. The proposed technique involves **perturbing the phase shift** of the gate driver signal and **monitoring input and output power** to optimize efficiency in both **Zero-Voltage Switching (ZVS)** and **Hard Switching** quadrangle modes.

To enable these two modes, a **ZVS detection circuit** is implemented. This circuit determines whether switching is achieved at zero voltage, sets the **phase shift boundary**, and **dynamically adjusts dead time** to maintain optimal operation.

By continuously adapting to varying load conditions, this innovative tracking method ensures the converter operates at peak efficiency in real time. The integration of advanced control strategies with hardware design results in improved system performance, reduced switching losses, and higher energy efficiency—making it highly suitable for renewable energy systems and bidirectional power applications.

78. IOT ENABLED WATER MONITORING IN SMART CITIES WITH POWER GRID AND INVERTER-BASED HARVESTING

Mrs. T. Durga, K. Sanjeev K. Sathis Kumar R. Sridhar S. Krishnamoorthy
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ABSTRACT

This project presents an **IoT-based smart water monitoring and distribution system** tailored for smart cities, integrated with **power grid and inverter-based energy harvesting**. The core objective is to ensure real-time monitoring of water quality and automate water distribution based on user demand levels.

Conventional water distribution systems often suffer from **corruption, inefficiency, and lack of transparency**, largely due to manual, decentralized management. With urban populations increasing rapidly, there is a critical need to modernize water infrastructure to ensure sustainable access.

The proposed solution utilizes **IoT technology**, including **microcontrollers, sensors, and actuators**, to monitor key parameters such as **water purity, overhead tank level, flow rate, and pipeline leakage**. Real-time data from individual households is collected and processed, with the results being visualized on a web-based dashboard.

This intelligent system enhances operational efficiency, minimizes water wastage, and ensures equitable water distribution. Additionally, **renewable energy harvesting** through grid and inverter-based mechanisms supports energy-efficient, autonomous operation—making it a sustainable solution for future smart cities.

79. HYBRID RENEWABLE PV-FUEL CELL EV CHARGING WITH INTELLIGENT RNN-BASED STATE-OF-CHARGE MANAGEMENT

Mr. R. Sathish, Jeeva. V Silambarasan. S Lenin. S Hariharan. T

Dhanalakshmi Srinivasan Engineering College (Autonomous)

ABSTRACT

This project focuses on the design and implementation of a **hybrid electric vehicle (EV) charging system** powered by a combination of **photovoltaic (PV) panels** and a **fuel cell**, incorporating intelligent **Recurrent Neural Network (RNN)-based state-of-charge (SOC) management** for optimized energy usage and battery efficiency.

The system integrates a PV array and a fuel cell with an EV battery, enabling **grid-connected operations**. A **Zeta Converter**, guided by an **Artificial Neural Network (ANN)-based Maximum Power Point Tracking (MPPT)** algorithm, is employed to maximize solar power extraction. The fuel cell output is stabilized via a **Proportional-Integral (PI) controller** and fed into the system through a boost converter.

Both the PV and fuel cell systems supply energy to a common **DC bus**, which is interfaced with the power grid using a **three-phase Voltage Source Inverter (VSI)** and **LC filter** to ensure smooth power delivery. A **bidirectional DC-DC converter**, controlled by a PI controller, manages bidirectional energy flow between the DC bus and the EV battery.

A **Recurrent Neural Network (RNN)** is deployed to continuously monitor the **SOC** of the battery, enabling dynamic adjustment of charging and discharging processes. This approach significantly enhances system **reliability, efficiency, and sustainability**, overcoming the intermittent nature of renewable sources.

The entire system is simulated and validated using **MATLAB 2021a Simulink**, proving its potential as a practical solution for intelligent EV charging infrastructure in smart energy environments.

80. SMART IOT MONITORING OF RF ENERGY HARVESTING TECHNIQUES FOR WIRELESS POWER TRANSFER SYSTEM

Mr. M. Asaithambi, Bavishna. A, Gayathri. A, Midhuna. N, Pavithra. P
Dhanalakshmi Srinivasan Engineering College (Autonomous)

ABSTRACT

Environmental energy-harvesting technologies—including **solar, vibration**, and **radio frequency (RF) energies**—have the potential to significantly extend the operational lifespan of **wireless sensor nodes** while also reducing their size, weight, and cost. Traditional RF energy harvester design methodologies often rely on **ideal energy sources** and **resistive loads**; however, real-world RF energy conversion and power management involve complex dynamics that cannot be fully captured using these conventional approaches.

This study proposes an **integrated design methodology** for **RF energy harvesting and management**, aimed at achieving desired output parameters and enabling effective **load operation** during the design phase. Using this methodology, a **highly integrated, high-performance RF Energy-Harvesting Wireless Sensor Node (RF-EH WSN)** has been developed.

In the proposed system, the **solar panel output** is directed to a **boost converter**, which is regulated by a **Proportional-Integral (PI) controller** to ensure stable voltage levels. The boost converter's output is then fed into a **high-frequency inverter**, which supplies power to both the **RF transmitter** and **receiver**. The alternating current (AC) output is subsequently converted into **direct current (DC)** via a **diode bridge rectifier**, and the filtered output from the **capacitor filter** is continuously monitored and measured through **wireless IoT sensor nodes**.

This approach demonstrates a reliable and energy-efficient solution for powering wireless sensor networks using **hybrid energy-harvesting techniques**, paving the way for smarter, self-sustaining embedded systems.

81. AN INTEGRATED OPTIMIZATION TECHNIQUE FOR HIGH POWER DWPT SYSTEM IN ELECTRIC VEHICLES

Mrs. N. Saranya, R. Ragul M. Dinesh S. Ragul K. Mahendran
Dhanalakshmi Srinivasan Engineering College (Autonomous)

ABSTRACT

Dynamic Wireless Power Transfer (DWPT) systems represent a promising solution for charging **Electric Vehicles (EVs)** while in motion, effectively eliminating the need for frequent stops and reducing reliance on large battery capacities. This innovation greatly enhances the convenience of EV use, encourages wider adoption of electric mobility, and contributes to the reduction of greenhouse gas emissions. However, the implementation of **high-power DWPT systems** presents several challenges that must be addressed to ensure reliable and efficient operation.

Key challenges include **energy efficiency**, **system stability**, **electromagnetic interference (EMI)**, and **thermal management**. In the first phase, the electrical parameters of the DWPT system are meticulously optimized to maximize energy transfer efficiency. This involves developing advanced **algorithms and control strategies** to maintain stable operation under varying conditions, such as changes in **vehicle speed**, **coil misalignment**, and **fluctuating load demands**. Important aspects such as **resonant frequency tuning** and **adaptive power control** are also investigated to enhance system responsiveness and overall performance.

The integration of DWPT systems with existing infrastructure also introduces additional considerations, including **scalability**, **cost-effectiveness**, and the need for **standardization** in system design and implementation. By addressing these multifaceted challenges, DWPT systems can be effectively deployed, paving the way for a new era of **efficient and sustainable electric transportation**.

82. MODELING OF DC-DC CONVERTER BASED DC SERIES ELECTRIC SPRING IN DC MICROGRIDS

K. Mohan Kumar, N. Parasaran, M. Mohamed Musraf

Krishnasamy College of Engineering and Technology

ABSTRACT

The integration of **intermittent energy sources** into DC grids has attracted significant attention among researchers. However, this integration introduces power quality issues such as **voltage instability** and **ripples**, especially in large power systems utilizing **Intermittent Renewable Energy Sources (IRES)**. This research explores the implementation of a **DC Series Electric Spring (DCSES)** to reduce the burden on the main grid during periods of insufficient generation from IRES.

This investigation focuses on the development of a **DC-DC converter-based DCSES** equipped with an **Artificial Neural Network (ANN)** based intelligent controller. The system is designed to address key challenges including **voltage regulation**, **harmonic mitigation**, and **battery lifetime enhancement** by minimizing the required storage capacity. The entire system is modeled and simulated using **MATLAB/Simulink**.

Performance metrics such as **voltage regulation**, **DC harmonic distortion**, and **voltage ripple** are thoroughly analyzed and compared with those achieved using conventional **Proportional-Integral (PI) controllers**. The results demonstrate that the **Levenberg–Marquardt Backpropagation (LMBP)** based ANN controller for DCSES, with its **fast and accurate convergence**, delivers significantly better performance compared to traditional PI controllers.

83. ANALYSIS OF AN INTELLIGENT CONTROL BASED STABILITY IMPROVEMENT OF A MICRO-GRID

R. Bala, A. Sanjai, S. Sivasankaran
Krishnasamy College of Engineering and Technology

ABSTRACT

In modern power systems, the increasing integration of **renewable energy sources** poses significant challenges to the **stability of microgrids**. This study presents an **intelligent control scheme** aimed at enhancing microgrid stability by synchronizing **artificial intelligence (AI)**-based control mechanisms with **optimization techniques** to improve overall **power quality**.

The paper contributes to advancements in **smart grid technologies**, focusing on **reliable and sustainable power distribution**. It examines **small-signal stability** in the presence of uncertainties such as load variations, limitations in power generation capacity, and sluggish feedback behavior in certain microgrid systems. The study also analyzes instability arising from **transient phenomena**, including **losses in distributed energy resources (DERs)**, **islanding**, **transition operations**, **load shedding**, and **faults**.

Particular attention is given to **voltage fluctuations**, explored in relation to load types, fault types, power imbalances, and system responses. A comparison of existing controllers is conducted based on metrics such as **steady-state error**, **response time**, and **robustness**. Additionally, **voltage**, **frequency**, and **active/reactive power** control strategies are assessed within both **hierarchical** and **distributed control schemes**.

The proposed intelligent controller predicts and optimally tunes parameters in both the **inner current control loop** and **outer power control loop**, adapting to various system conditions. The controller is implemented and tested using the **MATLAB/Simulink** platform. Results highlight the adaptive controller's effectiveness in improving microgrid stability across diverse operational scenarios.

84. ENHANCED SOLAR PV PERFORMANCE WITH DUAL CONTROL MPPT IN DC-DC CONVERTER APPLICATIONS

Mrs. P. Suriya, Vengatesan R, Vijay S, Asraf Deen M, Pugalarasan S
Dhanalakshmi Srinivasan Engineering College (Autonomous)

ABSTRACT

This project aims to significantly enhance the performance of **solar photovoltaic (PV)** systems through the implementation of **dual Maximum Power Point Tracking (MPPT)** algorithms. These algorithms are designed to optimize energy extraction from solar panels, ensuring maximum efficiency even as environmental conditions—such as changes in solar irradiance and temperature—fluctuate throughout the day.

By employing a **dual MPPT control strategy**, the system can effectively respond to environmental variations, ensuring that solar panels operate at their peak efficiency and harvest the maximum amount of energy possible under diverse circumstances.

In addition to the MPPT capabilities, the project integrates a **real-time monitoring system** that displays key operational parameters, such as **voltage**, **current**, and **power output**. This functionality enables users to assess performance, identify trends, diagnose issues, and make informed adjustments to optimize energy production. The system also includes an **automatic grid connection feature**, which connects the system to the grid when solar energy production exceeds a specified threshold. This ensures efficient utilization of excess energy, reduces reliance on conventional grid power sources, and contributes to **grid stability** by supplying renewable energy when available.

The primary objective of this project is to maximize the energy harvest from **solar panels** while fostering greater independence from non-renewable energy sources. By improving the reliability and efficiency of solar PV systems, the project encourages broader adoption of **renewable energy technologies** in residential, commercial, and industrial applications. Expected outcomes include enhanced energy yield, lower operational costs, and a substantial reduction in the **carbon footprint** associated with energy consumption.

Additionally, by demonstrating the viability and effectiveness of advanced MPPT strategies, the project aims to inspire further innovations in solar technology, supporting global efforts to transition toward a more sustainable energy future. This initiative not only addresses current energy challenges but also aligns with **global sustainability goals**, promoting a cleaner, greener planet for future generations.

85. SINGLE STAGE AC/DC RESONANT CONVERTER BASED ON EV CHARGING

Mr. R. Sathish, Varadharajan A, Devarenga G, Farzon ahamed S, Vigneshwara S
Dhanalakshmi Srinivasan Engineering College (Autonomous)

ABSTRACT

This project presents a novel **single-stage AC/DC resonant converter** designed for **electric vehicle (EV) charging applications**, addressing the growing demand for efficient, compact, and cost-effective charging solutions. The converter utilizes **resonant techniques** to achieve **soft-switching**, thereby minimizing switching losses, reducing **electromagnetic interference (EMI)**, and enhancing overall efficiency. By integrating the AC-DC conversion process into a single stage, the proposed design eliminates the need for multiple conversion stages, leading to a simpler topology and lower component count. This not only reduces system complexity but also optimizes space, making it particularly well-suited for both **residential** and **public EV charging stations**.

The converter is capable of providing **stable and efficient power delivery** to the EV battery, even under varying load conditions, which is critical for fast and reliable EV charging. The use of resonant circuits also contributes to reduced EMI, ensuring compliance with stringent regulatory standards. The results demonstrate significant improvements in efficiency compared to conventional non-resonant converters, with reductions in both **switching** and **conduction losses**. Additionally, the converter exhibits **robust thermal performance**, contributing to longer operational lifespans and reduced maintenance costs.

This work highlights the potential of the **single-stage AC/DC resonant converter** as a viable solution for the next generation of EV charging infrastructure, offering advantages in terms of **efficiency**, **cost**, and **compactness**.

86. SOLAR BASED HIGH-GAIN DC-DC CONVERTER WITH INVERSE GAIN CHARACTERISTIC

Mr. M. Asaithambi, Vishwanth M, Avinash S, Barani Kumar M, Dineshkumar

Dhanalakshmi Srinivasan Engineering College (Autonomous), Perambalur,

Abstract:

Renewable energy sources, particularly **solar** and **wind energies**, are increasingly penetrating the market, with **solar energy** being particularly suitable for the **Gulf Cooperation Council (GCC)** region. Typically, the output voltage of **Photovoltaic (PV) strings** is limited to approximately **1500 V** due to safety constraints, requiring a boost to higher **DC levels** for **High-Voltage DC (HVDC)** and **AC grid applications**, in order to achieve the required **DC-Link voltage**. However, conventional **non-isolated DC-DC converters** offer a limited practical gain due to their parasitic elements. **Isolated DC-DC converters**, which utilize costly **high-frequency transformers**, have limited power capability and increased footprint in **HVDC** applications, often associated with higher losses.

An alternative solution involves connecting conventional DC-DC converters in different combinations to achieve higher gains while maintaining high efficiency. This thesis proposes the **cascade** and/or **series connection** of **DC-DC modules** as a solution to meet the high conversion ratio requirements. The proposed system is based on **Cuk** and **Single-Ended Primary Inductor Converter (SEPIC)** topologies, which are suitable for **PV applications** due to their continuous input current characteristics and reduced bulkiness of input-side capacitor filters.

The paper provides detailed theoretical models of the proposed topologies, followed by practical verification through low-power prototypes. A **sensitivity analysis** is conducted to assess the impact of small variations in parasitic inductor resistances on the overall system gain, revealing that the **input inductor** significantly affects the system, especially at higher duty ratios (i. e., higher gains). Simulations for **high-power applications** (up to 1 MW) demonstrate that the proposed converters exhibit **efficiency levels higher than 90%**, showcasing their potential for **high-power solar applications**.

87. AI-POWERED SMART INVERTER FOR PREDICTIVE LOAD MANAGEMENT AND SOLAR ENERGY OPTIMIZATION

Dr. K. Anbarasan, R. Kavi Arasu, P. Anbarasan, A. Kilbert William, S. Dhayanithi,

Dhanalakshmi Srinivasan Engineering College (Autonomous)

Abstract:

Nowadays, users face significant disadvantages related to unreliable power supply, inefficient energy use, and the risk of system overloads. Traditional inverters often lack the capability to predict load duration or monitor solar panel and battery performance in real-time, which leads to sudden power outages, reduced battery lifespan, and potential hardware damage. These issues are particularly critical in off-grid or remote locations where solar energy is the primary power source, making it essential to optimize energy consumption.

The proposed system addresses these challenges by integrating a solar panel, voltage sensors, and a microcontroller that sends real-time data to an AI-based predictive model. This model analyzes the solar panel output and battery voltage levels to accurately forecast the load duration and energy availability. By predicting how long the battery can sustain the load, the system ensures efficient energy management, preventing overloads and optimizing battery usage.

This intelligent approach enhances the reliability of the power supply, reduces maintenance costs, and maximizes the longevity of the battery, providing a robust solution for solar energy users, especially in remote and off-grid areas. Ultimately, the solution offers a reliable way to ensure continuous, efficient power supply in areas where access to traditional grid power is either unavailable or unreliable.

The integration of predictive load management, real-time monitoring, and solar energy optimization ensures that the system can meet the energy needs of users, extend battery life, and significantly reduce the risk of power outages and hardware damage.

88. IOT-ENABLED ELECTRIC VEHICLES MAINTENANCE FOR SMART CHARGING PILES

Mr. K. Vijayakanth, Srikanth B, Siva S, Vishva J, Sivamanicam M
Dhanalakshmi Srinivasan Engineering College (Autonomous)

ABSTRACT

- This project aims to develop a Smart Charging Piles integrated with solar panels to facilitate the recharging of electric vehicles in communal parking areas.
- The Smart Charging Piles will enable users to monitor their energy consumption, select charging options, and make payments through a mobile app.
- The solar panels will generate clean energy to power the charging infrastructure, reducing the reliance on traditional power sources and minimizing carbon emissions.
- The system will also provide real-time data on energy usage and availability, allowing operators to optimize the use of the charging infrastructure.
- The proposed solution will address the growing demand for sustainable transportation in urban areas while improving the convenience and accessibility of EV charging, all while utilizing renewable energy sources.

89. ELECTRICAL VEHICLE TO VEHICLE ENERGY TRANSFER USING ON-BOARD CONVERTER

Mrs. Suriya, Abishek. S, Karthik Raja. K, Prasanth. K, Rajesh. V

Dhanalakshmi Srinivasan Engineering College (Autonomous)

ABSTRACT

A promising idea for the future of the electric transportation sector is the transfer of energy and communication between two vehicles.

Electric vehicle to vehicle energy transfer system represent a promising solution for charging vehicle(EVs) while in emergency, due to the insufficiency of charging stations. The V2V method will effectively eliminate power from transmitting end to receiving end.

This innavation can significantly enhance the convenience of using EVs, they also promote wider adoptaion of electric mobility, and ultimately contribute to the reduction of green house gas emission.

However the implementation of V2V charging optimization methods and analyzes the power electronics architures for effective V2v power transfer.

90. ADVANCED TRANSFORMER MONITORING AND LOAD DISTRIBUTION WITH IOT INTEGRATION

Mr. M. Asaithambi, Rajavel V, Rajesh S, Guru Prasad S, Rengasamy G
Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

The rapid advancement of smart technologies has underscored the necessity for intelligent systems to ensure the optimal performance and longevity of critical infrastructure such as transformers. This project introduces an IoT-based real-time health monitoring and load management solution specifically designed for transformers, addressing the challenges of overload, overheating, and unplanned outages. By leveraging advanced sensors and IoT technology, the system continuously tracks essential parameters, including temperature and load, to ensure operational stability and mitigate potential failures. A key feature of this system is its intelligent load management mechanism, which dynamically distributes the electrical load between two transformers to prevent overloading.

This prevents overheating, ensuring that transformers operate within safe temperature limits. The IoT-enabled design facilitates remote monitoring and management, providing real-time data access to electricity board stations and authorized personnel. Alerts for critical issues such as excessive load, overheating, or equipment failure are instantly communicated through the IoT platform. These alerts empower operators to take prompt corrective actions, minimizing service interruptions and enhancing maintenance efficiency.

91. DESIGN OF HARMONIC FILTERS FOR SUPRAHARMONICS SUPPRESSION IN POWER ELECTRONICS DOMINATED POWER SYSTEM

Mrs. N. Saranya, Mohamed Yasin A, Logeshwaran M, Raghu S, Mahesh U
Dhanalakshmi Srinivasan Engineering College (Autonomous)

ABSTRACT

Designing harmonic power filters for supraharmonic suppression in power electronics-dominated power systems involves developing systems that effectively mitigate unwanted high-frequency noise (supraharmonics) caused by modern power electronics devices In modern power systems dominated by power electronics, the presence of supraharmonics—frequencies beyond the traditional harmonic range—poses significant challenges, including interference and reduced system performance

This paper presents a comprehensive design approach for harmonic power filters aimed at suppressing these detrimental supraharmonics. The proposed hybrid filter combines the strengths of both active and passive filtering techniques to achieve effective and efficient suppression of high-frequency noise

The harmonic filter design integrates active power filters (APFs) and passive power filters (PPFs). Active filters, equipped with advanced control strategies, dynamically adjust to compensate for varying supraharmonic frequencies, providing precise and adaptable filtering. Passive filters, consisting of inductors, capacitors, and resistors, are tuned to target specific frequency ranges

92. HIGH POWER FACTOR AND HIGH STEP-DOWN BRIDGELESS SEPIC CONVERTER BASED EV CHARGING

Dr. K. Anbarasan, Vishwa K, Praveen E, Surya R, Saravanan S
Dhanalakshmi Srinivasan Engineering College (Autonomous)

ABSTRACT

The low voltage electric vehicles (LVEVs), particularly, electric two and three wheelers, are the most dominant versions of the EVs, and also have a large share in the EV global market. One of the major difficulties faced by the EV industry in many countries, is the unavailability of proper grid favorable, good power quality charging systems. As a result, the use of Internal Combustion (IC) engines continue even after the significant advantages EVs possess over the former. Unlike many existing high power factor (HPF) AC-DC converter-based battery chargers, this topology ensures continuous current flow on both the input and output sides, reducing the need for large filters due to significantly lower ripple content. Finally, the design, operating modes, and performance of the charging circuitry are validated through simulations, with the results discussed for performance verification. As an aftermath of this problem, the LVEVs' chargers that are available now, face issues of low power factor and considerable harmonic current distortion at the input side, which causes problems at the grid side as well as for the charger performance. In Several active PFC topologies that are based on normal buck, boost and buck-boost converters have been demonstrated in the literature for the implementation of the single stage charger topology. The active PFC topologies with the diode bridge rectifier (DBR) at the front end, suffer significant losses, cause majorly due to the conduction of the diodes.

93. FRESHGUARD PRO-SENSING TECHNOLOGY

Nisha Priyadharshini J, Pooja S V, Roshni P R

Dhanalakshmi Srinivasan Engineering College (Autonomous),

Abstract

The project aims to design an automated, efficient, and cheaper gadget for identifying the freshness of fruits using gas sensors and a microcontroller. There are growing concerns related to the safety of food products, especially vegetables and fruits. This has raised a need for real-time monitoring to prevent spoilage and food losses. The proposed system utilizes the MQ135 gas sensor to detect the concentration of gases such as ammonia, carbon dioxide, and other volatile organic compounds released during the ripening and decay processes.

94. AUTOMATIC PLANT WATERING SYSTEM USING ARDUINO UNO

Praveen Kumar A, Purushothaman K, Sreeram S P

Dhanalakshmi Srinivasan Engineering College (Autonomous)

Abstract

Monitoring and preserving ideal soil moisture levels in real-time is made easy and intelligent by the Automatic Plant Watering System using Arduino Uno. This system continuously measures the water content in the soil by means of an Arduino Uno microcontroller interfaced with a soil moisture sensor. On an LCD screen, the gathered data shows users real-time views of the moisture condition. The system automatically turns on a water pump to irrigate the plants when the soil moisture level falls below a specified level, ensuring ideal hydration. The pump shuts off once the intended moisture level is reached, preventing overwatering and water waste. Perfect for home gardens, agriculture, and smart living, this project combines sensors, actuators, and real-time data visualization.

95. IOT DRIVE COST REDUCTION STRATEGIC FOR ON GRID SOLAR POWER GENERATION

Mugundan Ad, Kathiravan R, Vetrivel V

Abstract

The project titled “IoT-Driven Cost Reduction Strategies for On-Grid Solar Power Generation” focuses on enhancing the efficiency and affordability of solar energy systems through the integration of Internet of Things (IoT) technologies. On-grid solar systems, which are connected to the utility grid, provide a sustainable energy source while reducing dependence on conventional power. However, maximizing their efficiency and minimizing operational costs require intelligent control and real-time data insights.

This project utilizes current (SCT-013-030) and voltage (ZMPT101B) sensors to measure power usage, with data displayed on a 16x2 LCD I2C screen. The system features a relay-based switching mechanism that automatically alternates between solar power and the utility grid based on availability and demand. The ESP32 microcontroller serves as the central processor, transmitting data to the Blynk IoT platform, allowing users to monitor system performance remotely through a mobile app.

The system aims to optimize energy consumption, reduce electricity bills, and minimize grid reliance by prioritizing solar usage. Data collected is used for performance analysis and predictive maintenance. By integrating smart monitoring and automated control, this project contributes to the development of cost-effective, intelligent, and eco-friendly on-grid solar power solutions, aligning with modern energy sustainability goals.

96. ADVANCED HYBRID CHARGING STATION FOR ELECTRIC VEHICLE USING Z-SOURCE QUADRATIC IMPROVED ZETA CONVERTER AND MPPT OPTIMIZATION WITH ENERGY STORAGE

Mr. R. Sathish, Kathiravan R, Dinesh Kumar S, Rethneshwaran M, Jayasurya M
Dhanalakshmi Srinivasan Engineering College (Autonomous)

Abstract

The widespread adoption of electric vehicles (EVs) is a critical component of the transition towards more sustainable transportation systems. However, the limited driving range and long charging times of EVs have been key barriers to their widespread acceptance. Addressing these challenges is essential for accelerating the transition to electric mobility. Hence, this project proposes an advanced hybrid charging station for electric vehicles using a Z-source quadratic improved boost Zeta converter and MPPT optimization with energy storage. At the core of the system is the PV panel, which captures solar energy and feeds it into a sophisticated Z-source quadratic improved boost Zeta converter, enhancing the output power of the PV system to the required level for the EV.

Moreover, a Crayfish optimized Radial Basis Function Neural Network (RBFNN)-based Maximum Power Point Tracking (MPPT) algorithm ensures that the PV system operates at its maximum efficiency regardless of varying environmental conditions. The bidirectional DC-DC converter is used for charging and discharging based on the battery needs. Additionally, the excess energy from the PV system is sent to the grid through a single-phase Voltage Source Inverter (VSI), which converts the DC into AC power. During peak times, the grid system provides supplementary power to the EV battery.

97. DESIGN AND DEVELOPMENT OF AN ENERGY-EFFICIENT MULTI-PURPOSE PORTABLE AIR COMPRESSOR FOR INDUSTRIAL AND DOMESTIC APPLICATIONS

Adhavan R, Anirudh A, Dhiraj D V
K Ramakrishnan College of Technology

Abstract:

The research implements a lightweight portable air compressor design that eliminates power waste and integrates GPS-based location sensors. A GPS-based system builds its foundation on the ESP32 microcontroller to deliver dependable air compression power during outdoor use such as tire inflation, and provides real-time tracking functionality. The device operates with rechargeable batteries, enabling its use as a mobile system, especially during emergencies or in remote locations. Through its automation and security features, the project delivers an efficient smart solution for mobile applications.

Keywords: Portable Air Compressor, ESP32 Microcontroller, GPS Location Tracking, Lithium-ion Battery, DC-DC Buck Converter, Pressure Monitoring, IoT-Based System, Smart Embedded Design, Field Maintenance Tool, Low Power Device, Real-Time Monitoring, Mobile Automation, Rechargeable System, Energy Efficiency, Emergency Applications.

98. NEXT-GEN VEHICLE SECURITY: IMPLEMENTING RFID FOR KEYLESS IGNITION SYSTEMS

R. Gayathri, R. Karuppaiah, S. Deebak, M. Abdulrahman
Dhanalakshmi Engineering College (Autonomous), Perambalur

Abstract:

The project focuses on developing a keyless vehicle ignition system powered by Radio Frequency Identification (RFID) technology. The goal is to replace traditional key-based ignition systems with a more secure and convenient solution that leverages the advantages of RFID. By incorporating RFID technology, this system aims to prevent unauthorized access to the vehicle while improving the user experience. In the proposed setup, a unique RFID tag is used as a key to authenticate the vehicle owner. The system comprises three main components: the RFID reader, a microcontroller, and a relay mechanism. The RFID reader, embedded in the vehicle, scans for the RFID tag when the user attempts to start the engine. If a valid tag is detected, the microcontroller processes the data and sends a signal to the relay mechanism, enabling the vehicle's ignition system to power up. If an invalid or no tag is detected, the vehicle remains inaccessible, thus preventing unauthorized users from starting the vehicle. The microcontroller plays a pivotal role in this process, serving as the brain of the system. It not only reads and verifies the RFID data but also ensures the security protocols are followed. It is programmed to interact with the relay system, allowing for seamless integration between the RFID authentication and the ignition control. The system's reliability and security are enhanced by the fact that RFID tags are difficult to duplicate or counterfeit, offering a more robust defense compared to traditional mechanical keys. Additionally, the convenience factor is significantly improved, as vehicle owners no longer need to fumble with keys, making this system ideal for modern vehicles. This RFID-based ignition system represents an innovative step forward in the evolution of vehicle access systems, offering a secure and efficient alternative to traditional key-based methods.

99. AI BLACK AND WHITE IMAGE COLORIZATION USING OPENCV SENSOR

M. Noorjahan, S. Kowsick, S. Gurudeep, V. Hari Prabakaran
Dhanalakshmi Srinivasan Engineering College (Autonomous)

Abstract:

The process of colorizing black and white images has significantly advanced with the integration of Artificial Intelligence (AI) and computer vision techniques. This project focuses on automated image colorization using deep learning models combined with OpenCV. Convolutional Neural Networks (CNNs) are employed to predict realistic color values for grayscale images by learning from large datasets. OpenCV enhances the system's image processing, offering efficient input/output handling and visualization tools. The model eliminates the need for manual coloring, producing visually accurate and natural-looking images. It finds practical applications in fields such as historical photo restoration, medical imaging, and surveillance. With a diverse training set, the system is capable of adapting to various scenes and textures, delivering high-quality results. This work demonstrates the effective fusion of AI and traditional computer vision for intelligent and automated image enhancement.

Keywords:
Image Colorization, Black and White to Color, OpenCV, Artificial Intelligence, Deep Learning, Image Processing, Computer Vision, Grayscale Images

100. Solar Power Bank

Mr. Prakash ( ), A. Akash, R. Abishake, P. Mani Bharathi, J. Jeffrin
Dhanalakshmi Srinivasan Engineering College (Autonomous), Perambalur

Abstract:

This project presents the design and development of a Mini Rechargeable Power Supply, a compact and portable device capable of delivering a stable DC output for low-power electronic applications. The system integrates a rechargeable lithium-ion battery, a charging circuit, and a voltage regulation module to ensure reliable performance and safety. Designed for versatility, it can power microcontrollers, sensors, and other small devices, making it ideal for prototyping, portable electronics, and emergency backup use. The mini power supply emphasizes energy efficiency, portability, and user-friendly operation, providing a practical solution for modern electronics enthusiasts and engineers.

Keywords:
ATMega328p Microcontroller, Solar Panel, Charge Controller, Arduino (NANO), Battery, Current and Voltage Sensors

101. SOLAR TRACKING SYSTEM USING ARDUINO

Mr. Prakash, S. Dineshkumar, Maha Ganesh, J. Jaganraj
Dhanalakshmi Srinivasan Engineering College (Autonomous)

Abstract:

A solar tracking system using Arduino is designed and built. This system collects free energy from the sun, stores it in the battery, and then converts this energy to the respective alternating current, making the energy usable in normal homes as an independent power source. The system is designed to react to its environment in the shortest amount of time. Any errors in software and hardware are controlled or eliminated. The system is tested for its real-time responsiveness, reliability, stability, and safety. It is designed to be resistant to weather, temperature, and minor mechanical stresses.

Keywords:
Solar Panel, Arduino, Dual Axis Motor, Power Supply, Stepper Motor, Display

102. SMART MEDICINE REMINDER SYSTEM

Vijay Vs, Vishwa G, Sudharsanan M

Abstract:

With the increasing need for medication management among the elderly and patients with chronic illnesses, a smart medicine reminder system is an essential solution. This paper presents an Arduino-based Smart Medicine Reminder System that alerts users to take medicine on time through a buzzer sound, LED indicators for specific tablets, and an LED display showing the remaining quantity of each tablet. The system ensures timely medication intake, reducing the chances of missed doses and improving patient adherence. The proposed system is cost-effective, easy to use, and can be customized according to the user's needs.

103. SMART IOT MONITORING OF RF ENERGY HARVESTING TECHNIQUES FOR WIRELESS POWER TRANSFER SYSTEM

Mr. M. Asaithambi, N. Midhuna, A. Bavishna, P. Pavithra, A. Gayathri

Dhanalakshmi Srinivasan Engineering College (Autonomous)

Abstract:

Environmental energy-harvesting technologies, such as solar, vibration, and radio frequency (RF) energies, can effectively increase the lifespan of wireless sensor nodes while reducing their size, weight, and cost. Generally, RF energy harvester design methods are based on ideal energy sources and resistive loads, whereas real RF energy conversion and management are extremely complex and cannot be verified using conventional design methods.

In this study, an RF energy harvesting and management combined design method is proposed to achieve the requisite output parameters of an RF energy harvester to enable load operation during the design phase. Based on the proposed method, a highly integrated high-performance RF Energy-Harvesting Wireless Sensor Node (RF-EH WSN) is constructed.

The solar panel output is given to the boost converter, which is controlled by a PI controller. The output of the boost converter is applied to the high-frequency inverter, and then it is supplied to the RF transmitter and receiver to convert AC supply into DC supply with the help of a Diode Bridge Rectifier. The output of the capacitor filter is measured and monitored with the help of wireless IoT sensor nodes.

104. DUAL BATTERY RELIABILITY ASSESSMENT IN ELECTRIC VEHICLE'S BY USING LITHIUM ION BATTERY

Mrs. Thenmozhi, Anbu Selvan J, Dhanush Sanjai V, Gowtham S, Rajesh Kannan

Dhanalakshmi Srinivasan Engineering College (Autonomous)

Abstract:

This project focuses on assessing battery reliability in electric vehicles (EVs) through a state-of-the-art monitoring system using Arduino Uno. The system integrates multiple sensors, including voltage, temperature, and flame sensors, to ensure comprehensive battery health assessment.

An ultrasonic sensor is used for obstacle detection, enhancing safety by preventing collisions. The system features real-time data display on an LCD, which provides continuous feedback on battery status and environmental conditions.

An automated response mechanism, involving a relay and motor, halts the vehicle if a fire is detected, and a buzzer alerts the user to potential issues. This integrated approach aims to improve battery reliability, vehicle safety, and overall performance in electric vehicles.

105. VOICE CONTROLLED BOMB DIFFUSION ROBOT USING BLUETOOTH COMMUNICATION

B. Aravindhan, B. Manish Kiruthick Roshan, A. Monishan

Abstract:

This project presents an innovative autonomous surveillance robot designed for reconnaissance and landmine detection, integrating advanced technologies for enhanced safety and efficiency. The robot is powered by the Raspberry Pi Pico microcontroller, which effectively manages sensor data, motor control, and cloud-based communication for remote operation. Equipped with an ESP32 CAM module, the robot provides live video streaming, allowing users to monitor surroundings in real time. The ESP32 CAM also captures still images and transmits them to the Telegram app, ensuring remote operators receive timely visual updates for better situational awareness. This dual functionality enhances the system's reliability and effectiveness in critical scenarios.

A key feature is the integrated metal detector, which identifies buried landmines. Upon detection, a specialized cutter mechanism is deployed to neutralize the threat by severing wires, ensuring safe and efficient landmine clearance. For navigation, the robot uses an ultrasonic sensor to detect obstacles, enabling autonomous path adjustment and safe movement in complex environments. Cloud-based automation allows remote control via the internet, providing operators with seamless access to the robot’s functionalities.

This combination of embedded systems, IoT, and robotics makes the system versatile for defense, military, and security operations. With capabilities like real-time feedback, automated landmine neutralization, live video monitoring, and photo updates via Telegram, this robot offers a powerful solution for surveillance and explosive threat management. It is particularly valuable in hazardous areas, where its autonomous and remote operation significantly reduces risks to human personnel while ensuring precise and efficient mission execution.

106. RF ID – BASED EMBEDDED ROBOT CAR FOR HUMAN TRACKING

Mrs. B. Sujitha, S. Rajamohan, D. Saffiyulla, S. Sanjeev, R. Vignesh

Dhanalakshmi Srinivasan Engineering College (Autonomous)

Abstract:

This research presents the development of an RFID-based embedded robot car designed to track a human subject. The system leverages Radio Frequency Identification (RFID) technology to accurately identify and locate the target individual. The robot car, equipped with essential sensors and actuators, is capable of autonomous navigation within a defined environment. The core functionality of the system involves the RFID reader, which continuously scans for the target's RFID tag. Upon detection, the unique ID is transmitted to the microcontroller, which processes the information to determine the relative position of the target. The microcontroller then generates control signals to the motor driver, directing the robot car's movement toward the target.

To enhance the system's capabilities, additional sensors, such as ultrasonic sensors or cameras, can be integrated to provide obstacle avoidance and refined tracking. The system's performance is significantly influenced by factors like the RFID reader's sensitivity, the microcontroller's processing speed, and the accuracy of the sensors. By successfully implementing this RFID-based embedded robot car, we aim to contribute to advancements in robotic systems for various applications, including elderly care, security surveillance, and industrial automation. Future research directions may involve exploring more sophisticated tracking algorithms, incorporating advanced sensor fusion techniques, and developing robust error handling mechanisms to ensure reliable and efficient operation.

107. IOT-BASED ACCIDENT MINIMIZATION IN E-VEHICLE MULTIPLE FAULT DETECTION USING AI

Dr. M. Parameswari, J. Gowtham, K. Karthikeyan, R. Gowtham, S. Vinayaga Raghunathan

Dhanalakshmi Srinivasan Engineering College (Autonomous),

Abstract:

The integration of IoT technology in Electric Vehicles (EVs) revolutionizes fault detection and battery management, ensuring optimal performance and safety. By leveraging sensors like voltage and temperature sensors, the system continuously monitors battery status, enabling proactive maintenance to prevent critical failures. Fire sensors further enhance safety by detecting overheating, while an ATmega328P microcontroller coordinates system functions. Wireless connectivity via NodeMCU allows remote monitoring via platforms like Blynk, facilitating real-time status updates and proactive fault management. With features including relay control and an LCD display, the system empowers users to efficiently manage EVs, ensuring reliability and safety.

108. MASTERING ENERGY: A DESIGN GUIDE FOR EFFICIENT MANAGEMENT IN SELF-POWERED SENSOR SYSTEMS

Mrs. A. Thamijunisha, Ankit Kumar, Kalaiselvan K, Ruthiran C, Saravana Kumar P

Dhanalakshmi Srinivasan Engineering College (Autonomous)

Abstract:

This project focuses on the efficient energy harvesting and management system for self-powered sensor systems, which integrates solar panels and piezoelectric sensors to harvest energy. The harvested energy is stored in a battery to ensure a continuous and reliable power supply for system operations. The voltage outputs from the solar panel, piezoelectric sensor, and battery are continuously monitored using a voltage sensor. A DC-DC converter and inverter are used to regulate and convert power to meet various application needs. The system displays real-time data on an LCD and manages the load via a relay for optimal performance. Additionally, temperature and humidity sensors are incorporated to provide comprehensive environmental data for effective energy management, ensuring that the system operates efficiently in various conditions.

109. REAL-TIME IMAGE PROCESSING WITH PYTHON AND OPENCV

Dr. B. Karthiga, Madhesh S, Jothiprasanna S, Karthi K, Kabilan P

Abstract:

This study presents the design and implementation of a real-time image processing system utilizing Python and the OpenCV library. The primary goal is to process video frames in real-time, enabling dynamic analysis and interpretation of visual data. Core image processing techniques, including grayscale conversion, filtering, edge detection, object tracking, and motion detection, are implemented and optimized for performance. Python's extensive ecosystem, combined with OpenCV's high-performance image processing functions, provides an ideal platform for rapid prototyping and deployment. Applications of this system span across various domains such as surveillance, gesture-based control systems, and autonomous navigation. The project emphasizes both the feasibility and efficiency of real-time processing using open-source tools on consumer-grade hardware.

110. FACE RECOGNITION-BASED STUDENT ATTENDANCE SYSTEM WITH LIVENESS VERIFICATION

R. Abinaya, B. Hariharan, P. Ajith, K. Bharathi

Dhanalakshmi Srinivasan Engineering College (Autonomous)

Abstract:

Attendance management is a fundamental aspect of academic and organizational environments, where traditional methods such as manual roll calls and biometric systems often result in inefficiencies, security issues, and disruptions to regular activities. This project proposes a face recognition-based attendance system integrated with liveness detection to provide a contactless, real-time, and automated solution. Utilizing computer vision and deep learning algorithms, the system can detect and authenticate individual faces, thereby recording attendance accurately and securely without physical interaction. By eliminating conventional verification methods—such as calling out names or checking identification cards—this approach enhances operational efficiency and reduces the risk of fraudulent attendance. The system is designed to function effectively under varied lighting conditions and facial orientations, leveraging robust facial feature extraction and classification techniques. Furthermore, it supports scalability and potential integration with cloud services and mobile platforms, making it suitable for modern educational and professional settings. This work demonstrates that intelligent face recognition systems, when implemented thoughtfully, can significantly improve the reliability, accuracy, and user experience of attendance tracking processes.

Keywords:

Face Recognition, Attendance System, Biometric Authentication, Deep Learning, Liveness Detection, Computer Vision.

111. VEHICLE TO VEHICLE COMMUNICATION USING LI-FI TECHNOLOGY

R. Sreenivasan, K. Jevaneswari, J. Sherin Beneditta, K. Rubasri

Abstract:

Wireless communication has become an essential part of our daily lives, relying on the radio spectrum for data transfer. However, there are several challenges associated with using the radio spectrum, including capacity limitations, efficiency, availability, and security concerns. Additionally, the use of Wi-Fi technology has negative effects on the ecosystem, impacting flora and fauna. To overcome these challenges, the concept of Li-Fi (Light Fidelity) technology has emerged as a promising solution. Li-Fi is an advanced communication technology that offers several advantages over traditional radio frequency-based systems.

This project focuses on implementing Li-Fi technology for vehicle-to-vehicle communication to prevent road accidents. The system incorporates sensors such as ultrasonic, gas, and vibration sensors, along with an LCD display, Li-Fi transmitter, and receiver. In the event of an abnormal situation in the front vehicle, the rear vehicle will be notified and can automatically stop to avoid a collision.

In future developments, Li-Fi can be further expanded to classroom environments, where data stored on servers can be transmitted via LED lights installed in the ceilings, and students can receive the data through a Li-Fi receiver (dongle) that they carry.

Keywords:
Li-Fi, LEDs

112. INTEGRATED IOT SYSTEM FOR FALL AND CARDIAC EVENT DETECTION IN SMART HOMES

Nithya Shree M, Parvathavarthini S, Rejolin Nancy A

Abstract:

Accidental falls and sudden cardiac events, particularly in bathrooms, pose significant risks, especially for elderly individuals and patients with chronic conditions. This paper introduces a smart toilet monitoring system that integrates both fall detection and cardiac event monitoring into a unified IoT-based solution. The system uses an ultrasonic sensor to detect changes in user height and a ceiling-mounted PIR motion sensor to monitor inactivity, helping identify potential falls. Cardiac health is continuously monitored using a MAX30102 sensor embedded in a pad-like structure where the user's hand rests. In case of an emergency, the system triggers an alert, partially unlocks the bathroom door, and sends notifications to caregivers via Wi-Fi. Additionally, a push button is provided for manual override in case of false cardiac alerts. Powered by an ESP32 microcontroller, this system presents an efficient and cost-effective approach to improving safety in indoor environments.

Keywords:
Smart toilet, fall detection, cardiac monitoring, ESP32, MAX30102, PIR sensor, IoT healthcare, elderly safety, real-time alert system.

113. INTEGRATED WIRELESS CHARGING RECEIVER FOR ELECTRIC VEHICLES USING A HALF-BRIDGE INVERTER

Mrs. T. Thenmozhi,, Padmanaban. K, Balaji. S, Raja. V, Jayaprathap. S
Dhanalakshmi Srinivasan Engineering College (Autonomous),

Abstract:

The increasing demand for sustainable transportation solutions has accelerated the adoption of Electric Vehicles (EVs), necessitating efficient and user-friendly charging systems. This project presents the design and implementation of an integrated wireless charging receiver for electric vehicles using a half-bridge inverter, offering a novel approach to enhance EV charging convenience and efficiency. The proposed system is divided into two primary sections: the transmit side and the receiving side, enabling seamless wireless power transfer from the grid to the EV. On the transmit side, power from the electrical grid is stepped down using a transformer to ensure a suitable voltage level and converted into high-frequency alternating current (AC) using a half-bridge inverter.

This high-frequency AC is transmitted wirelessly through a specially designed transmit coil, forming the foundation of the inductive power transfer system. The transmit coil is optimized for maximum efficiency, minimizing energy losses during the transfer process. The receiving side of the system features a receiver coil that captures the transmitted power through magnetic coupling. This power is subsequently rectified into direct current (DC) using a robust rectifier circuit, ensuring a stable DC output to charge the EV's battery.

To enhance system functionality, an Arduino microcontroller is integrated into the design to monitor and control the entire charging process. The Arduino ensures efficient power transfer by continuously regulating parameters such as the rectifier output voltage and the battery voltage.

Keywords:
Wireless Charging, Electric Vehicles, Half-Bridge Inverter, Inductive Power Transfer, Arduino Monitoring, Sustainable Transportation.

114. NON-ISOLATED FOUR-PORT DC-DC CONVERTER FOR ELECTRIC VEHICLE APPLICATIONS

Mr. C. Kavikumar,, Kathiravan. P, Abishek. T, Sujith. L
Dhanalakshmi Srinivasan Engineering College (Autonomous),

Abstract:

Renewable energy sources are quite easy to interface with low voltage DC microgrid applications. These systems require only one step of power conversion for effective power flow into the grid. As photovoltaic (PV) systems continue to expand rapidly, recent research has focused on integrating them with other energy sources. This project presents a four-port DC-DC converter that connects photovoltaic solar (PV) and hydrogen-powered fuel cell resources to a low-voltage bipolar DC microgrid. The converter is designed with only one inductor, minimizing circuit complexity and component count.

The performance of the proposed four-port converter is analyzed under various input voltages and load conditions using MATLAB simulations. This study includes a comparative analysis between the dual-input dual-output converter and the proposed four-port converter. The ability of the converter to deliver dual output using a single or dual input source is also evaluated. Simulation results and discussions confirm the effectiveness and versatility of the converter for electric vehicle and renewable energy integration applications.

Keywords:
Four-Port Converter, DC-DC Conversion, Electric Vehicles, Photovoltaic System, Fuel Cell, Low Voltage DC Microgrid, MATLAB Simulation.

115. DUAL AXIS SOLAR POWER TRACKING SYSTEMS

Mrs. N. Saranya, K. Sriram, V. Srinath, V. Vigneswaran, S. Sakthi
Dhanalakshmi Srinivasan Engineering College (Autonomous),

Abstract:

This project focuses on the design and implementation of a simple dual-axis solar tracking system aimed at maximizing energy generation from solar power. To optimize energy output, solar panels must follow the sun's path throughout the day, and a dual-axis tracker enables this by adjusting the panel's orientation both vertically and horizontally. This capability significantly enhances energy capture by allowing continuous alignment with the sun's rays.

The dual-axis tracking system developed in this project allows the solar panel to rotate in all directions for maximum sunlight absorption. In addition to tracking, the system also features environmental sensing capabilities, displaying weather conditions such as rainfall, temperature, and humidity on an LCD screen. The system is built around an Arduino microcontroller and includes a servo motor, stepper motor, raindrop sensor, temperature and humidity sensor, and an LCD display, providing both automation and user feedback for improved performance and monitoring.

Keywords:
Dual Axis Tracking, Solar Energy, Arduino, Servo Motor, Stepper Motor, Weather Sensing, LCD Display.

116. MICRO INVERTER – BATTERY CHARGER CIRCUIT

Thillai Nayaki R, Anusiya K, Sneha V, Sangari G, Sri Priyasamoondeswary R
Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

A battery charging abstract generally outlines the research, problem statement, methodology, and findings of a study related to charging batteries. It focuses on the process of storing electrical energy within a battery, often for later use in portable devices or electric vehicles. The abstract might explore different charging techniques, charger designs, and algorithms used to optimize charging speed, efficiency, and battery lifespan. Here's a more detailed breakdown of what you might find in a battery charging.

117. ELECTRIC VEHICLE CHARGING

Suriya. S, Sundhar Rajan. R, Siva Kumar. V, Vishnuvardan. G. K
Dhanalakshmi Srinivasan Engineering College (Autonomous),

Abstract:

Electrification of vehicles has been recognised as a key part of meeting global climate change targets and a key aspect of sustainable transport. Here, an integrative and bird's-eye view of scholarly research on Electric Vehicles (EV) is provided with a focus on an objective and quantitative determination of research trends. The analyses suggest that areas of EV research linked to (i) charging infrastructure, (ii) EV adoption, (iii) thermal management systems, and (iv) routing problem have been the distinct trending topics in recent years. While hybrid EV proves to have been a dominant keyword, its frequency of use has either flattened out in recent years or is notably on the decline across major subfields of EV research. The findings provide objective indications about the directions to which EV research is currently headed. A secondary outcome is the determination of references that have been most instrumental in developing each major stream of EV research.

Keywords:
Electric Vehicle, Charging Infrastructure, EV Adoption, Hybrid EV, Thermal Management, Routing Problem, Sustainable Transport.

118. MOBILE CELL PHONE CHARGER CIRCUIT USING 555 TIMER

Tamizharasan G, Sandhuru P, Vishal K, Sridharshan S
Dhanalakshmi Srinivasan Engineering College (Autonomous),

Abstract:

The objective of this project is inserting the coin to charge your mobile phone in public places. People who are using mobile phones outside of home or office without charging facilities will find the coin-based mobile phone charger very useful. The system uses an IR (infrared) transmitter and IR receiver to transmit and receive the IR signal at the receiver side. Between the IR transmitter and receiver, a coin is inserted to change the polarity of the pulse in the SCU input. The relay is activated to switch on the 230V charger, which is then used to charge the mobile phone.

Keywords:
Mobile Charger, 555 Timer, IR Transmitter, IR Receiver, Coin-based Charging, Public Charging.

119. SMART ENERGY MANAGEMENT SYSTEM FOR BUILDINGS USING WIRELESS COMMUNICATION

Rajesh R, Sabarinathan G, Vignesh M, Yugendiran S
Dhanalakshmi Srinivasan Engineering College (Autonomous),

Abstract:

This paper presents the design and implementation of a smart building energy management system that leverages wireless communication and self-energy harvesting to optimize electricity consumption. The system addresses the growing need for energy efficiency in buildings by automating appliances, monitoring energy usage in real-time, and optimizing energy consumption patterns based on various factors, such as occupancy, time of day, and energy demand. The system incorporates a central control unit that communicates with various smart devices and sensors throughout the building via wireless communication technologies. The system utilizes self-energy harvesting techniques to power certain components, reducing reliance on external power sources. Simulation results and experimental data demonstrate the effectiveness of the proposed system in achieving significant energy savings and improving overall building energy performance.

Keywords:
Energy Management, Wireless Communication, Smart Building, Energy Efficiency, Self-energy Harvesting, Real-time Monitoring, Energy Consumption.

120. AI-ENABLED IOT SYSTEM FOR PRECISION AGRICULTURE USING SMART SENSORS

Saritha M, Shreemathi D, Senthil Murugan V, Rithika L, Rubika P

Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

The convergence of artificial intelligence (AI) and the Internet of Things (IoT) is transforming traditional agriculture into a data-driven, intelligent system. This paper presents an AI-enabled IoT (AIoT) framework for precision agriculture that utilises smart sensors to monitor critical parameters such as soil moisture, temperature, humidity, pH, and crop health indicators like NDVI and leaf colour. The collected data is processed using AI techniques, including machine learning and deep learning, to predict irrigation needs, detect diseases, and optimise fertiliser usage. By combining real-time environmental sensing with predictive analytics, the proposed system enhances crop productivity, conserves resources, and reduces operational costs. The architecture supports decision-making at both the edge and cloud levels, making it scalable and adaptable to varying farm sizes. This approach empowers farmers with timely, actionable insights while contributing to sustainable and climate-resilient agricultural practices. The study highlights the potential of AIoT in enabling smart farming solutions that are efficient, scalable, and environmentally conscious.

121. CHARGING ONE BATTERY WITH A MOTOR-GENERATOR POWERED BY ANOTHER BATTERY

Seenivasan R, Subash B, Santhoshkumar S, Tamilkaviyan A
Dhanalakshmi Srinivasan Engineering College (Autonomous),

Abstract:

One battery powers the motor, causing it to spin. The spinning motor is mechanically linked to a second motor, which is now acting as a generator. This generator then charges the second battery.

1. Battery 1 provides electrical energy to Motor 1, making its shaft rotate.
2. The rotating shaft of Motor 1 is mechanically connected to the shaft of Motor 2.
3. Motor 2 is forced to rotate by Motor 1. Since its coils are moving through a magnetic field, it acts as a generator, producing electrical energy.
4. The electrical output of Motor 2 is connected to Battery 2, charging it. This setup is inefficient for practical energy generation due to energy losses in each conversion. It's more of a demonstration of energy conversion principles. It might be used in very niche applications where a small amount of isolated charging is needed, but it’s not a primary method for electricity production.

122. HOME AUTOMATION USING ESP8266

Mr. Khadhar Basha, R. Ramkumar, R. Ragul, M. Rahul, S. Mohammed Sheak Dawood
Dhanalakshmi Srinivasan Engineering College (Autonomous),

Abstract:

Home automation is a rapidly growing area within the Internet of Things (IoT) ecosystem, aiming to provide smart, efficient, and user-friendly control over household appliances and systems. This project explores the development of a low-cost, flexible home automation system using the ESP8266 Wi-Fi module, a compact and affordable microcontroller known for its built-in wireless networking capabilities. The primary objective is to enable users to control and monitor their home appliances remotely, thus improving convenience, energy efficiency, and overall lifestyle quality.

The ESP8266 serves as the core of the automation system, connecting various home appliances—such as lights, fans, and other electrical devices—to a Wi-Fi network. Through this connection, users can operate appliances using a smartphone application or a web-based interface, regardless of their physical location. This is achieved by sending control signals over the internet, which the ESP8266 receives and translates into commands that activate relays connected to the appliances.

The system architecture is designed to be modular and scalable, allowing users to integrate a variety of sensors, including temperature, humidity, gas, and motion detectors. These sensors enable automation based on real-time environmental conditions. For example, fans can automatically turn on when a room becomes too warm, or lights can switch off when no motion is detected, leading to better energy management and enhanced comfort.

Security is also a key consideration. Communication between the user's device and the ESP8266 can be encrypted to prevent unauthorized access. Additionally, user authentication systems can be implemented to ensure that only authorized individuals can control the devices.

One of the standout features of using ESP8266 is its compatibility with various IoT platforms and voice s like Amazon Alexa and Google . This allows for seamless integration into existing smart home ecosystems, enabling voice control and automation routines that fit user preferences.

In conclusion, this project demonstrates how the ESP8266 can be effectively used to build a robust and scalable home automation system. With its low cost, wireless connectivity, and support for real-time monitoring and control, it presents a practical solution for transforming conventional homes into smart living spaces. This approach not only enhances user convenience and safety but also contributes to more efficient energy consumption and modern lifestyle integration.

123. INTELLIGENT DOOR ACCESS CONTROL SYSTEM

T. Boopathy, R. Sivabharathi, Vikas Kumar, Ratan Kumar, N. Muthumanikandan
Dhanalakshmi Srinivasan Engineering College (Autonomous),

Abstract:

The Smart Door Lock System is an IoT-based security solution designed to enhance home and office safety by replacing traditional lock-and-key mechanisms with a more secure, convenient, and remotely accessible system. This project integrates a microcontroller (such as Arduino or ESP32), a biometric scanner or keypad, and wireless connectivity (Wi-Fi/Bluetooth) to authenticate users and control door access. The system allows users to unlock the door using fingerprints, passcodes, or a smartphone application, ensuring flexibility and multi-layered security. It also supports real-time notifications, access logs, and remote control, making it ideal for modern smart home environments. The proposed system not only improves security but also adds convenience, reduces key duplication risks, and provides better control over access management.

124. IOT BASED SMART ENERGY METER MONITORING WITH THEFT DETECTION

Rishabananthan R., Raja Sithick M., Varunraj M., Sanjay S.
Dhanalakshmi Srinivasan Engineering College (Autonomous),

Abstract:

Energy crisis is one of the major problems that the world faces today. The energy crisis can be reduced to a certain extent by properly monitoring our energy consumption and avoiding energy wastage. Nowadays, people face many problems like power theft. Power theft may be a major crime and it also directly affects the economy of our country. This system will detect energy theft easily. The IoT-based electricity meter consists of an Atmega 328 microcontroller with a Wi-Fi module for IoT connection and a GSM module for mobile connection, through which users will receive information via SMS. This smart electricity meter also includes a current sensor that sends the current reading to the microcontroller. The system connects to cell phones via SMS, enabling configuration. In case of an emergency, the information will be shared with the configured number. The system allows setting costs for the unit using four buttons. As the system starts, it shows readings on the IoT screen, which changes with time. In the case of energy theft, the theft will be detected and displayed on the IoT screen. The system also sends SMS alerts to the configured number. After receiving the alert, the operator can turn off the system using IoT to prevent theft, and a message will be sent to the cell phone indicating the system shutdown.

125. FIRE DETECTOR USING FLAME SENSOR

Mrs. Parimala, R. Saravana Prasath, P. Sathish Kumar, A. Praveen Kumar, S. Selvin Charles

Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

Fire accidents can lead to serious damage to life and property. To minimize these risks, early detection of fire is very important. This project titled “Fire Detector Using Flame Sensor” is designed to detect fire at an early stage and alert the user to take immediate action. The system uses a flame sensor which is capable of detecting infrared (IR) light emitted from flames. When the sensor detects a flame, it sends a signal to a microcontroller which then activates an output device such as a buzzer or LED to provide an alert.

The flame sensor operates in a specific wavelength range (typically 760nm to 1100nm), which allows it to respond quickly to the presence of fire or flame. The sensor is connected to a microcontroller like Arduino, which processes the input signal from the sensor. If the sensor value crosses a predefined threshold indicating the presence of a flame, the microcontroller triggers the alarm system.

This system is simple, cost-effective, and easy to build, making it suitable for use in small-scale applications like homes, kitchens, laboratories, and workshops. The main advantage of this project is its ability to detect fire as soon as it appears and alert the user in real-time, thereby helping to avoid major accidents.

In future improvements, the system can be expanded by adding features such as sending alert messages through GSM modules or integrating with IoT platforms for remote monitoring. Additional sensors like temperature or smoke detectors can also be combined with the flame sensor to increase the accuracy and reliability of fire detection.

Overall, this project helps in understanding the practical application of sensors and microcontrollers in real-life safety systems. It also promotes awareness about fire safety and the importance of preventive measures. By using basic electronic components and simple programming, an effective fire detection system can be created to improve safety and reduce the risk of fire-related incidents.

126. WIRELESS POWER TRANSFER SYSTEM

Mohan K, Sanjai R, Saravanan P, Ranjith E
Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

Wireless Power Transfer (WPT) technology enables the transmission of electrical energy through an air gap, eliminating the need for physical connections. This paradigm shift in power delivery leverages electromagnetic fields, employing near-field techniques like inductive and resonant inductive coupling for short-range applications and far-field methods such as radio frequency, microwave, and laser transmission for longer distances. This abstract outlines the fundamental principles, key technologies, and diverse applications of WPT, highlighting its growing significance in consumer electronics, electric vehicles, medical devices, and beyond, paving the way for more convenient, safer, and mobile power solutions.

127. AI AND MACHINE LEARNING-BASED COLOR IMAGING FOR DISEASE DIAGNOSIS AND CLASSIFICATION

Devi D, Harini M, Varshini A S, Surya M, Anitha S,
Roever Engineering College

ABSTRACT

The use of Artificial Intelligence (AI) and Machine Learning (ML) with colour images is changing the way diseases are diagnosed and classified in medicine. By analysing tongue colour images, such hydration and cancer detects with colour or shape. Colour images of the eye can detect conditions such as heart disease and diabetes, including the identification of different stages of these diseases. AI and ML can help doctors identify diseases more accurately and quickly. AI systems, especially deep learning models, are trained to find patterns in these colour images that may be hard for humans to see. These systems can not only detect diseases but also help classify their severity or type, which is important for treatment. This technology can speed up diagnoses and make them more consistent, reducing the need for manual analysis. In addition, AI systems can analysis images in real-time, helping doctors catch diseases early, which can improve patient outcomes. However, challenges still exist, like ensuring the technology works well for all patients and improving its accuracy. As AI and ML continue to advance, they have the potential to make disease diagnosis faster, more accurate, and available to more people around the world.

Key Words: AI, Machine Learning, Deep resent Algorithm, Deep Learning, Ocular Image.

128. COMPREHENSIVE STUDY OF UNIDIRECTIONAL DC-DC CONVERTERS IN EV CHARGING: PERFORMANCE, DESIGN, AND FUTURE DIRECTION

R. Vadivelan, N. Chellammal
SRM Institute of Science and Technology

ABSTRACT

There has to be a dependable and affordable charging infrastructure because electric vehicles (EVs) are becoming more common. To regulate the flow of electricity from the grid or renewable energy sources into the battery of electric vehicles, unidirectional DC-DC converters are necessary. This review provides an in-depth analysis of electric vehicle charging solutions that make use of unidirectional DC-DC converter systems. Considerations for performance include electromagnetic compatibility, power density, voltage regulation, thermal management, and conversion efficiency. Based on the results, this research concludes that buck, boost, buck-boost, and resonant converters are the most suitable for use in Level 1 and Level 2 charging stations. Researchers are looking into digital control methods to improve performance and reduce energy loss through wide-bandgap semiconductor devices. The study takes into account the limitations of electric vehicle charging infrastructure and the operational features of high-voltage equipment. By reviewing prior work and highlighting design trade-offs, this study hopes to assist engineers and academics in finding the best converter topologies for contemporary EV charging networks. Results indicate that unidirectional DC-DC converters are key to creating scalable and energy-efficient charging solutions for EVs.

129. BATTERY TECHNOLOGY IN ELECTRIC VEHICLES

Ms. A. Thamijunisha,, Ms. Indira Devi S, Ms. M. Aakarsha Sheela, Ms. Abirami S

Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

Battery technology is at the heart of the electric vehicle (EV) revolution, playing a crucial role in determining performance, range, cost, and environmental impact. This presentation explores the evolution and current state of battery technologies used in EVs, with a focus on lithium-ion batteries—the dominant choice due to their high energy density and long cycle life. It also examines emerging innovations such as solid-state batteries and silicon anodes, which promise to enhance safety, capacity, and charging speed. Key challenges like cost, charging infrastructure, raw material sourcing, and thermal management are discussed, along with solutions being developed to address them. Finally, the presentation looks ahead to the future of EV battery technology, including advancements in sustainability, recycling, and smart battery management systems. Understanding these technologies is essential to comprehending the broader shift toward clean and sustainable transportation.

130. ENHANCING IMAGE SECURITY VIA ELLIPTIC CURVE CRYPTOGRAPHY AND AES ENCRYPTION IN STREAMLIT-BASED WEB APPLICATION

Bharath Kumar S, Reddy Lakshman Naik B, Jenny Celesta
Sri Venkateswara College of Engineering, Sriperumbudur, India

ABSTRACT

This paper addresses the growing need for secure image handling across sensitive fields like healthcare, defense, and personal communication by introducing a dual-layered security model that combines Elliptic Curve Cryptography (ECC) and random pixel shuffling. As digital interactions increase globally, the risk of unauthorized access to sensitive images has become a critical concern. Traditional image protection methods often lack efficiency or strong security, prompting the development of this lightweight yet robust approach. ECC, known for its high security-to-key-size ratio, ensures strong encryption with reduced computational and storage demands compared to conventional cryptographic methods. Additionally, pixel shuffling acts as a pre-encryption obfuscation layer, making image content resistant to unauthorized analysis. This dual-layer technique enhances both confidentiality and integrity without compromising processing speed. The proposed system is implemented in a Streamlit-based web application with a user-friendly interface, enabling even non-technical users to securely encrypt and protect images. This project offers a practical, efficient, and secure method for safeguarding digital images.

131. POWER DRIVE: A MICROCONTROLLER-BASED ELECTRIC VEHICLE

Ms A. Thamijunisha, Ms S. Anitha, Ms A. Kanishka, Ms K. Aarthi
Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

Power Drive is a microcontroller-based electric vehicle designed to offer a cost-effective and eco-friendly transportation solution. The system uses a microcontroller to control a DC/BLDC motor, manage battery usage, and monitor key parameters like speed and voltage. This project demonstrates how embedded systems can effectively power and control electric vehicles, laying the groundwork for future enhancements like solar charging and smart monitoring.

132. INFRARED MOTION SENSING RELAY SWITCH

Sunil T, Sudharshan S, Sri Kanth L, Sanjay K
Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors. PIR sensors are commonly used in security alarms and automatic lighting applications. PIR sensors detect general movement but do not give information on who or what moved. For that purpose, an imaging IR sensor is required. PIR sensors are commonly called simply "PIR", or sometimes "PID", for "passive infrared detector". The term "passive" refers to the fact that PIR devices do not radiate energy for detection purposes. They work entirely by detecting infrared radiation (radiant heat) emitted by or reflected from objects.

133. HVDC POWER SUPPLY DESIGN

Mahendran H, Harish G, H. Muhamathuarsath, Praveenkumar A
Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

HVDC (High Voltage Direct Current) power supply design involves creating a system that converts AC (Alternating Current) to high voltage DC (Direct Current), often with wide voltage ranges. Key design considerations include efficient power conversion, reliable isolation between high and low voltage levels, and effective control of the output voltage. Common architectures include boost converters, inverters, and voltage doublers/quadruplers.

134. AI-POWERED LOAD FORECASTING SYSTEM

Elumalai R, Arun M, Priyan K, Mathan G
Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

Predicting electricity demand is critical for energy efficiency. This project employs AI to analyze and predict load patterns in smart grids and power distribution systems. It's a forward-thinking project that combines AI with electrical engineering principles to enhance power management. It equips students with knowledge of AI applications in energy systems, enabling them to tackle real-world challenges in power management and distribution.

135. LIFI DATA TRANSFER SYSTEM

N. Vasanthakumar, R. S. Ragul, D. Manivel, S. Akash
Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

LiFi technology utilizes LEDs for transmitting data. It is a subsidiary of optical remote communication technology, utilizing light from LEDs to convey rapid communication. Visible light communication works by turning the LED on and off at an exceptionally high speed, which cannot be seen by the human eye. Li-Fi (Light Fidelity) technology uses light, specifically from LEDs, to transmit data wirelessly. This system works by modulating the intensity of the LED to represent digital data, with the on/off states of the LED representing binary 1 and 0. A photodiode on the receiving end detects these light pulses and converts them back into electrical signals.

136. 4 CHANNEL MULTI-MODE AUDIO AMPLIFIER

Chandru S, Harish R, Monisha J, Aasha G
Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

Sometimes, configurable multichannel amplifiers are needed for experiments or for use in offices or schools. This project is based on the TDA1554Q, configured for multi-mode functions with four-channel outputs. It has four channels, and each channel can provide around 11W over a load of 2 ohms and around 6W over a load of 4 ohms. The circuit will also work with loads ranging from 4 ohms to 16 ohms. The gain of each channel is fixed at 20dB in single-channel mode and 26dB in BTL mode.

137. PASSWORD-BASED CIRCUIT BREAKER

Aakash A, Naveen Varshan M, Nithish S, Arvinth N
Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

A circuit breaker protects electrical circuits from damage in case of overload or short circuit. Its basic function is to detect a fault condition and interrupt current flow. The system uses an 8-bit microcontroller from the 16F877A family. An EEPROM stores the password, which is easily changeable. The password is entered through a keypad, and a relay opens or closes the circuit breaker, which is indicated by a lamp.

138. GENERATE POWER USING MICROTURBINE

Hareesh A, Kalaiselvan B, Dinesh Kumar S, Elancheran E
Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

Presented here is the hydropower generation circuit that generates power from a water pipe in a building using a microturbine. The generated electricity can be used to charge batteries, which can be used for emergency lighting or other such purposes. The microturbines produce kinetic energy, which in turn helps in power generation.

139. POWER SAVING RELAY DRIVER

Sangeetha V, Kaviya T, Mahalakshmi S, Harisudhan R
Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

In many circuits, the switching action is performed by a relay, which in turn activates an external load. The power consumed by the relay may be unsuitable for battery-powered system applications. Here is a simple solution using some inexpensive components to considerably save power.

140. DC PANEL METER USING ARDUINO

Lakshmanan D, Guhan M, Yaswanth E, Nishanth S
Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

Panel meters in regulated power supplies are used to display electrical parameters like voltage and current. Presented here is a circuit to display the DC voltage and current of power supplies, including DIY-type ones.

141. IOT-BASED ENVIRONMENTAL QUALITY MONITORING USING ESP32

Sudharsana R, Tharshitha S. S, Shakthi R

ABSTRACT

This project presents the development of a compact and efficient environmental monitoring system using an ESP32 microcontroller, designed to display real-time air quality, temperature, and humidity data on a 0. 96" OLED screen. The primary goal of this project is to create a low-cost, low-power device capable of monitoring indoor environmental conditions, which can be further adapted for smart home integration or IoT-based environmental tracking systems. The hardware configuration includes three main components: the MQ135 gas sensor for detecting air pollutants (such as ammonia, nitrogen oxide, alcohol, benzene, smoke, and carbon dioxide), the DHT11 sensor for measuring temperature and humidity, and the SSD1306-based OLED display for output visualization. The ESP32, known for its dual-core processor and built-in Wi-Fi/Bluetooth capabilities, serves as the central controller, handling sensor data acquisition and display tasks efficiently. The DHT11 sensor is interfaced through a digital pin with a 10kΩ pull-up resistor, ensuring stable communication. The MQ135 provides analog output reflecting air quality levels and is connected to one of the ESP32's analog input pins. The OLED display operates over the I2C protocol (SDA and SCL lines), using default GPIO 21 and 22 on the ESP32, enabling seamless real-time visualization of collected environmental parameters. This project not only demonstrates effective sensor integration and microcontroller interfacing but also emphasizes low power consumption and compact design suitable for portable or home-embedded systems. It has applications in smart homes, greenhouses, classrooms, or any space where air quality and environmental comfort need to be monitored. Future enhancements may include adding Wi-Fi-based data logging to cloud platforms, mobile notifications for poor air quality alerts, and machine learning-based trend predictions. Overall, this project lays a strong foundation for scalable, user-friendly environmental monitoring solutions that blend hardware simplicity with real-world functionality.

142. SECURE AND REMOTE NFC-BASED HOME AUTOMATION SYSTEM USING RASPBERRY PI PICO W AND FIREBASE INTEGRATION

Krishna Murthy B, Monamukil SS, Laxmanprasath L

Abstract:

The rapid progress of smart home automation using IoT technologies has not replaced traditional local network connections because these systems lack flexibility. The project designs an affordable automatic home control system through the integration of a Raspberry Pi Pico combined with dual relay module. The system enables appliance control through either NFC-enabled phones or RFID cards at local locations and Firebase control from any device while omitting Wi-Fi network requirements. The system adopts Firebase functionality to guarantee real-time safe updates while users can access it securely from any location. Home automation control through this method provides a practical solution particularly for developing countries such as India.

143. WIRELESS POWER TRANSFER SYSTEM FOR EV CHARGING USING TRANSFORMER INDUCTION AND ROBOTIC ALIGNMENT

Vedhanayagam A, Ilamparthi M, Vetrivel R, Jayaprakash M
Dhanalakshmi Srinivasan Engineering College (Autonomous),

ABSTRACT

Wireless power transfer (WPT) for charging electric vehicles (EVs) is a technology that enables the charging of EVs without the need for physical cables or connections. Instead, it utilizes electromagnetic fields to transfer electrical energy from a charging infrastructure to the vehicle. The objective of WPT is to provide a convenient and efficient charging solution for EV owners. By eliminating the need for manual cable connection, WPT offers convenience and simplifies the charging process. It also allows for automated charging systems that can initiate charging without human intervention. WPT systems employ advanced technologies like resonant inductive coupling or magnetic resonance coupling to optimize energy transfer efficiency and minimize power losses. This ensures that the charging process is efficient and minimizes energy wastage. Charging time and power transfer efficiency are the main challenges of wireless power transfer for electric vehicles. It is proposed in this paper to resolve both issues using the transformer induction concept as well as adaptive robotic technology. A high-efficiency WPT system for electric vehicle charging that carries a receiving coil is developed. A prototype is built and tested to verify the feasibility of the proposed design, with unity power factor achieved over an air gap of 8 cm and a maximum sliding distance of 10 cm under various power conditions. The output voltage produced is approximately 15V. The system uses solar energy to produce electric voltage. Safety is a key consideration in WPT systems, incorporating features such as foreign object detection to prevent charging if any non-compatible objects are detected on the charging pad.

144. OPTIMIZING DISTRIBUTED ENERGY RESOURCES IN MICROGRIDS USING THE CUCKOO SEARCH ALGORITHM

Ms. A. Thamijunisha, Solaiyammal S
Dhanalakshmi Srinivasan Engineering College (Autonomous)

ABSTRACT

In this modern scientific era, the usage of power is very high. As usage increases, power demand also increases. This paper addresses the growing power demand by exploring the use of Distributed Energy Resources (DER) within microgrids. The concept of MicroGrid (MG) has been proposed as a way to solve several problems associated with the integration of small generators in distribution feeders. Dispatchable energy resources (non-renewable energy sources) are sources that can be turned on and off in a short amount of time and are generated through various techniques. Non-dispatchable energy resources (renewable energy sources) include nuclear power plants, hydroelectric plants, and wind and wave energy resources, which rely mainly on renewable sources like solar, wind, and geothermal energy. The focus is on minimizing the total operational cost of a microgrid using the Cuckoo Search Algorithm, a meta-heuristic optimization method implemented in MATLAB.

Keywords: Economic Dispatch, Microgrid, Cuckoo Search Algorithm, Renewable Energy, Optimization

145. A DEEP NEURAL NETWORK BASED INFANT FACE DETECTION

Fathima Sulthana S, Mahalakshmi D, Jeeva G, Subha A, Vidhya E
Roever Engineering College, Perambalur, Tamil Nadu, India

ABSTRACT

Computer vision and facial recognition are just two of the industries that deep neural networks have transformed. This research suggests an advanced method for access control that combines face recognition with infant presence detection. The principal goals of the system are to protect young children and improve security by distinguishing between those who are authorized and those who are not. To identify if there is a baby in the observed region, the system first uses a deep neural network. To determine whether a baby is there or not, real-time video feeds or photos must be analyzed. To guarantee reliable performance, the model is trained on a wide range of datasets covering different environmental circumstances. The system then turns its attention to face recognition access control once the existence of the baby has been established. Should the existence of the system then turn its attention to face recognition access control once the existence of the baby has been established. The device can identify and discriminate between allowed and unauthorized individuals if it detects the presence of a baby. In order to reliably identify people, the face recognition module makes use of a deep neural network that has been trained on an extensive dataset of facial photographs. The technology allows entry to the secured area for those who are permitted. On the other hand, in the event that an unauthorized individual is identified, the system initiates an alert process that may involve notifying security personnel or executing other prearranged measures. By integrating infant presence detection, parents or other caregivers can feel even more secure and in-control, knowing that only authorized personnel are allowed access when a baby is present.

Keywords: Deep Learning, Face Recognition, Infant Presence Detection

146. NEURAL NETWORK-BASED LOAN ELIGIBILITY PREDICTION

Dr. R. Rajalakshmi, Mrs. M. Bhuvaneswari, Mr. D. R. Ramakrishnan, Dr. Polaiah Bojja
Trichy Engineering College; Dhanalakshmi Srinivasan Engineering College; Roever Engineering College; Institute of Aeronautical Engineering

ABSTRACT

The primary source of income of a bank in our banking system is derived from extending credit to customers. The interest earned on those loans the banks provide is the main source of income for them. Bank profits or losses are primarily determined by loans. That is, it depends on whether the consumer repays the loan or defaults. Banks can reduce bad assets by predicting loan defaults. The banking industry needs a more accurate type of predicting modeling for many problems. The main goal of this project is to predict which customers will pay off the loan. Using artificial neural networks and using gradient descent, it is possible to identify, by assessing their likelihood of default on a loan, the right customers to be targeted for loans.

147. AUTOMATED RESUME FILTERING USING NATURAL LANGUAGE PROCESSING AND NAÏVE BAYES

Dr. R. Rajalakshmi, Mrs. M. Bhuvaneswari, Mr. D. R. Ramakrishnan, Dr. Polaiah Bojja
Trichy Engineering College; Dhanalakshmi Srinivasan Engineering College; Roever Engineering College; Institute of Aeronautical Engineering,

ABSTRACT

In the recruitment process, efficiently categorizing and analysing resumes is a critical task. Manual resume screening is time-consuming and prone to human error, necessitating automated systems for resume classification. This study focuses on utilizing Deep Learning and Natural Language Processing (NLP) techniques integrated with a Multinomial Naïve Bayes (MNB) classifier for automated resume categorization. Deep Learning models extract semantic features from textual data, while the MNB classifier efficiently categorizes resumes into predefined categories based on probabilities. The system processes resumes using NLP techniques such as tokenization, lemmatization, and TF-IDF vectorization for feature extraction. Experimental results demonstrate the proposed method's accuracy, robustness, and computational efficiency in handling diverse resume datasets, paving the way for practical applications in human resource management.

Keywords: Resume Classification, Natural Language Processing, Multinomial Naïve Bayes, Deep Learning.

148. SMART ENERGY METER WITH IOT

Praveenkumar. K, Umesh. J, Vijayakumar. R, Sanjai. S
Department of Electrical and Electronics Engineering, Dhanalakshmi Srinivasan Engineering College (Autonomous), Perambalur, India

ABSTRACT

This project aims to create an IoT-based smart energy meter that measures electricity consumption in real-time and sends the data to a cloud platform for monitoring and billing purposes. Using current sensors and microcontrollers, the energy usage data is calculated and transmitted via Wi-Fi or GSM modules. Utilities can access this data to generate accurate bills, while users can track their usage through a web dashboard or mobile app, promoting energy conservation.

149. TRACKING THE DUSTBIN WITH AN IOT-BASED SMART GARBAGE MONITORING AND ALERT SYSTEM

Dr. A. Yogeshwaran, N. Sivasakthi, K. Muthukumar, S. Thina, B. Mohammedyazzer
Dhanalakshmi Srinivasan Engineering College (Autonomous),

Abstract

Urban waste management is a major problem that calls for effective and long-term solutions. This paper presents an Internet of Things (IoT)-based Smart waste Monitoring and Alert System designed to optimize waste collection in smart cities. In order to track dustbin conditions in real time and send out timely waste disposal signals, the system integrates sensors, microcontrollers, and cloud-based analytics. The recommended method uses ultrasonic sensors to measure the amount of trash in the trashcan and gas sensors to detect dangerous chemicals released by decomposing waste. Furthermore, a temperature, humidity, and gas sensor keeps an eye on the surrounding environment, guaranteeing fire safety in the event that hazardous waste builds up. These sensors are linked to a microcontroller unit (MCU), like an ESP32, which sends the data to a cloud-based server over Wi-Fi. Waste collection is tracked and managed more effectively by municipal officials thanks to a smartphone application that processes and visualizes the collected data. Waste collectors receive an electronic alarm signal when a trashcan fills up, which streamlines collection schedules and cuts down on pointless trips. Waste collectors receive an automated alert notice when a trashcan reaches a predetermined threshold, cutting down on pointless visits and maximizing fuel efficiency. To ensure correct installation and upkeep, GPS tracking is also integrated to detect and monitor the dustbins. Additionally, the system uses machine learning algorithms to forecast trends of trash accumulation, enabling garbage collection to be dynamically scheduled based on historical data. This strategy eliminates overflowing trash cans, improves urban cleanliness, lessens environmental risks, and encourages sustainability.

150. ACCIDENT AVOIDING CAR

T. Boopathy, V. S. Nilauvarasi, R. Sona, R. Sivasakthidevi, E. Sophiya
Dhanalakshmi Srinivasan Engineering College (Autonomous),

Abstract:

The Automatic Brake System is a safety-focused innovation designed to enhance the overall safety of vehicles by preventing collisions through real-time obstacle detection and automated braking. This project integrates electronic components and embedded systems to create a low-cost, efficient solution suitable for small-scale vehicles or prototype models. The core concept revolves around using an ultrasonic sensor (HC-SR04) to detect obstacles in the vehicle's path. This sensor emits ultrasonic waves and calculates the distance of objects by measuring the time taken for the echo to return. When an obstacle is detected within a predefined threshold distance, the system automatically activates the brakes, thereby avoiding potential collisions. At the heart of this system is the Arduino Uno microcontroller, which serves as the control unit for processing sensor data and triggering responses. When the ultrasonic sensor identifies an obstacle, the Arduino interprets this data and controls a relay module to cut off power to the gear motor, effectively stopping the vehicle. A buzzer is also triggered to provide an audible warning to the user, further enhancing safety. The hardware setup includes essential components such as a gear motor, wheels, relay, buzzer, battery, switch, and jumper wires, making the assembly straightforward and cost-effective. The software is developed using the Arduino IDE in C++, leveraging libraries to interface with the ultrasonic sensor and relay module. The logic is based on a loop that continuously checks the sensor readings and reacts instantly to any object detected within the danger zone. This automatic brake system represents a foundational step toward more advanced autonomous driving technologies. It demonstrates the potential of integrating sensors and microcontrollers to create intelligent safety systems, paving the way for further development in automated vehicle safety solutions.

151. MODERN SERVOMOTOR SYSTEM USING ARDUINO UNO R4 AND IOT CLOUD

Nithish Raghavendar T. K, Siranjeevi, Subharam K. T. R
K. Ramakrishnan College of Technology

ABSTRACT

This project is particularly useful in remote control systems, robotic arms, and industrial automation, where precise motor control and feedback are essential. The use of ESP32 ensures high-speed processing and seamless internet connectivity, while the cloud integration provides live updates, remote access, and data logging features. A modern Arduino microcontroller (ESP32) is integrated with an IoT cloud platform (e. g., Audimo or Blynk). The system is designed to measure, control, and monitor the angular position of a servo motor in real-time. A position sensor (e. g., potentiometer or encoder) is used to detect the servo's angle, and this data is processed by the ESP32. The data is then sent wirelessly over Wi-Fi to the IoT cloud, allowing real-time monitoring and control through a mobile app or web dashboard.

152. REAL-TIME DECISION-MAKING IN ELECTRIC VEHICLE ROUTING USING PREDICTIVE ENERGY MODELS

Prabakaran S, Rajarajeswari R
SRM Institute of Science and Technology

ABSTRACT

Nowadays, the transportation sector gives more importance to the rise of electric vehicles for environmental reasons. However, electric vehicle routing presents several challenges such as limited driving range, operational inefficiencies, and issues at charging stations including waiting time, queuing time, and uneven slot distribution. New techniques need to be implemented for effective route planning to benefit the users. This research conducts a comprehensive survey across multiple case studies to address not only energy-optimal route identification but also various types of optimized routing considering traffic impact. The study proposes different algorithmic approaches and predictive analytics to develop adaptive routing strategies for real-time decision-making in electric vehicle navigation.

153. DISASTER MANAGEMENT DRONE

Dr. M. Ashok Raj, R. K. V. Mathavan, K. Prakesh Raj, D. M. Sabbrish, Y. Seshiyan
K. Ramakrishnan College of Technology

ABSTRACT

Disaster management is a critical field where rapid response and efficient resource allocation can save lives. This project presents a versatile disaster management drone designed to enhance rescue operations and supply delivery in disaster-stricken areas. The drone has advanced imaging and object detection capabilities to identify and locate stranded individuals in real time. Leveraging thermal imaging and AI-based recognition systems, it can detect human presence in challenging conditions, including low visibility and obstructed environments. The drone features autonomous navigation, enabling it to fly to predefined locations or search for survivors in unmapped areas. With a payload capacity of 1. 5 kg and an endurance of up to 30 minutes, it can deliver essential supplies such as food, water, and medical kits. Additionally, it can transmit real-time data to rescue teams, providing a detailed situational analysis to prioritize and coordinate ground efforts. Integrating autonomous and manual control ensures flexibility and reliability in diverse disaster scenarios. This innovative approach aims to significantly reduce response times, increase survival rates, and optimize resource utilization during natural calamities such as floods, earthquakes, and wildfires. The disaster management drone is a step forward in leveraging technology for humanitarian aid, combining efficiency, accuracy, and practicality in life-saving missions.

154. COMPREHENSIVE STUDY OF UNIDIRECTIONAL DC-DC CONVERTERS IN EV CHARGING: PERFORMANCE, DESIGN, AND FUTURE DIRECTION

R. Vadivelan, N. Chellammal
SRM Institute of Science and Technology

ABSTRACT

This paper presents the necessity for a dependable and affordable charging infrastructure as electric vehicles (EVs) become more common. To regulate the flow of electricity from the grid or renewable energy sources into the battery of an electric vehicle, unidirectional DC-DC converters are necessary. This review provides an in-depth analysis of electric vehicle charging solutions that make use of unidirectional DC-DC converter systems. Considerations for performance include electromagnetic compatibility, power density, voltage regulation, thermal management, and conversion efficiency. Based on the results, this research concludes that buck, boost, buck-boost, and resonant converters are the most suitable for use in Level 1 and Level 2 charging stations. Researchers are looking into digital control methods to improve performance and reduce energy loss through wide-bandgap semiconductor devices. The study takes into account the limitations of electric vehicle charging infrastructure and the operational features of high-voltage equipment. By reviewing prior work and highlighting design trade-offs, this study hopes to assist engineers and academics in finding the best converter topologies for contemporary EV charging networks. Results indicate that unidirectional DC-DC converters are key to creating scalable and energy-efficient charging solutions for EVs.

Keywords: DC-DC converter, non-isolated, electric vehicle, unidirectional converters, fast charging, efficiency

155. SOLAR-POWERED EV CHARGING STATION INFRASTRUCTURE

G. DHIVYA

SRM Institute of Science and Technology,

ABSTRACT

This research presents a new solar-powered EV charging station that addresses significant problems of grid dependency and environmental impact. The system employs intelligent power management that incorporates energy flow between solar panels, battery storage units, grid connections, and EV charging points. The system operates in various adaptive modes like solar prioritization, grid support, battery utilization, and power export configurations to optimize utilization of resources based on time of day and availability limitations. This allows for constant charging capacity while optimizing the utilization of renewable energy. Performance analysis indicates high efficiency with high solar contribution in peak sun hours and the capability to export surplus energy to the grid if available. Bidirectional energy flow converts the charging stations from simple grid consumers to flexible nodes of energy management, which improve the stability of the grid and, in the process, have the potential to earn revenue. Environmental analysis shows significant reductions in carbon emissions, enhancing the environmental benefits that electric vehicles already provide. The MPPT technology for optimal solar energy harvesting and strategic energy storage controls that efficiently fill at transition periods. This research greatly helps in the development of clean transportation and the integration of renewable energy, and future work to focus on ensuring nighttime data accuracy and using predictive algorithms in demand forecasting.

Keywords: solar EV charging, bidirectional power flow, grid support, MPPT, energy storage, clean transportation

156. WEB CONTROLLED SURVEILLANCE ROBOT USING ESP32

Deepika S, Easuraj S, Lalithkumar K
Dr. Navalar Nedunchezhiyan College of Engineering

ABSTRACT

The Web Controlled Surveillance Robot using Python is an intelligent system that integrates robotics with the Internet of Things (IoT) for remote surveillance. The project aims to provide a robust solution for monitoring specific areas via a robotic platform controlled through a web interface. The robot is equipped with a camera to capture live images, and it can be controlled remotely over the internet. The ESP32 serves as the central controller that connects the hardware components, including motors for movement and a camera for the visual feed. This system allows users to monitor and control the robot from anywhere in the world, offering both mobility and surveillance functionalities.

Keywords: Internet of Things (IoT), ESP32, web interface

157. ANALYSIS OF SOLAR-POWERED EV CHARGING STATION INFRASTRUCTURE

G. Dhivya, R. Rajarajeswari

SRM Institute of Science and Technology,

ABSTRACT

This research presents an adaptive solar-powered EV charging station that addresses significant problems of grid dependency and environmental impact. The system employs intelligent power management that incorporates energy flow between solar panels, battery storage units, grid connections, and EV charging points. The system operates in various adaptive modes like solar prioritization, grid support, battery utilization, and power export configurations to optimize utilization of resources based on time of day and availability limitations. This allows for constant charging capacity while optimizing the utilization of renewable energy. Performance analysis indicates high efficiency with high solar contribution in peak sun hours and the capability to export surplus energy to the grid if available. Bidirectional energy flow converts the charging stations from simple grid consumers to flexible nodes of energy management, which improve the stability of the grid and, in the process, have the potential to earn revenue. Environmental analysis shows significant reductions in carbon emissions, enhancing the environmental benefits that electric vehicles already provide. The MPPT technology for optimal solar energy harvesting and strategic energy storage controls that efficiently fill at transition periods. This research greatly helps in the development of clean transportation and the integration of renewable energy, and future work will focus on ensuring nighttime data accuracy and using predictive algorithms in demand forecasting.

Keywords: Electric vehicle, Energy storage system, DC fast charging.

158. SMART HUMAN MONITORING SYSTEM USING AI AND IOT

Vishnu S, Anbu Mani M, Mahendiran L
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ABSTRACT

The Smart Human Monitoring System leveraging AI and IoT integrates advanced technologies to enhance real-time health and safety monitoring. By utilizing IoT-enabled wearable devices and sensors, the system collects vital data such as heart rate, temperature, and activity levels. AI algorithms analyze this data to detect anomalies, predict potential health risks, and provide actionable insights. The system supports remote monitoring, enabling caregivers or emergency services to respond promptly. It ensures privacy and security through encrypted data transmission and storage. With its adaptive learning capabilities, the system continuously improves accuracy and personalization. This innovative solution is ideal for elderly care, workplace safety, and chronic disease management, offering a proactive approach to health monitoring and emergency response.

Keywords: AI, IoT, health monitoring, wearable sensors, anomaly detection, remote care

159. SMART DINING AUTOMATION WITH CAR-PARKING SYSTEM

Dr. P. Sathees Lingam, P. Charu Prabha, K. Gayathri, A. Harini, R. Vishalini

ABSTRACT

During the current scenario, people face various issues when going on tours with family or friends for leisure. This innovative project addresses the challenges encountered by tourists while dining out by introducing a smart dining automation system integrated with secure car parking facilities. Leveraging IoT technology, the system streamlines restaurant operations, ensuring a seamless, secure, and hassle-free experience for tourists. The proposed system combines automation and safety features, utilizing various devices and components to cater efficiently to tourists' needs. By providing a comprehensive and secure solution, the system aims to enhance the overall dining experience, making it more enjoyable and convenient for tourists.

160. ELECTRIC SHOES USING PIEZOELECTRIC PATCHES

Nikhitha Ra, Priya R, Nithyasri M

ABSTRACT

The global need for portable and renewable power solutions remains strong with the growing use of smart devices and wearable electronics. This project proposes the development of electric shoes embedded with piezoelectric patches that harness human movement-based mechanical energy and convert it into electrical energy. The system utilizes the piezoelectric effect—where certain materials generate electricity when subjected to mechanical stress—by integrating piezoelectric substances such as PZT (lead zirconate titanate) or PVDF (polyvinylidene fluoride) into stress-prone areas of the shoe sole like the heel and ball.

As the wearer walks or runs, mechanical stress deforms the material, generating alternating current electricity. A rectifier circuit converts this into usable power, which is stored in a rechargeable battery or capacitor to power small devices such as LEDs, fitness trackers, or mobile phone charging stations. The integration of these components is subtle, ensuring the shoe remains comfortable and wearable.

By promoting energy autonomy and reducing reliance on conventional power sources, this technology contributes to environmental sustainability. A microcontroller manages energy output and storage, allowing effective regulation. While early tests suggest power output is limited to a few milliwatts—suitable for low-power applications—it offers great utility in rural or off-grid areas. Additionally, the system has potential for network integration with other wearables to enhance power generation.

Beyond personal electronics, possible applications include emergency rescue operations, military use, and biomedical monitoring systems. The project also explores future research directions in wearable energy-harvesting technologies, smart textiles, and human-powered electronics.

Keywords: Piezoelectric, wearable energy, smart textiles, energy harvesting, autonomous devices, PVDF, PZT

161. ARDUINO BASED SPEED MONITORING SYSTEM WITH LCD DISPLAY AND OBJECT DETECTION

Raidan I, Pragathish M, Remigius W

K. Ramakrishnan College of Technology

ABSTRACT

This project presents an Arduino-based speed monitoring system designed to detect and display the speed of moving objects in real time. The system employs ultrasonic sensors (or IR sensors) for object detection and an Arduino Uno microcontroller for processing the data. It is suitable for various applications, including traffic monitoring, industrial automation, and robotics.

The microcontroller calculates the speed of the detected object and displays it on an LCD screen. Additional features such as buzzer alerts for overspeeding and data logging for analysis can be integrated to enhance functionality. The object detection mechanism ensures accurate tracking, making the system applicable in scenarios like vehicle speed monitoring or any speed-tracking requirements in a controlled environment.

Keywords: Arduino, speed monitoring, ultrasonic sensor, IR sensor, real-time tracking, automation

162. AUTOMATIC CERTIFICATE GENERATION USING MATLAB

M. Mohan Babu, M. Naveen, S. Nishanth, M. Sivaraj
Dhanalakshmi Srinivasan Engineering College,

ABSTRACT:

Automatic certificate generation using MATLAB simplifies and accelerates the certificate creation process by leveraging MATLAB's powerful capabilities in image processing, dynamic text formatting, and document generation. The system extracts relevant information such as participant names, event details, and achievements from an input source like an Excel sheet. Using the Image Processing Toolbox, it incorporates visually appealing design elements, including logos and backgrounds, into a predefined certificate template. The text placement and formatting are adjusted dynamically to accommodate varying lengths of data, ensuring each certificate maintains a consistent and professional appearance. The developed MATLAB code automates this entire process, efficiently generating and saving certificates with unique filenames in a designated folder. This project not only saves time but also ensures systematic organization, and it can be extended to generate various types of reports.

163. SMART SHOPPING TROLLEY USING RFID

S. Sasikala, T. Logeshkumar, A. Babu, T. Arunkumar
Dhanalakshmi Srinivasan Engineering College, (Autonomous)

Abstract:

In the modern retail environment, long queues at billing counters remain a significant inconvenience for customers. This project presents a Smart Shopping Trolley system using Radio Frequency Identification (RFID) technology, designed to enhance the shopping experience by automating the billing process. Each product in the store is equipped with an RFID tag containing unique identification data. As items are added to or removed from the trolley, an onboard RFID reader scans the tags and updates the cart's inventory in real-time. A microcontroller processes the data and displays the item list, prices, and total amount on an LCD screen. This system eliminates the need for manual billing, reduces checkout time, and increases operational efficiency. Additionally, the trolley can be integrated with wireless communication for online payment or data synchronization. The smart trolley aims to provide a seamless, queue-free, and user-friendly shopping experience while reducing the workload of retail staff.

164. WHEELCHAIR CONTROL THROUGH GYROSCOPIC MOVEMENT USING IOT

Dr. T. Muruganantham, Gobi M, Devadarshan G N, Balaji J, Durairaj B

Abstract:
This paper presents an advanced wheelchair control system that utilizes gyroscopic movement and IoT technology to enhance user autonomy and safety. The system enables intuitive wheelchair movement control through simple gyroscopic tilts, integrates a real-time LCD display for status updates and alerts, and provides functionality for food and water requests, as well as emergency alerts, through push buttons. Additionally, an ultrasonic sensor monitors urine levels, triggering notifications for timely intervention.

165. ARDUINO BASED POWER SAVING SYSTEM FOR AUDITORIUM

SANTHOSH S, SARANJEET M SHAM GANNESH P

Abstract:

The rising need for energy efficiency has driven the creation of different systems for minimizing power consumption in large venues such as auditoriums. This project outlines an Arduino-powered power-saving system specifically tailored for auditorium use. The system utilizes sensors and intelligent control processes to maximize the utilization of electrical resources so that lights, fans, and other electrical devices function only when required. The heart of the system consists of motion sensors to sense the presence of individuals and control lighting and air conditioning automatically depending on occupancy. There are also ambient light sensors included to control lighting levels based on the level of natural light, further cutting down on electricity usage.

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