# THIAGARAJAR COLLEGE OF ENGINEERING

(An Autonomous Institution Affiliated to Anna University, Chennai)

**MADURAI – 625 015**

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS - STUDENT BRANCH**

# ANNUAL REPORT: 2023-2024

Submitted By


**Dr. G ANANTHI**

(IEEE STUDENT BRANCH COUNSELOR)

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(IEEE STUDENT BRANCH CHAIR)

**S VISHNUPRIYA**

(IEEE STUDENT BRANCH CO-CHAIR)

# Annual Report: IEEE Student Branch 2023-2024

## INTRODUCTION:

The IEEE Student Branch is pleased to present its annual report for the academic year 2023-2024. As an integral part of the Institute of Electrical and Electronics Engineers (IEEE), our student branch has continued its mission of promoting technical excellence, fostering professional development, and enhancing community engagement among students interested in electrical and electronics engineering.

## EXECUTIVE SUMMARY:

The academic year 2023-2024 has been marked by significant growth and achievement for the IEEE Student Branch. With a total membership of 36 students, predominantly comprising second and third-year undergraduates, our student branch has actively participated in a wide range of activities, events, and competitions. Through collaborative efforts and dedicated leadership, we have strengthened our presence within the university and the broader IEEE community.

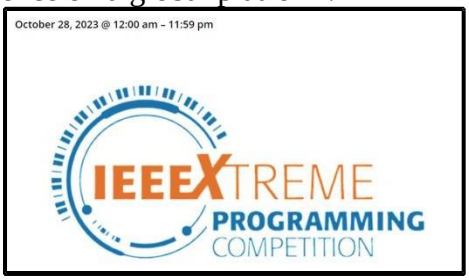
## MEMBERSHIP GROWTH AND ENGAGEMENT:

Throughout the year, the IEEE Student Branch has focused on increasing membership and engaging existing members in meaningful activities. Compared to the previous year, we have witnessed a notable increase in membership numbers, reflecting the growing interest and enthusiasm among students for IEEE initiatives. Regular meetings, workshops, and social events have served as platforms for fostering camaraderie, networking, and knowledge exchange among members.

## EVENTS AND ACTIVITIES:

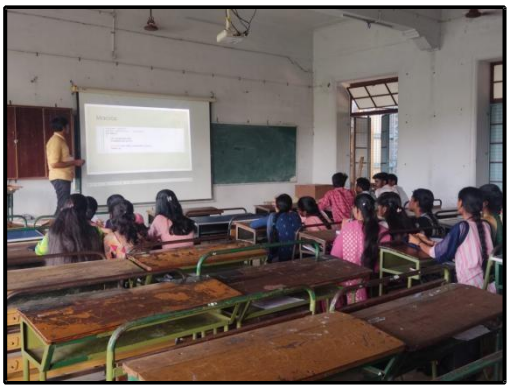
The IEEE Student Branch has organized and participated in numerous events and activities aimed at enriching the academic and professional experiences of its members. These include:

- **IEEE Xtreme 17.0:** Our student teams participated in the prestigious international hackathon held on October 28th, 2023, showcasing their problem-solving skills and innovative thinking. Teams such as Quantum Quest and Starverse secured commendable university rankings, demonstrating our students' competence on a global platform.



- **EARENDEL 2024:** Our flagship event, EARENDEL 2024 held on February 17th 2024, was a resounding success, attracting 197 participants from various colleges and universities across the country. The technical symposium featured a diverse range of competitive events, including paper presentations, coding challenges, problem-solving contests, and aptitude tests.

- **Intra-IEEE Events:** Throughout the year, the IEEE Student Branch organized a series of engaging intra-IEEE events designed to cater to the diverse interests and aspirations of its members. These events, such as
  - **(i) Tic Talk -** This interactive group discussion event provided a platform for students to enhance their communication skills in a collaborative setting. Through engaging conversations on various topics related to electrical and electronics engineering, participants learned to articulate their ideas effectively and engage in constructive dialogue with their peers.
  - **(ii) Electrofun -** An event held on 11th January 2024, designed to enrich students' core knowledge in Electronics and Communications Engineering (ECE), Electro Fun offered an interactive and hands-on approach to learning. Participants had the opportunity to explore fundamental concepts, experiment with circuit design, and gain practical insights into the application of ECE principles in real-world scenarios.
  - **(iii) Flash -** A dynamic quiz competition held on 22nd January 2024, Flash challenged students to test and showcase their understanding of fundamental electronics concepts. Participants competed in a fast-paced environment, answering questions on topics such as circuit analysis, digital electronics, and semiconductor devices, demonstrating their mastery of key concepts and principles.
  - **(iv) Let's C -** This programming contest held on 13th March 2024 focused specifically on C programming, equipping students with valuable skills for embedded applications development. Participants were tasked with solving a series of coding challenges and optimizing algorithms, fostering creativity, problem-solving, and critical thinking skills essential for success in the field of electrical and electronics engineering.

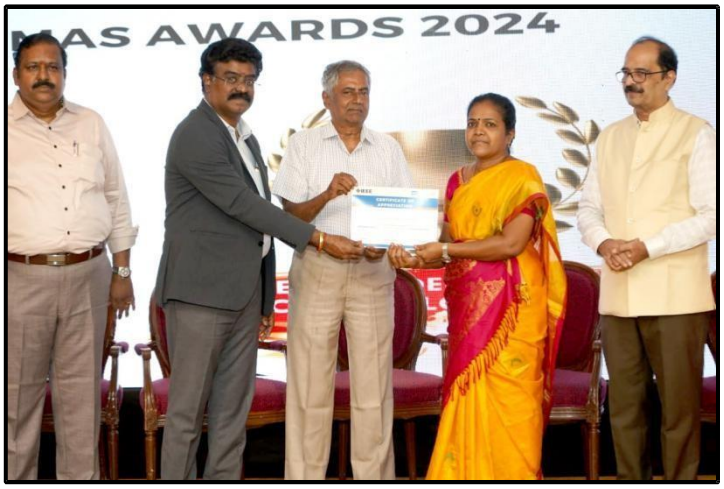


These exciting events, provided opportunities for students to enhance their technical knowledge, communication skills, and teamwork abilities in a supportive and collaborative environment.

**ACHIEVEMENTS AND AWARDS:**

The efforts and accomplishments of our student members have been recognized through various awards and commendations, including:

- The Student Branch Award at the 2024 IEEE Madras Section Annual Meeting, which acknowledges the outstanding contributions of our student branch to the IEEE community and beyond.




- Commendable university rankings achieved by our student teams in competitions such as IEEE Xtreme 17.0, highlighting the dedication and talent of our members.

| TEAM NAME | TEAM LEAD | TEAM MEMBER | YEAR | PROCTOR | University Rank |
|---|---|---|---|---|---|
| Quantum Quest | Dhivya.S | Ramya.B,Varsha Mithraa.M | 2nd Year | Dr B Sathyabama | 6 |
| Starverse | Santhosh Kumar A | Soundharya A A, Priyadharsni | 2nd Year | Dr D Gracia Nirmala Rani | 8 |
| Battle Hawks | Ananth N | Mathankumar M | 2nd Year | Dr B Manimegalai | 9 |
| The Wolf Pack | Karthick raja.M | Joshua.G, Abdur Rahman | 2nd Year | Dr S Mohammed Mansoor Roomi | 10 |
| CrafTechies | Kameshwari Ka | Shrinidhi RM, Kalai Selvi A | 2nd Year | Dr S J Thiruvengadam | 12 |
| HackMasters | Kayalvizhi.B | Devisree Veeraparvathy , Hemapriyadharshini.M | 2nd Year | Dr N B Balamurugan | 14 |
| Digital Dreamers | Shahana.S | Sakthi Meera.K, Jaishree Bhavya.M | 2nd Year | Dr K Rajeswari | 15 |
| TechBloomers | Gayathri S | Shobana Shree S | 2nd Year | Dr M N Suresh | 16 |
| LogiCoders | Karthika S | Vishwadhika R, Harish S | 3rd Year | Dr K Hariharan | 17 |

- Individual achievements in events such as Tic Talk, Electrofun, and Flash, where students demonstrated exemplary skills and capabilities in their respective fields.

| EVENT | PLACE | TEAM/INDIVIDUAL | MEMBERS | YEAR |
|---|---|---|---|---|
| **Tic-Talk** | 1st | Soundharya A A | - | 2nd |
| | 2nd | Harish S, Santhosh Kumar A | - | 3rd, 2nd |
| | 3rd | Shreya R | - | 3rd |
| | Special Mention | Vishwadhika R | - | 3rd |
| | Special Mention | Vishnupriya S | - | 3rd |
| | Special Mention | Bairavi N | - | 3rd |
| **Electrofun** | 1st | Riya Bobby, Jeya Uthira S R, Swetha B | TEAM | 2nd |
| | 2nd | Lakshita M, Bairavi N | TEAM | 3rd |
| | 3rd | Hemanth Pandian D R, Harish S | TEAM | 3rd |
| **Flash** | 1st | Shobana Shree S, Gayathri S | TEAM | 2nd |
| | 2nd | Joshua G, Abdur Rahman | TEAM | 2nd |
| | 3rd | Sanjanaa I, Ramya B | TEAM | 2nd |
| | Special Mention | Hemanth Pandian D R | - | 3rd |
| | Special Mention | Soundharya AA, Varsha Mithraa M, Shrinidhi R M | TEAM | 2nd |
| | Special Mention | Kayalvizhi B, Hemapriyadharshini M | TEAM | 2nd |
| **Let's C** | 1st | Mathan Kumar M, Joshua G | TEAM | 2nd |
| | 2nd | Vishnupriya S, Karthika S | TEAM | 3rd |
| | 3rd | Abdur Rahman, Karthick Raja | TEAM | 2nd |

| | | | | |
|---|---|---|---|---|
| | | M | | |

## FINANCIAL REPORT:

Our financial activities remained transparent and sustainable throughout the year, with income of Rs.17,588 primarily generated through IEEE flagship event Earendel 2024. Detailed financial statements, including income, expenses, and budget allocations, are available for review upon request.

## FUTURE PLANS AND GOALS:

Looking ahead, the IEEE Student Branch is committed to building on its successes and furthering its mission of empowering students and advancing the field of electrical and electronics engineering. Our goals for the upcoming year include:

- Expanding membership and diversity within the student branch.
- Enhancing the quality and diversity of events and activities to cater to the evolving needs and interests of our members.
- Strengthening collaborations with industry partners, academic institutions, and professional organizations to provide valuable opportunities for our members.
- Continuing to promote innovation, excellence, and ethical leadership among students through hands-on projects, technical workshops, and mentorship programs.

## CONCLUSION:

In conclusion, the IEEE Student Branch has had a productive and fulfilling year, thanks to the unwavering dedication, enthusiasm, and passion of our members, volunteers, sponsors, and supporters. As we reflect on our achievements and challenges, we remain committed to fostering a vibrant and inclusive community where students can thrive and contribute to the advancement of electrical and electronics engineering.

# ICEMCE 2023

Proceedings of the

IEEE Technically Sponsored

December 14 & 15, 2023

## International Conference on Energy, Materials and Communication Engineering

Organized by

Departments of

Electrical and Electronics Engineering

Electronics and Communication Engineering

& Physics

THIAGARAJAR COLLEGE OF ENGINEERING

66 YEARS 1957-2023

Proceedings of the

IEEE Technically Sponsored

# International Conference on Energy, Materials and Communication Engineering (ICEMCE – 2023)

December 14 & 15, 2023


Coordinators

Dr.P.Venkatesh

Dr.S.Charles Raja

Dr.G.Ananthi



Organized by

Departments of
Electrical and Electronics Engineering
Electronics and Communication Engineering
and Physics

**Thiagarajar College of Engineering**

(A Govt. Aided Autonomous Institution affiliated to Anna University)

Madurai 625015, Tamilnadu, India

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# THIAGARAJAR COLLEGE OF ENGINEERING

(A Govt. Aided Autonomous Institution Affiliated to Anna University)

MADURAI - 625 015

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1957-2023

Celebrating Academic Excellence

K. HARI THIAGARAJAN

Chairman & Correspondent


## Message

I am very happy to note that the Department of Electrical and Electronics Engineering, Department of Electronics and Communication Engineering and Department of Physics of Thiagarajar College of Engineering is organizing an International Conference on Energy, Materials and Communication Engineering (ICEMCE -2023) on 14th & 15th December 2023.

Energy is one of the essential components needed for the economic growth of a nation. The traditional electric grid has been transformed into a smart grid by embedding advanced communication protocols and network security. Power systems, power electronics, electrical machines, instrumentation, and control are subsets of energy. As we are moving towards Industry 4.0, it is essential to know about the modern technologies involved in communication, manufacturing, product development, and customer services such as the Internet of Things (IoT), advanced human-machine interface, smart sensors, cyber-physical systems, and big data analytics. Communication technologies such as 5G, wireless networks, energy-efficient communication, and visible light communication are being widely researched. In recent years, intensive research has taken place in several types of materials such as smart materials, semiconducting materials, metamaterials, and nanomaterials. Also, now since everything almost is based on data, the application of data analytics and artificial intelligence is diversified in all fields of research and engineering. I hope ICEMCE 2023 will have useful deliberations on futuristic ideas in energy management. I wish ICEMCE- 2023, all success.

I wish the conference all success and congratulate the organizers.

Chief Patron

Chairman & Correspondent

Thiagarajar College of Engineering


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MADURAI - 625 015

Dr. M. Palaninatharaja, B.E.,M.E.,Ph.D.,
Principal (I/C)

# Message

I am happy to know that the Department of Electrical and Electronics Engineering, Department of Electronics and Communication Engineering and Department of Physics of Thiagarajar College of Engineering is organizing an International Conference on Energy, Materials and Communication Engineering (ICEMCE -2023) on 14th & 15th December 2023.

Conferences always provide an enabling stage for the Engineers and researchers from many facets of technology to come together and deliberate the developments in the respective domains. TCE always stand at the forefront in organizing conferences and programmes which are latest and relevant to the society.

I am sure that this conference will witness enthusiastic participation of the delegates from across India which will lead to a better evolution of inter-disciplinary research. I wish the authors for fruitful deliberations and appreciate the faculty, staff and students of EEE, ECE and Physics department for their tireless efforts towards International Conference for a successful summit and a bright future.

Patron
Principal (i/c)
Thiagarajar College of Engineering

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College : 0452 - 2482240 - 2482242
Principal : 0452 - 2482430

## ABOUT THE COLLEGE

Thiagarajar College of Engineering (TCE), Madurai, Tamilnadu established in 1957, is an autonomous institution affiliated to Anna University, Chennai. It is one among the several educational and philanthropic institutions founded by Philanthropist and Industrialist Late. Shri.Karumuttu Thiagarajan Chettiar. TCE offers 9 Undergraduate Programmes, 10 Postgraduate Programmes, and Doctoral Programmes in Engineering, Science, and Architecture. The UG and PG programmes of TCE are accredited by the National Board of Accreditation. TCE is ranked 85th among the top 200 engineering institutions in India in the National Institutional Ranking Framework published by MHRD, Govt. of India in 2022.

### Vision Statement

World class quality technical education with strong ethical values

### Mission Statement

- Academic excellence in Science, Engineering and Technology through dedication to duty, commitment to research, innovation in learning and faith in human values.
- Enable the students to develop into outstanding professionals with high ethical standards capable of creating, developing and managing global engineering enterprises.
- Fulfill expectations of the society and industry by equipping students with state of art technology resources for developing sustainable solutions.
- Achieve these through team e-orts making Thiagarajar College of Engineering the socially diligent trend setter in technical education.

These, we all will achieve through the sustained team effort, making TCE

**“The Leader of Leaders”**

## SCOPE OF ICEMCE- 2023

ICEMCE- 2023 is a platform created for exploring the recent advancements and addressing the research challenges in the areas of energy, communication, and materials by involving research scholars, students, engineers, researchers, and subject matter experts from several colleges/universities, industries, and government organizations across India and the world. Energy is one of the essential components needed for the economic growth of a nation. The traditional electric grid has been transformed into a smart grid by embedding advanced communication protocols and network security. Power systems, power electronics, electrical machines, instrumentation, and control are subsets of energy. As we are moving towards Industry 4.0, it is essential to know about the modern technologies involved in communication, manufacturing, product development, and customer services such as the Internet of Things (IoT), advanced human-machine interface, smart sensors, cyber-physical systems, and big data analytics. Communication technologies such as 5G, wireless networks, energy-efficient communication, and visible light communication are being widely researched. In recent years, intensive research has taken place in several types of materials such as smart materials, semiconducting materials, metamaterials, and nanomaterials. Since everything almost is based on data these days, the application of data analytics and artificial intelligence is diversified in all fields of research and engineering. The theme areas of the conference include:

## Organizing Committee

***Chief Patron***

**Mr. K. Hari Thiagarajan,**

Chairman and Correspondent, TCE.

***Patron***

**Dr. M. Palaninatharaja,**

Principal i/c, TCE

***Organizing Chairs***

**Dr.C.K. Babulal,**

Professor and Head, EEE, TCE

**Dr. S. Rajaram,**

Professor and Head, ECE, TCE

**Dr. M. Mahendran,**

Professor and Head, Physics, TCE

***Coordinators***

**Dr. P. Venkatesh,**

Professor, EEE, TCE

**Dr. S. Charles Raja,**

Associate Professor, EEE, TCE

***Co-Coordinators***

**Dr.G. Ananthi,**

Associate Professor, ECE, TCE

**Dr. A.L.Subramanian**,

Assistant Professor Physics, TCE

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**2023 International Conference on Energy, Materials and Communication Engineering (ICEMCE), December 14 – 15, 2023, Madurai, India**

**ICEMCE-001**

## EVALUATION OF 5% KNOWN AND 95% UNKNOWN MATTER IN INNER AND OUTER UNIVERSE USING QUANTUM COMPUTING, ARTIFICIAL INTELLIGENCE AND VEDIC SCRIPTURE

***Sachin Sharma (Graphic Era University)*; Abhiraj Gautam (Graphic Era University); Ranu Tyagi (Graphic Era University)***

Modern physics and cosmology place a lot of emphasis on the idea that there is 5% known matter and 95% unknown matter in the inner and outer universe. The use of quantum computing has been suggested as a way to investigate this mystery. The Vedic scripture, on the other hand, provides a logical and spiritual framework for comprehending the nature of the cosmos. Protons, neutrons, and electrons make up the 5% of the universe's known matter, while the other 95% of the cosmos is made up of dark matter. The community of scientists is faced with a challenge because the nature and characteristics of these components are still unknown. With its capacity to analyse enormous volumes of data concurrently, quantum computing offers a creative solution to this issue. It might be able to simulate and study the behaviour of these mysterious particles by using quantum algorithms

**ICEMCE-002**

## A MACHINE LEARNING AND DEEP LEARNING FOR DIABETES DIAGNOSIS -A DESIGN THINKING APPROACH

***Ramya S (Dr.SNS Rajalakshmi College of Arts and Science)*; Kalaivani D (Dr.SNS Rajalakshmi College of Arts and Science)***

Diabetes is less likely to cause serious complications if it is diagnosed and treated early. The goal of the proposed study is to create a machine learning pipeline that produces the smallest possible feature subset with the highest accuracy for predicting the start of diabetes. In contrast to the well-known Pima Indians Diabetes Dataset (PIDD), it uses a new diabetes dataset that is sufficiently representative and gender-neutral. Health professionals from all across the world have expressed serious worries concerning the need to treat and identify it as early as possible. The most effective method for diagnosing diabetes condition is now made possible by technological advancements and data mining techniques.In order to detect diabetes based on various symptoms and traits, this review paper compares several data mining techniques and studies a classifier. In the machine learning, several feature selection methods are used toward create a reduced feature subset with the purpose is fed addicted to diverse heterogeneous classifiers. Feature selection is used to identify the most important features from dataset. On the preprocessed dataset, classification is done by using a variety of heterogeneous classifiers like Naive Bayes (NB), Logistic Regression (LR), K-Nearest Neighbor (KNN), Decision Tree (DT), Support Vector Machine (SVM), Random Forest (RF), AdaBoost, Deep Learning, and Gradient Boost (GB) as base learners followed by stacking ensemble. Precision, recall, and F1-Score metrics are used to assess each classifiers performance, as well as the performance of deep learning classifiers. Deep learning outperforms the other classifiers, according to a comparison with more recent research in the same field on the same dataset.

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**ICEMCE-003**

## IMPROVEMENT AND ENHANCEMENT OF ENERGY-SAVING INDUCTION HEATERS

***Rathi devi P ( JJ college of engineering and technology ) Sivakumar P ( Rajalakshmi Engineering College ) Thirusenthil Kumaran P ( Rajalakshmi Engineering College ) Sundararajan G ( JJ College Of Engineering And Technology ) Jenita D ( JJ College Of Engineering And Technology )***

Induction heaters are frequently used to heat magnetic materials in a variety of commercial and research applications, particularly where controlled precision heating is required. Induction heating provides benefits over other types of heating such as noncontact heating, high efficiency, surface hardening, clean heating, and so on. In various applications, the power circuit layout utilised for induction heating systems is an inverter circuit based on hard switching, which increases losses in the inverter bridge, especially for high current, high frequency switching applications. Because of the benefits of lower switching power loss and high frequency operation, soft switching type induction heaters may be employed for heating in a variety of process applications. sIn this paper, it presents the simulation and implementation of a Induction Heater. In this model, high frequency current is produced by a single phase, half bridge, series resonant inverter. A single phase half bridge series resonant inverter is driven by a driver circuit which is controlled by a microcontroller unit. The duty cycle of the gate pulses delivered to the switching device's gate is determined by the current flowing through the load. Hall Sensors are used to monitor the current flowing through the load. The gate pulses for the switching devices are generated by the microcontroller unit. The microcontroller used is a PIC16F877A. The amount of power supplied to the load is controlled by varying the duty cycle of the PWM gate pulse generated by the PIC16F877A microcontroller. This closed loop control of induction heater controls the power consumed by the load.

**ICEMCE-004**

## INFLUENCE OF AUXILIARY TRIP RELAYS AND BATTERY GROUND FAULTS ON POWER SYSTEM PROTECTION SECURITY

***Pankaj kumar jha***

The auxiliary DC power supply stands as a critical cornerstone within protective relaying and control systems. The reliability of this auxiliary DC system is paramount, as its failure can result in delayed fault clearance during power system faults. Beyond this, a malfunctioning auxiliary DC system can significantly impact the operation and reliability of the broader electrical grid, causing switchgear non-operation and inaccurate or suspicious status reporting to remote control centers. The auxiliary DC control power system comprises essential components, including batteries, battery chargers, distribution systems, switching and protective devices, as well as monitoring equipment. It necessitates proper sizing, design, and maintenance to function effectively. Despite advancements in relay technologies and the adoption of modern numerical protection relays, auxiliary trip relays continue to play a crucial role in circuit breaker tripping during fault events, aligning with specific scheme requirements within substations. The inadvertent operation of auxiliary trip relays, stemming from issues within the auxiliary DC power system, can lead to mis-operation of the protection system. This paper delves into real-world case studies from the Indian power sector,

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illustrating instances where unintended operation of auxiliary trip relays resulted in transmission element outages. It further explores the coordination of auxiliary trip relays with DC ground fault relays, presents techniques to mitigate the unintended operation of auxiliary trip relays, and discusses methods for monitoring ungrounded DC systems to detect transient ground faults.

**ICEMCE-005**

## REAL TIME SIMULATION OF MICROGRID BASED EV CHARGING STATIONS UNDER FAULT CONDITION

***Honnesh C S (Central Power Research Institute)*; Vimalraj M (Central Power Research Institute); Sreedevi J (Central Power Research Institute)***

Electric vehicles (EVs) are regarded as portable power sources that may be connected to any infrastructure, including the power grid, in various geographic locations to create a dynamically altering system. Grid-to-vehicle (G2V) and vehicle-to-grid (V2G) connections are regarded as crucial components of smart grids that can significantly improve the system's performance in a variety of ways. The power system's performance is significantly improved by the control method for integrating EVs. The purpose of this study is to use RSCAD/RTDS to examine the real-time performance of various control techniques for integrating electric vehicles with RES-based microgrids (µg) under symmetrical fault (LLLG) conditions. Constant V control and constant Q control, which preserve charging continuity in abnormal conditions, stability of µg, and limit peak overshoot current under abnormal conditions, are the control techniques used for G2V and V2G connections. This type of µg-based charging station (CS) is more appropriate for large parking lots, workplace charging, and university campuses.

**ICEMCE-006**

## COMPREHENSIVE REVIEW ON THE RECENT TRENDS IN SOLAR PHOTO VOLTAIC DISTILLATION

***Safiata Sawadogo (Pan African University Institute of Water and Energy Sciences ); Ravi Samikannu (Saveetha Institute of Medical and Technical Science)*; R Karpagam (Easwari Engineering College); Priya N (Easwari Engineering College); Bhavani N P G (Saveetha School of Engineering); Abid Yahya (Saveetha Institute of Medical and Technical Sciences )***

Distillation is used for purification across a variety of industries, including those that refine, clean gas or water, and extract essential oils from plants. It still takes a lot of work to make distillation more energy efficient and to consider other heating sources besides conventional fossil fuels because of its enormous relevance in the industry, its high energy requirements, and its consequent impact on global warming. The most common method of distillation in the world is the traditional method. This old-fashioned method uses a lot of energy. Another energy source discovered to increase the efficiency of distillation is the sun. Even though there are many other conventional energy resources, solar power is a readily available clean, sustainable, renewable, and affordable energy resource. Solar distillation refers to the practice of distillation using the sun. Compared to the conventional approach, this one is less expensive, cleaner, and more effective. For distillation, solar distillation can be combined

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with other processes or used independently. Many solar Photovoltaic (PV) are developed in solar distillation. The goal of this study is to increase distillation's effectiveness. Among the solar Photovoltaic developed for distillation, there is standard dew collection device, spherical Vacuum-tube distillation with a solar-powered power source, Solar Distillation connected PV Module, PCM Tube hybrid, and Solar Still with Parabolic Trough Collector, Hybrid Solar Still-Storage Medium and Compound Parabolic Concentrating, and Pyramid Solar distillation with V-Corrugated Absorber Plate and Phase Change Membrane used as a Thermal Storage Media.

**ICEMCE-007**

## IMPLEMENTATION OF SOLAR ROOFTOP- EXPERIENCE IN INDIA

***Ishaan C Saxena (Vellore Institute of Technology,Vellore)*; S Meikandasivam (Vellore Institute of Technology)***

In India, the main source of Energy generation is Coal/Thermal Power Plants. They account for around 60% of the power generated in our country. However, this is an exhaustible and not an environmentally friendly generating method. The emerging alternatives are Renewable Energy Sources(RES) like Solar PV System, Solar energy, Wind energy. In the present scenario, Rooftop Solar has the maximum installed capacity of around 7000 MW as on October,2022.

The need of choosing Rooftop Solar is due to the fact it can be easily implemented atop roofs of houses in residential and easily even in commercial areas. They don’t need relocation of any sort like required in other RE alternatives like Wind, Hydel,etc. The paper discusses the Policy Initiatives, Use of Solar Rooftop, Integration in Indian Scenario and its comparison with the International Experience, Metering Systems-Gross Metering and Net Metering aspects & Challenges, and Impact on Grid. Various initiatives have been taken by the Govt. in this area with schemes like Setting Up Grid-Connected Solar PV Power Projects in various states & island union territories like Andaman & Nicobar, Grid Connected Solar Rooftop programs and many more.

**ICEMCE-008**

## NOVEL DC TO DC BOOST INTEGERATED BIFRED CONVERTER FOR TYPE 2 MPPT FUZZY BASED PV/EV APPLICATION

***Tharwin Kumar (Puducherry Technological University)*; C. Christober Asir Rajan (Puducherry Technological University)***

Electric vehicle (EV) charging with solar photovoltaic (PV) technology is a novel idea with a number of advantages in terms of technology and economic. When an EV is utilized in conjunction with low carbon PV power generation, the problems brought on by greenhouse emissions from gas-powered engines can be reduced. The Maximum Power Point Tracking (MPPT) for Type 2 Fuzzy Logic Controller (FLC) PV Systems is presented in this study. PV solar panels, a Boost Integrated BIFRED Converter, and an MPPT controller comprise the PV system. The Type 2 FLC is simple to use and does not require a thorough understanding of the technique’s reliable model. A Boost integrated BIFRED is used to boost the dc voltage produced by the PV setup, and the DC-DC converter output is managed by Type 2 Fuzzy.

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The suggested method is simulated with MATLAB and the results show that the proposed topology behaves precisely.

**ICEMCE-009**

## SMART IMAGE RECOGNITION SYSTEM FOR THE VISUALLY IMPAIRED PEOPLE

***Ganesh Khekare (Vellore Institute of Technology, Vellore)*; Midhun chakkravarthy (Lincoln University College, Petaling Jaya)***

The inclusion of people with specifics in society has become a big challenge. Vision is extremely relevant in the relationship with objects, space, and others, and their absence can negatively affect the quality of life. Object detection can be applied in various forms, such as autonomous cars, industrial 4.0, and people control. This research work aims to objectively the application of computer vision techniques to present a proposal for an application of image recognition for visually impaired people and give real-time voice feedback of the object. It is possible to build an application of recognition of images that can help visually impaired people to easily surround things and live independently. The application uses a special algorithm based on machine learning and deep learning.

**ICEMCE-010**

## COMPARATIVE PERFORMANCE ANALYSIS OF MACHINE LEARNING CLASSIFIERS ON WEATHER DATA

***Dhanalakshmi J (B.S.Abdur Rahman Crescent Institute of Science and Technology)*; Ayyanathan N (B.S.Abdur Rahman Crescent Institute of Science and Technology); Prabhu Chakkaravarthy A (St.Joseph's College of Engineering )***

Accurate weather forecasting is essential for predicting the conditions of atmosphere based on time and location. It is used to determine the future climatic conditions of expectation. The Seattle weather data from Washington United States of America (U.S.A) is taken for this analysis and implemented using data mining tool for calculating and classifying its performance. In this study, the machine learning techniques are applied for classifying the weather forecast using various machine learning algorithms for giving the best accuracy. Based on variables, comparative performance is done using SMO, Random Forest and J48 algorithms. Thus, the weather data is classified with maximum accuracy of 98% using Random Forest compared with J48 and SMO algorithm. The suggested strategy improves that the rain weather data forecast is higher in Seattle region based on other weather conditions.

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**ICEMCE-011**

## CASCADED ANFIS MPPT ALGORITHM BASED NON ISOLATED ZETA CONVERTER FOR PV/EV APPLICATIONS

***Tharwin Kumar (Puducherry Technological University)*; C. Christober Asir Rajan (Puducherry Technological University)***

A battery stallion for EVs based on Zeta converters was suggested by the current research. Zeta converters are simultaneously, fourth-order DC–DC converters that function as buck–boost converters. The Zeta converter is designed to excerpt the most quantity of electricity possible from a planetary collection in order for charging the EV battery. The PV array is made up of solar power panels with a 280 watt capability. Perturb and Observe MPPT determines the solar power method's optimal output. The right rate of duty for the Zeta conversion circuit can also be chosen. Using the mat lab, the system's concept is constructed and recreated. The functionality of the MPPT controller's algorithm will be enhanced by cascading ANFIS. To assess the presentation of the recommended scheme, the simulation is run in MATLAB, and outcomes of the simulation are presented.

**ICEMCE-012**

## SPURIOUS CURRENT-INDUCED BREAKER FAILURE PROTECTION IN THE 220KV DMT BUS SWITCHING SCHEME– A CASE STUDY FROM INDIAN POWER SECTOR

***Pankaj kumar jha (1)****

Double main & transfer (DMT) bus switching scheme is being used generally at 220kV voltage level in POWERGRID India. During line shutdown for any maintenance work on the transmission line, circuit breakers at both ends of the transmission line are opened and line earth switch at both ends are closed after opening of line side disconnectors. The current transformer in DMT scheme is towards line side and falls between the earth at two ends of transmission line, hence the chances of spurious current in the CT during line shutdown is very high. This spurious current leads to incorrect operation of breaker failure protection (BFP) and may leads to unwanted tripping of multiple elements of the transmission system. This paper presents a case from Indian power sector wherein BFP operated during line shutdown work because of spurious current detected by the CT, however correct isolation process by the utility and correct implementation of protection function avoided widespread outage during this inadvertent BFP operation. This paper will help the readers in understanding how CT and earth switch position in DMT scheme leads to BFP operation during line shutdown? The paper will also highlight the importance of human aspects in the protection system.

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**ICEMCE-013**

## DESIGN OF OPTIMIZED PID CONTROLLER FOR SWITCHED RELUCTANCE GENERATOR IN WECS APPLICATIONS

***Fabbina C. (Government College of Engineering)*; Muthamizhan Thiyagarajan (Academic Researcher); Mujahid Irfan (SR UNIVERSITY); Martin G. W. (Marthandam College of Engineering and Technology); Shadhik M. (Dhaanish Ahmed College of Engineering); Balaji V. (KCG College of Technology)***

The goal of this study is to provide a technical overview of SRG and their use in WECS. The fundamental architectures and combinations of SRG converters in WECS are examined, as well as optimization control approaches for improving the effectiveness of SRGs in wind energy producing infrastructures. The key aspects of each SRG converter architectural and regulator technique were thoroughly examined. The examination presented here can also be used as an initial substance for the advancement of SRG control systems, setting the framework for more and possibly younger experts to study magnet-less battery-powered machines, clearing the way for a faster deployment of SRG-based wind farms. The SRG was presented as a complement to regular wind turbines. Because the SRG is a direct current machines. The goal of this research was to apply a PID controller to the electrical output of the power source, allowing it to be used in AC-DC converters or load controllers. The PID controller that was utilised here was optimized such that the proportional, integral, and derivatives gains could offer the controller with increased versatility. The Settling time obtained using PSO-PID controller is 0.15s.

**ICEMCE-014**

## SIMULATION STUDY OF A META STRUCTURED SOLAR CELL

***Victor Du John H (Karunya Institute Of Technology And Sciences)*; Ahathiyan G (Karunya Institute Of Technology And Sciences)***

In this proposed work, a 3d -structured Metamaterial structured solar cell with GaAs as a top layer is designed and simulated. In this study, HFSS software is used to design the device and used to find the absorption curve then the designed device is imported to Sentaurus TCAD device editor and Sentaurus workbench is used to simulate the device. We use GaAs as a top layer because it had a bandgap which is approximately equal to solar ray bandgap. The bandgap of GaAs is 1.42eV. All the device structure is simulated and the output is tabulated. The proposed device has four layers. The top layer is a meta material structure which is made up of gold, the second layer is GaAs, third layer is Silicon Nitride and the bottom layer is silicon. The device has a two contact which is made up of silver. The solar cell we designed has a length of 600nm and a width of 500nm and a thickness of 100nm. The proposed device is simulated successfully and optimized, which has an efficiency of 18.15%, Voc of 0.18V and Jsc of 0.31 mA/cm2.4

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**ICEMCE-015**

## IOT BASED POWER QUALITY MONITORING IN SMART GRID

***Devaki M (Velammal College Of Engineering & Technology)****

The Internet of Things (IoT) has found extensive use in various industries such as smart grids and industrial fields for energy monitoring purposes. In the context of monitoring Power Quality (PQ) in a smart grid, the Internet of Things (IoT) has emerged as a promising network for enabling such capabilities. This paper presents an IoT-based power quality that is designed for monitoring various Power Quality parameters. To build this IoT-based on power quality monitoring, a flexible microcontroller is utilized to process the voltage and current signals. The IoT-based smart meter includes a communication module that enables the transfer of data to IoT cloud platforms such as "the things speak". In addition to causing damage to devices, Power Quality (PQ) issues can also result in energy wastage. As a result, conducting PQ analysis can aid in identifying and resolving such issues, ultimately contributing to energy savings. In this method, it is possible to reduce both voltage imbalance and harmonic distortion. Real-time electrical data from consumers can be obtained using an IoT-based software application called "Ubidots".

**ICEMCE-016**

## POTENTIAL USE OF CATHODE RAY TUBE AS AN ABRASIVE PARTICLE IN ABRASIVE JET MACHINE

***Thamizhvel R (IFET College of Engineering); Thamizhvel R (IFET College of Engineering)****

The growth of the electronic industries have developed in recent decades to make more electronic items as the demands increases which lead to disposal of non-bio degradable waste. This causes environmental pollution and harmful effect to human being and animals. In this project, the abrasive particles used in the abrasive jet machining process are made from repurposed e-waste. For this idea, the flow analyses of nozzle are finding from the research on various published papers. Based on research the nozzle is fabricated. Further, the e-waste like CRT and using sieving and segregated methods, monitors are gathered and reformed into abrasive particles. The mixing chamber is constructed, and the abrasive particles and dry air are mixed inside. Then, through the outlet opening, the mixed particles are forced to flow out into the working chamber. As a result, in the abrasive jet machining process, a targeted stream of abrasive particles is accelerated through a nozzle at a high velocity stream to machine the glass materials. Furthermore, the abrasive particle performance parameters of the abrasive jet machining process are assessed.

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**ICEMCE-017**

## EFFICIENT RESIDUAL LSTM-BASED SHORT DURATION POLARIZATION CURRENT FORECASTING TECHNIQUE OF TRANSFORMER

***Aniket Vatsa (Indian Institute of Technology (Indian School of Mines)); Ananda Shankar Hati (Indian Institute of Technology (Indian School of Mines))*; Mayank Sharma (Indian Institute of Technology (Indian School of Mines))***

Polarization and depolarization current (PDC) measurement is a vital time-domain analysis technique of transformer insulation conditions. However, the PDC measurement can sometimes be extended to several hours, thereby making it susceptible to data corruption due to external disturbances. Therefore, this paper proposes a short-duration polarization current forecasting method based on residual long short-term memory (LSTM) networks for accurate forecasting of polarization current. The proposed method is evaluated using a laboratory-developed insulation sample. Experimental results demonstrate the remarkable accuracy of the presented technique in forecasting polarization current using the past 225 seconds of training data. It highlights the potential of the proposed approach to enhance polarization current forecasting in practical applications by effectively capturing temporal dependencies and patterns in polarization current data. Additionally, the residual LSTM model is compared with attention LSTM, LSTM, and GRU models for a relative evaluation of polarization current forecasting performance. It evaluates the effectiveness of models in capturing long-term dependencies and retaining information to determine the optimal model. Furthermore, the relative evaluation of dissimilarity metrics (Euclidean distance, dynamic time warping, Chebyshev distance, and Manhattan distance) demonstrates the superior performance of the Residual LSTM model in forecasting polarization current, exhibiting notably diminished dissimilarity values across all metrics. The achieved accuracy provides valuable insights for assessing insulation performance for developing proactive maintenance strategies.

**ICEMCE-018**

## ZERO SEQUENCE FILTERING AND ITS IMPACT ON LOW IMPEDANCE DIFFERENTIAL PROTECTION OF SHUNT REACTORS

***Pankaj kumar jha (1)****

Numerical low impedance differential protection relay is used for protection against internal three phase-to-ground, phase-to-phase and phase-to-ground faults in shunt reactors. these numerical relays calculate the differential and restraining current based by eliminating zero sequence current from the fundamental frequency differential & restraining current based on some pre-defined connections like star-star, star-delta etc. These numerical differential protection relays are basically designed for protection of two and three winding transformers and no separate application blocks are available in these relays for protection of shunt reactors. In this paper we will discuss about the effect of zero-sequence filtering on the performance of low impedance differential protection of shunt rectors. This paper will also provide the guidelines for setting of low impedance differential protection of shunt reactor and we hope that this paper will serve as a reference guide to the utility engineers across the power sector.

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**ICEMCE-019**

## A COMPREHENSIVE REVIEW OF UPFC TECHNIQUES FOR IMPROVING POWER QUALITY

***Vinay Kumar. Polishetty (Annamalai University)*; G. Balamurugan (Annamalai University); Kartigeyan Jayaraman (Annamalai University)***

Power electronic parts are used by Flexible AC Transmission System (FACTS) devices to preserve an adaptability and versatility of the power supply system. In this paper we provided the survey about UPFC techniques. To improve power quality we use conventional techniques and optimization techniques for UPFC. We have provided the comparative analysis related to the existing approaches using UPFC. Remarkably versatile and intricate power electronic gadget for managing and enhancing power flow in an electrical power transmission system is the UPFC. The effectiveness of power transmission and an increase in voltage stability margin are both studied in this study in relation to the incorporation of UPFC. To demonstrate the improvement in the voltage stability margin, the findings obtained in this manner are contrasted with those obtained following system compensation using UPFC.

**ICEMCE-020**

## ELM APPROACHES FOR PRODUCT BASED RANKING AND SCHEDULING MODELS

***S. Abirami (P.S.R Engineering College)*; K. Amsaveni (P.S.R Engineering College); S. Kayathri (P.S.R Engineering College)***

An extreme learning machine (ELM) has remained employed in a range of tasks involving regression and classification because to its high efficacy and accuracy. The organization of data used for training and testing must be the same, which is frequently inaccurate in practical situations, for ELM to be effective. ELM operates poorly when adapting to domain scenarios when the exercise informations and testing data are discrete otherwise but still connected. Additionally, the recommended method's ELMs, such as the classification algorithm and the space learning ELM, only need a restricted amount of hidden nodes to retain low computing overhead. Numerous tests using actual image and text samples show that our technique surpasses other domain adaption techniques in terms of reliability while maintaining a high level of economy. This research develops a unique Extreme Learning Machine model for sentiment assessment and categorization based on the Improved Red Deer Algorithm. As part of the suggested MRDA-ELM technique, preprocessing is first done to get the data ready. Additionally, the TF-IDF vectorizer is used for feature extraction, and the ELM model is employed for emotion categorization. The ELM algorithm's characteristics are also adjusted using the MRDA method to their ideal values. Several simulations assessments were performed, and comparative studies' consequences show that the MRDA-ELM methodology is larger to other modern methods.

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**ICEMCE-021**

## IMPROVED Z-SOURCE DC-DC CONVERTER FOR PMBLDC BASED EV

***B. Kavya Santhoshi (Godavari Institute of Engineering and Technology (A))*; J. Reegan (St. Mother Theresa Engineering College); R. Venkatesh (Annapoorana Engineering College); K.S. Kavin (Government College of Engineering); P. Subha Karuvelam (Government College of Engineering); sivarajan s (Vel Tech Multi Tech Dr rangarajan Dr Sakunthala Engineering College)***

The premise of a dc microgrid that offers the benefits of cheap expenses and low losses since the AC/DC converter operations are eliminated, is shown by the growing use of RES. Because of the unpredictable behaviour of renewable energy sources, voltage swings are the usual power quality issue in DC microgrids. In DC microgrids, direct current (DC), a newly developed power quality device, is used to lessen the impact of the associated issue. In contrast to typical systems, a z source converter architecture is presented in this study to offer a large compensation voltage range with a smaller duty cycle range and a noticeably lower battery nominal voltage. PMBLDC, a Z-Source converter, and a PV system make up the system that is suggested. Despite the need of extra switches, it uses a z source converter with passive components to achieve high voltage gain. Three phase VSI is employed to execute the shoot-through control that is utilized to obtain high gain in the Z-Source Converter.

**ICEMCE-022**

## OPTIMIZED FEATURE SELECTION FOR BRAIN CANCER DETECTION

***S. Vinurajkumar (Saveetha Engineering College)*; Sofia J Bobby (Jerusalem College of Engineering); Deepa Beeta Thiyam (Vel Tech Rangarajan Dr. Sagunthala R & D Institute of Science and Technology); Rajasekar M. (Saveetha University)***

A brain cancer is an unexpected growth of nerves within the brain that interferes with the brain's normal function. Numerous lives have been lost as a result of it. It will take time to protect individuals from this illness by prompt discovery and the appropriate treatment. The search for tumor-affected brain cells is a difficult and time-consuming process. However, detecting brain cancer with the precision and speed necessary is a significant hurdle in the field of image processing. This study suggests a brand-new, precise, and enhanced method for finding brain cancer. Preprocessing, segmentation, feature extraction, optimisation, and identification are some of the processes the system uses. A skull scraping constitutes one of the first steps in the procedure of finding anomalies in the brain and is used in the initial processing method. Discrete wavelet transform (DWT) is employed for feature extraction, while K-means algorithms are used for picture segmentation. In this section the optimised CNN method is used, which selects the best characteristics via dragon fly optimisation. The CNN classifier is used for identifying brain tumours. Utilising reliability, precision, and recall characteristics, this system evaluates its efficacy with that of another contemporary optimisation approach and declares that its work is superior.

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**ICEMCE-023**

## FEATURE FUSION TACTICS IN GASTROINTESTINAL ENDOSCOPIC IMAGE RETRIEVAL USING DEEP FEATURES

***Mathana Gopal Arulsamy (Kalasalingam Academy of Research and Education)*; M.PALLIKONDA RAJASEKARAN (Kalasalingam academy of research and education); Arun T Prasath (Kalasalingam Academy of Research and Education); Kottaimalai Ramaraj (Kalasalingam Academy of Research and Education)***

Learning outcomes in the vast field of image retrieval (IR) can enhance the effectiveness of IR systems. Medical imaging is crucial because it can quickly and precisely diagnose a patient's disorder, monitor their response to treatment, and manage their condition. Therefore, it is essential to develop a reliable and effective medical image retrieval system. Endoscopic colored images have a single mode of representation with identical attributes, making it difficult to exploit low-level features. In this work, feature vectors extracted from deep learning networks such as ResNet101 and DenseNet201 are fused together in two ways, namely concatenation and summation, using the canonical correlation analysis-based feature fusion technique. The dimensionality of the feature space chosen for the analysis was reduced using principal component analysis. The effectiveness of this methodology was examined using the well-known medical image dataset, Kvasir. The experimental performance analysis demonstrated that the retrieval strategy is extremely effective when integrating various feature spaces.

**ICEMCE-024**

## DEVELOPING A TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION DEVICE FOR REGULATING HORMONES IN PCOS PATIENTS

***Arun T Prasath (Kalasalingam Academy of Research and Education); Sakthivel Sankaran (Kalasalingam Academy of Research and Education); Kawyaa Krishnan (Kalasalingam Academy of Research and Education); Neeraja Ramanan (Kalasalingam academy of research and education ); Kruthika Reshmi C (Kalasalingam Academy Of Research and Education); Rajalakshmi S (Kalasalingam Academy of Research and Education); M.Pallikonda Rajasekaran (Kalasalingam academy of research and education); Kottaimalai Ramaraj (Kalasalingam Academy of Research and Education)*; Sundar M (Thiagarajar College of Engineering)***

Numerous investigations have been carried out in later times to comprehend the impacts of Transcutaneous Electrical Nerve Stimulation (TENS) innovation on the female regenerative framework, and several contrivances have been proposed to explicate its prospective benefits. These include regulation of the hormonal secretion and living a normal lifestyle without being subjected to several symptoms of Poly-cystic ovarian syndrome (PCOS) through the effect of TENS. It is known that normal levels of reproductive hormones fall out of balance as a result. People With PCOS frequently experience irregular menstrual cycles, missed periods, and uncertain ovulation as a result. Anovulation, or the absence of ovulation, can cause little follicular cysts on the ovaries to be apparent on ultrasound. Regulation of these hormones on normal levels and reducing the amount of androgen secretion are very important in regulating the behavioral and physiological events necessary for success to enlarge. The point of this study is to test the convenience of TENS in normalizing hormone levels in

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ladies, considering its impacts on comes about of age, Body Mass Index (BMI) and torment resistance of members. It is theorized that inducing pain at certain points of the body using TENS significantly regulates hormone levels and decreases the androgen level.

**ICEMCE-025**

## EDGE-DRIVEN BIOMETRICS AND FACIAL RECOGNITION FOR VIRTUAL ASSISTANT

***Ramalingam H M (Mangalore institute of technology & Engineering ); Mohamed Fazil (Mangalore institute of technology & Engineering); M.PALLIKONDA RAJASEKARAN (Kalasalingam academy of research and education); Kottaimalai Ramaraj (Kalasalingam Academy of Research and Education)*; Vishnuvarthanan G (VIT Bhopal University); Arun T Prasath (Kalasalingam Academy of Research and Education)***

In modern society, time is essential. Recent advances in technology have accelerated the emergence of assistance systems for individuals in their everyday lives. Quick and correct information at the right time needs computerization. In the existing voice assistants, the proper authentication of the user for security purposes is not precise. Inculcating the face and voice biometrics will add up security for the system. To ensure each user's data and personal information is properly maintained, we provide Multifactor authentication. Also, a lot of time is spent on tedious repetitive tasks which can be reduced by using a virtual assistant. This paper presents a combination of different technologies like Edge driven biometrics, Computer vision, and Machine Learning. The model was designed and developed for both personal mode and general mode. Usability testing was carried out for several use scenarios in order to assess performance.

**ICEMCE-026**

## EFFECT OF SOLID-FLUID INTERACTION PARAMETER ON SURFACE WETTABILITY WITH IRREGULAR TRIANGULAR MICROPILLARS USING LATTICE BOLTZMANN METHOD

***Ganesh Sahadeo Meshram (IIT Kharagpur)****

In this study, we present the numerical investigation of the surface wettability with irregular triangular micropillars using a two-dimensional (2D) pseudo-potential multiphase lattice Boltzmann method with a D2Q9 model for various solid-fluid interaction parameters of the range from -1.30 to -2.20. Firstly, the simulation of the equilibrium state of a water droplet on a smooth surface is considered with various interaction parameters to examine the accuracy of the present numerical model. We then imposed the microscale irregular triangular pillars at the bottom of the surface with different heights of the pillars to study the behavior of water droplets on the micropillars. We have taken a water droplet of radius 100 lattice units in the domain of 800x800 lattice units for the study and analyzed the wettability by measuring the contact angle. The study shows that increasing the solid-fluid interaction parameter of the pillars dramatically reduces the contact area between water droplets and solid walls due to the momentum redirection phenomenon.

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**ICEMCE-027**

## BLOCKCHAIN BASED AUTHENTICATION AND PRIVACY PRESERVATION IN IOMT DEVICES

***Sakshi Rajvanshi (Graphic Era University); Sachin Sharma (Graphic Era University)****

A decentralised, distributed, open, and transparent digital ledger that keeps track of transactions among a number of computers is what is meant by the term "blockchain." By creating Bitcoin, the first cryptocurrency, in 2008 under the pseudonym Satoshi Nakamoto, a person or group created a revolutionary technology. Designing a solution to the issue of confidence in digital transactions, which would do away with the need for middlemen like banks or governments to verify and approve transactions, was urgently needed. The blockchain was created as a result of several important considerations. First, the blockchain addressed the problem of double spending, in which digital currency might be duplicated and used more than once, by developing a decentralised consensus system that validates transactions and upholds a single source of truth. Second, blockchain introduced the idea of "smart contracts," which are self-executing contracts that autonomously enforce terms and conditions by doing so without the use of intermediaries, thereby increasing efficiency and lowering costs across a range of businesses

**ICEMCE-028**

## BAT OPTIMIZED CNN FOR SKIN CANCER DETECTION USING DEEP LEARNING APPROACH

***S. Sathish (Veltech Multitech Dr Rangarajan Dr Sakunthala Engineering College)*; J. Shanmugapriyan (NSN College of Engineering); N. Malathy (J. N. N Institute of Engineering); K. Shruthi (Easwari Engineering College)***

Among the most harmful forms of malignancy that people get easily these days is skin cancer. Skin cancer comes in a variety of forms, including basal, melanoma, carcinoma, and squamous cell, among which melanoma is unexpected. Therefore, earlier skin cancer diagnosis is crucial for successful treatment. In order to diagnose skin cancer, this research proposes a new technique dubbed the bat optimisation algorithm. To reduce the noise and artefacts from the input image, pre-processing is first applied. The pre-processed image is then passed on to the feature extraction stage, where the features are obtained using convolutional neural network features. A deep stacked auto-encoder that has been developed with the suggested bat optimisation is then employed to classify data based on the retrieved features. The precision, efficacy, and specificity of skin cancer diagnosis using the proposed approach are assessed.

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**ICEMCE-029**

## HYBRID FUZZY ASSISTED RNN ALGORITHM FOR DIABETIC RETINOPATHY IDENTIFICATION

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The most common cause of blindness in diabetics is diabetes retinopathy. The importance of early detection in preventing the DR cannot be overstated. However, because eye checkups are so expensive, many people let DR worsen and eventually lead to blindness. To identify persons with DR, the current study employs a color fundus image and a Fuzzy RNN algorithm. Although the purpose of this study is to save money, it could be a game changer for people with DR who cannot afford a medical diagnosis. Prior processing methods include green band extraction, histogram equalization, filtration, optic disc removal with organizational components on architecturally procedures, and illumination changes. The data acquired by GLCM contains contrast, correlation, energy, and homogeneity, and it is utilised to extract characteristics from the preprocessing results. This paper describes a threshold segmentation-based DR detection system. As a result of this study, a fuzzy-RNN methodology for identifying diabetic retinopathy has been developed. Threshold-based categorization is used to determine the diabetic zone. GLCM (Grey Level Co-occurrence Matrix) is the feature extraction technique applied in this case. These characteristics are utilised for categorization. For classification, an RNN classifier is utilised. The Accuracy Comparison of the Classification values are listed in Fig. 3, in which they are listed as 94%, 96.4% and 98.6% for ANN, RNN and FUZZY-RNN Classifier Respectively.

**ICEMCE-030**

## SMART TRASH CREDIT SEGREGATOR

***Manoharan P S (Thiagarajar College of Engineering)****

An intelligent garbage disposal system that employs cutting-edge technology to improve its functionality and effectiveness is referred to as a smart dustbin. To determine the amount of trash in the dustbin and alert the final user when it is filled-up, it makes use of a variety of sensors and gadgets such ultrasonic sensors, infrared sensors, and load cells. Using artificial intelligence algorithms, the smart dustbin can also automatically sort waste into several compartments, making it simpler to recycle and dispose of waste effectively. Its internet connection enables real-time data transmission to a centralized monitoring system, facilitating effective waste management and lessening the burden on human operators. Using a smart trash can not only enhances waste management procedures but also encourages sustainability and lowers the environmental impact of waste.

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**ICEMCE-031**

## IMPROVED DFIG-BASED POWER QUALITY CONTROLLER BASED ON MACHINE LEARNING CASCADED NEURAL NETWORKS

***S. Prakash (Aarupadai Veedu Institute of Technology, Vinayaka Missions Research Foundation)*; S. Radheswari (Aarupadai Veedu Institute of Technology, Vinayaka Missions Research Foundation)***

Due to its numerous benefits, sources of clean energy are utilized to generate electricity. The most effective Renewable Energy Source (RES) for power generation is wind. Typically, power network and wind system are directly connected to supply power. Doubly Fed Induction Generator (DFIG) is widely utilized in Wind Energy Conversion Systems (WECSs) because of its compact shape, affordable price, high efficiency, and independent power regulation. Managing quality of power issues including swells, voltage sag, flickers, harmonics, etc., are challenges that are directly associated. Peripheral correction is necessary to improve the Power quality (PQ) in a power network using WECS. In this work, a unique control method that uses a cascaded Artificial Neural Network (ANN) to enhance PQ in WECS is proposed. Pulse Width Modulation (PWM) generator provides required gate signal for the operation of PWM rectifier. Proportional Integral (PI) controller is employed to enhance, a Three Phase Voltage Source Inverter (3ϕ VSI) connected to grid. PWM rectifier, which is utilized in WECS employing DFIG, converts AC to DC with assistance of a PI controller. Making use of Bidirectional battery converter, battery charging and discharging is performed efficiently. The overall system is executed in MATLAB Simulink software and corresponding outcomes are attained. Total Harmonics Distortion (THD) value attained for proposed system is 1.76%.

**ICEMCE-032**

## AN IN-DEPTH ANALYSIS OF THE ELEMENTS SHAPING ORGANIC FARMERS: A SYSTEMATIC REVIEW

***Anilkumar Chunduru (GMR Institute of Technology)****

In pursuit of sustainable and eco-friendly agricultural practices, organic farming has emerged as a promising solution to address the challenges posed by conventional agriculture. This paper presents a comprehensive survey of organic farming techniques, aiming to shed light on the diversity of approaches employed by farmers worldwide. Organic farming emphasizes the use of natural processes, avoiding synthetic chemicals and genetically modified organisms, to promote soil health, biodiversity, and overall ecosystem balance. Through a systematic review, this study explores various organic farming techniques, including soil management practices that enhance soil fertility and structure, pest and disease control strategies based on natural predators and biological agents, crop rotation systems to reduce pest pressure and nutrient depletion, and the role of composting in recycling organic matter to enrich soil nutrients. Moreover, this survey investigates the impact of organic farming on ecosystem resilience and its potential to mitigate climate change by sequestering carbon in the soil. As organic farming continues to gain momentum, it becomes essential to understand its potential benefits, challenges, and implications for sustainable agriculture. By highlighting different techniques used in organic farming, this research aims to contribute valuable

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insights and foster a collective mission towards a more sustainable and healthier future for the nation.

**ICEMCE-033**

## GRASSHOPPER OPTIMIZED ARTIFICIAL NEURAL NETWORK FOR ROBUST DEMAND SIDE MANAGEMENT IN SMART GRID

***S. Sivarajan (Sathiyabama Institute of Science and Technology)*; S. D. Sundarsingh Jebaseelan (Sathiyabama Institute of Science and Technology)***

Supplying electricity that is safe and dependable is crucial to the nation's security, economy, and healthcare. The smart grid, which revolutionizes the way electricity is produced, distributed, monitored, and controlled, integrates communication technology and sensors into power structures. There are a number of challenges that must be resolved before smart grid can truly be applied. The safety of the smart grid is a significant and stimulating job. This paper offers a recommendation for a secure demand-side management (DSM) engine for an Internet of Things (IoT)-enabled grid. The intended DSM sequence is in charge of upholding use of electricity that is as effective as feasible in accordance with objectives. A novel resilience architecture is used to control intrusions into the smart grid. The robust computer anticipates fraudulent individuals by the ML classification. Progressive vigor organization and connection regulatory managers are suggested to procedure power expertise and optimize power operation. The recommended strategy's success is assessed using the efficient simulate. The results of the investigation demonstrate that the suggested DSM engines is sufficiently effective to decrease the power consumption of the smart grid and less prone to intrusion.

**ICEMCE-034**

## PERFORMANCE EVALUATION OF FUZZY LOGIC CONTROLLER ENABLED WIND ENERGY CONVERSION SYSTEM

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In the present research, boost converter employing renewable energy as a source of input is designed and simulated. Currently, unlike with other forms of energy, wind energy remains the sustainable and clean method of renewable energy. In India, the wind typically blows at a variable speed, creating a variable input voltage as an energy source. The output voltage can be raised to a level appropriate for residential use using a DC-DC boost converter. The current research used MATLAB SIMULINK to develop and simulate a boost converter circuit based on a topological circuit of wind energy conversion systems. Fuzzy Logic Controller (FLC) is employed to tune the duty ratio or pulse width of the converter so as to optimize the output voltage transient response. The result revealed that the boost DC-DC converter with FLC performed better than the buck converter. The projected approach is relatively better than alternative controls in effectiveness, robustness, and flexibility.

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**ICEMCE-035**

## CASCADED ANN ALGORITHM FOR SPEED CONTROL OF SWITCHED RELUCTANCE MOTOR IN EV APPLICATIONS

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Solar photovoltaic (PV) technology is a revolutionary concept for charging electric vehicles (EVs), and it has a variety of technological and financial benefits. A cascaded artificial neural network (ANN) for switching reluctance motor (SRM) driving with front end circuit integration is fascinating for EV. Because of its simple design, high reliability, high fault tolerance capacity, and low production cost, SRM has these advantages. The high torque ripples, running vibrations, and acoustic noise, however, are the principal drawbacks of SRM. The Cascaded ANN theory for SRM drives suggests a solution to deal with this drawback by using advantages like a wide torque range, a low torque ripple, and a vibration-free response with flexible speed control. The Luo converter is included in the suggested architecture to increase output voltage and decrease output ripples. To regulate the SRM motor's speed, a Cascaded ANN Controller is suggested. The main objective of this study is to improve the recommended controller, which provides outstanding performance and high robustness. Simulink and MATLAB are employed. The minimum time required to deploy a cascaded ANN is 0.01 seconds for 2000 rpm and 0.02 seconds for 2500 rpm.

**ICEMCE-036**

## SYNERGIC STUDY OF WEAR AND CORROSION BEHAVIOUR OF LOW ALLOYED HIGH-STRENGTH EH47 SHIP HULL STEEL

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The aim of this research work is to study the wear and corrosion properties of EH47 ship hull steel. Wear refers to the process by which materials degrade and erode due to mechanical or physical contact with other materials, typically in the presence of abrasive particles or surfaces. Wear primarily happens as a dynamic loss of material coming about because of the mechanical cooperation of two sliding surfaces under load. The disastrous and unexpected debasement of a material brought about by its current circumstance. Tragically for metals practically all conditions can make consumption some degree, since the eroded state is the steadier state were happened as corrosion observation in the hull of the ship. EH47 structure

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steel in a convoluted marine climate in which seawater, ocean ice, and ocean sand coincide, sped up wear and consumption tests were acted in a lab setting utilizing a tribometer. The impact of huge load on the way of behaving of scraped spot and erosion in a 4wt% NaCl (salt water) arrangement with ice and sand to reproduce a marine climate were examined. The trial results showed that the coefficient of friction, Potential dynamic polarization analysis, EDS corrosion morphology studies diminishes with expanding working burden; in the meantime, the stacking power and sand on the plate emphatically impact the coefficient of friction (CoF). The components of grating and the coupling impact of scraped spot and consumption in the 4wt% salt water arrangement with sand were the wear and erosion systems; besides, the wear and corrosion system applied the prevalent impact against marine corrosive environment.

**ICEMCE-037**

## HYBRID DEEP LEARNING ALGORITHM FOR MRI BRAIN ALZHEIMER'S DISEASE PREDICTION

***Karthikeyan D. (SRM Institute of Science and Technology )*; Nivasini R. (Guvi Geek Networks); Kiruba Thangam Raja (School of Information Technology and Engineering); Madhivadhani D. (Kings Engineering College); Sivakumar B. (Rohini College of Engineering and Technology); Krishna Priya (Rohini College Of Engineering And Technology)***

Magnetic resonance imaging (MRI) has been used to study the structural makeup of the brain and analyse several neurological disorders and diseased areas. For the adoption of preventative measures, early recognition of Alzheimer's disease (AD) patients is essential. A thorough inspection of the tissue arrangements obtained of MRI enables an exact characterization of certain brain diseases. There have been a number of division techniques for diagnosing AD that range in complexity. Compassion has been tested by deep learning techniques used to segment the structure of the brain and classify AD because they have the potential to uncover important information from vast amounts of data. As a result, hybrid deep learning methods are implemented and the result of the image prediction are presented in this paper.

**ICEMCE-038**

## A STUDY ON SQL INJECTION DETECTION: AI-BASED PERSPECTIVE

***Dharani pujitha (GMR Institute of Technology)****

Web applications have revolutionized the way we interact with and utilize the internet, offering dynamic and feature-rich experiences. However, alongside their numerous benefits, web applications also pose security challenges, with SQL injection vulnerability being one of the most common and harmful weaknesses. SQL injection attacks have become a prominent concern in web application security, as highlighted on their Network Security Problems released by OWASP. SQL injection attacks present a significant danger to web-based programs, undermining their security and potentially resulting in unapproved access and data

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violation. This work explores the application of DL techniques to enhance the identification of SQL injection Attacks (SQLiA) in web-based programs, aiming to strengthen their defense mechanisms. The work is going to analyze various ML/DL-based mechanisms in which algorithms have achieved the best accuracy in terms of performance.

**ICEMCE-039**

## A SURVEY ON SECURE METHOD OF COMMUNICATION USING QUANTUM KEY DISTRIBUTION

***Anilkumar Chunduru (GMR Institute of Technology)****

Modern-day secure communication is made possible via cryptography. Modern cryptographic algorithms are based on the process of factoring large integers into their primes, as they are intractable. But the cryptography we use nowadays is vulnerable to technological advances in computing power like quantum computing and evolution in math to quickly reverse one-way functions like factorization of large integers. Incorporating quantum physics concepts into cryptography is the answer, which results in an assessment of quantum cryptography. A unique type of cryptography known as quantum cryptography makes advantage of quantum mechanics to provide complete protection against the transmitted message. Quantum Key Distribution (QKD), a random binary key distribution used in quantum cryptography, enables communication participants to recognize unauthorized listeners. Quantum Key Distribution (QKD) is likely the most advanced quantum technology currently accessible with full- stack systems already in use. This project's goal is to develop secure and encrypted communication between the parties with the help of a web application using the BB84 protocol.

**ICEMCE-040**

## SOLAR POWERED IOT BASED SMART AGRICULTURAL LAWNMOWER USING BLUETOOTH/ANDROID APP

***Saravanan S (B V Raju Institute of Technology)****

In India, agriculture is the backbone of nearly 70% of the population, involving a diverse range of tasks spanning from seed sowing to ploughing. The imperative need for automation in agriculture to bolster productivity aligns with the ongoing technological advancements. Conventional fuel-powered lawnmowers require manual assistance. In this paper, an IoT-based solar-powered intelligent lawnmower has been developed. This lawnmower boasts a BLDC motor, four gear motors, an array of sensors, an Arduino-driven charge controller, and a solar panel, making it a sustainable choice. Its user-friendly control interface is seamlessly operated via an Android app for data communication and NodeMCU 8266 for energy and motor management. Notably, the standout feature is its IoT-based motion control, enabling remote operation and achieving an impressive 83% electrical efficiency across diverse weather conditions.

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**ICEMCE-041**

## IMPACT OF INTEGRATED LEARNING APPROACH TO STUDENTS' SUCCESS: A CASE STUDY FOR THE I YEAR PEEE COURSE IN A BACHELOR OF TECHNOLOGY PROGRAMME

***Saravanan S (B V Raju Institute of Technology)****

The modern engineering sector is fast-paced and full of unpredictability, therefore in the past two to three decades, various learning strategies have been tested in Bachelor of Technology studies. The study aims to propose the impact of an integrated learning strategy with the intention of developing students' technical competence and self-efficacy. In this paper, an integrated learning approach has been applied to 134 students of the First year first semester Principles of Electrical and Electronics Engineering course in the academic year 2022-23 and their performance are evaluated. A total number of students are divided into two groups: Section A and Section C. Section A is adopted an integrated learning approach and Section C has adopted a traditional approach for teaching. Exam Results at the Semester End Examinations and grade point average are indicators of a student's performance. The findings indicate there is a significant distinction between the performance of students who participated in integrated learning and those who did not. The research also indicated that the student's motivation and sense of competence, both essential in today's highly competitive job market, increased after using the integrated learning strategy to improve their knowledge, Analytical thinking, coding, communication, and presenting abilities. Students have the opportunity to improve their ability to think in a methodical, critical, analytical, and imaginative way. The obtained result shows that Section A has better student success in terms of pass percentage and scoring of marks than Section C. From the analysis, it is concluded that an integrated learning approach improves the students' performance by 21.85% and in future, it can also be used in other courses.

**ICEMCE-042**

### DESIGN AND DEVELOPMENT OF PROTECTIVE SUIT FOR UNDERGROUND WORKERS

***Sheela A (Kongu Engineering college)*; Javin N T (Kongu Engineering college); Kavin R (Kongu Engineering college); Kamalesh S (Kongu Engineering college); Abirami K P (Kongu Engineering college)***

Technological advancements in extraction techniques have increased the concern for safety in mining. To improve the safety of workers in this industry, we need a smart work design. So, we have created smart work clothing that is embedded with sensors for securely transmitting information to the management about hazardous conditions and workers' physical condition. Sensors such as MQ6 Sensors for detecting the gas level in the surroundings, Pulse oximeter sensors for controlling the percentage of oxygen saturation in the working employee's blood, MPU 6050 sensors for detecting the possibility of minor earthquake waves, temperature sensors, and so on are used in our suit. Using NodeMCU ESP32 with Arduino IDE, the output of the sensors can be viewed. In the meantime, the data will be sent to LoRa WAN, which in turn will transmit the data to the private cloud (Firebase). The database has been entirely managed in real-time by Firebase. As a result, data transfer between and within the database is simple and speedy. Through our website, it is possible to view and manage the value of the data acquired.

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**ICEMCE-043**

## FPGA INTERFACED ECG SIGNAL PROCESSING BASED ON MACHINE LEARNING CLASSIFIER

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This study aims to propose an FPGA-oriented ECG signal processing system architecture. The method identifies FPGA complexes and classifies beats as either preterm or typical contractions of the ventricular wall. For pulse classification, an element of the Open Source ECG Analysis Software is used, and for FPGA complexity verification, a method based on a phase-space image of an ECG signal is used. Artificial intelligence (AI) is increasingly serving as the basis for autonomous and independent systems. One of the most popular machine learning techniques among many categorization strategies is the Support Vector Machine (SVM) classification. We may further improve the SVM classifier's accuracy and classification process by using convex optimization techniques to identify the best solution. Numerous machine learning techniques, such as SVM classification, need a lot of processing power since they are compute- and data-intensive. Additionally, a number of machine learning algorithms have made it into incorporated and handheld gadgets, which have very particular demands.

**ICEMCE-044**

## POWER QUALITY IMPROVEMENT BY UPQC IN A DISTRIBUTION NETWORK USING A NOVEL SRF BASED CONTROL APPROACH

***Avik Metia (College of Engineering And Management, Kolaghat)****

In this paper an updated technique has been discussed to mitigate several kinds of power quality (PQ) problems to a distribution network which is connected with a unified power quality conditioner (UPQC). This UPQC is also considered to be connected with an unbalanced as well as distorted non-linear type of load. The harmonic distortions reduction and voltage profile fluctuations reduction can also be executed with the help of UPQC device connected to a distribution network. The principal formation of a UPQC can be represented as the simultaneous operation of two different kinds of active power filters (APF). These two filters are also named based on their connection as series active power filter (SAPF) and shunt active power filter (SHAPF) and they are used to mitigate the voltage and current related several PQ issues respectively. The SRF and d-q-0 concept based control strategies are utilized for series and also for the shunt connected APF of UPQC. The SRF and d-q-0 concepts have been utilized for the UPQC modelling using MATLAB software. The model is then simulated and the simulation results are discussed and analyzed.

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**ICEMCE-045**

## PERFORMANCE ANALYSIS OF AI BASED INTERLEAVED BOOST CONVERTER UNDER PV PARTIAL SHADED CONDITIONS

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A partial shading condition is harmful to the solar modules or arrays that are being shadowed. Additionally, it significantly lowers the output power generated. In contrast to a standard boost converter, the interleaved boost converter has various benefits, counting minimal voltage and current waves, reduced swapping loss, better efficiency, etc. The interleaved boost converter connects 'n' paralleled converters to progress the converter's general performance. A thorough performance analysis of the proposed PV system's interleaved boost converter (IBC) is presented in this paper. Due to the fluctuating climatic circumstances, tracking the maximum power point in solar photovoltaic systems is a difficult operation. Additionally, because there are several peaks in the power voltage characteristics during partial shade so the tracking technique becomes more difficult. In this study, a unique technique for monitoring IBC as ANN based maximum power point tracker in partially shadowed sets is presented. The PWM generator used by the PI controller to produce the output voltage, which it then supplies to the single phase Voltage Source Inverter (VSI) is presented. The proposed MPPT algorithm and the PV system were both simulated using the Mat lab/Simulink setting, also the comparative analysis are carried out in this paper , the efficiency of the IBC is monitored as 90.3%

**ICEMCE-046**

## ANFIS GREY WOLF OPTIMIZED AND SECURED PATH SELECTION ALGORITHM FOR VANET APPLICATIONS

***Sivaprakash P. (Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology)*; Nisha K. S. (Amrita College of Engineering and Technology); Jagadish Vijay R. (Amrita College of Engineering and Technology); Madhivadhani D. (Kings Engineering College); MAHESWARI E (Sri Sairam Institute of Technology); Sasikumar M. (C. Abdul Hakeem College of Engineering & Technology)***

Vehicle ad hoc networks (VANETs) present a unique mix of challenges and opportunities for routing protocols because to the semi-organized organization of means of transportation that faces limits of road structure and laws, as well as obstructions that limit physical access in urban environments. The dependability and scalability of routing protocols in big metropolitan VANETs are actively being explored. Furthermore, ANFIS-GWO Optimization approaches are used to increase routing sustainability and availability in VANETs by clustering vehicles beside one other based on connection locations and relative velocity, resulting in the widespread building of hierarchical network topologies. The transmission range demonstrates that the ANFIS-GWO (Adaptive Neuro-Fuzzy Inference System- Grey Wolf Optimization) is significantly more efficient than the ANFIS and GWO. End to End delay, Energy Consumption, Packet Loss and Throughput evaluation is contrasted with conventional approaches like FUZZY, ANN and ANFIS GWO Respectively. Throughput evaluation is contrasted with conventional approach ANFIS GWO is 650kbps.

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**ICEMCE-047**

## HIGH SPEED FPGA ASSISTED IOT DEVELOPMENT FOR SMART PV GRID MONITORING SYSTEM

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The Internet of Things (IoT) is the ability to link people and things with anyone and anything at anytime, anywhere, over any network, and via any service. The Smart Grid (SG) is the greatest significant IoT applications. Due to this development, the SG has billions of Internet-connected gadgets that produce a lot of data at the network edge. In this paper the Field Programmable Gate Array (FPGA) are supported for the development of IOT based Smart PV grid monitoring System. This paper provides a unique mayfly-optimized ANN controller for monitoring the highest power point in partly shaded sets. Smart PV's innovative technology makes it possible to store extra solar energy in the heating system. Luo converter is applied in this paper and it increase DC-DC voltage from optimistic to positive with a simple building, high control density, high competence, and affordable architecture. Both the PV system and the proposed method were simulated in the Mat lab/Simulink environment. Additionally, a comparative analysis is done in this work, and the voltage gain of the Luo converters is monitored at 9V.

**ICEMCE-048**

## ENHANCED CHARGE SCHEDULING OF ELECTRIC VEHICLE USING OPTIMAL ANDEAN CONDOR ALGORITHM

***S. Prakash (Aarupadai Veedu Institute of Technology, Vinayaka Missions Research Foundation)*; Jeevanandham S (Aarupadai Veedu Institute of Technology, Vinayaka Missions Research Foundation); Abhinand S. L (Aarupadai Veedu Institute of Technology, Vinayaka Missions Research Foundation); Adith S (Aarupadai Veedu Institute of Technology, Vinayaka Missions Research Foundation)***

The rapid expansion of Electric Vehicles (EVs) has led to developments in various research areas in this field, including the establishment of a charging cost approach, charging management, charging station the spot, and charging station organization. The article presents the most effective design of an EV charging station structure utilizing an efficient Andean Condor Algorithm (ACA) to improve the charge scheduling of EV. By simulating each charger incoming EVs with stochastic charging requirements, this suggested solution tackles the problem of dealing with dimension-varying state and action space associated with each charger. Considering the significance of charging station facilities this work examines the deployment of EV charging stations. Its purpose involves taking into consideration a number of limitations, such as the recharging station's power, the average amount of time period required for every charge, and regular travel schedules. The ACA method is used for scheduling electric vehicle Distributed Generators (DGs) and Network Reconfiguration (NR) are used to minimize loss of electricity. This strategy reduces active and reactive power losses in distribution systems by fulfilling the imposing scheduling specifications. The

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suggested approach improves the dependability of the charging system scheduling with entirely reducing overall power losses. Based on the MATLAB simulation findings, ACA significantly minimizes total distribution network losses by appropriately installing charging units.

**ICEMCE-049**

## MODELLING OF A NOVEL EIGHT SWITCH 15-LEVEL ASYMMETRIC INVERTER FOR PV SOURCES

***Devineni Gireesh Kumar (B V Raju Institute Of Technology)*; Saravanan S (B V Raju Institute of Technology)***

Increased demand and availability of fossil fuels are the major issues in the power sector. The PV modules generate solar power. The output of the PV module is DC, but to supply this to AC loads, it is needed to converter to AC. Conventional inverters suffer from harmonics and EMI problems. This led to the design of multi-level inverters to reduce the inverter's harmonic content. However, the available multilevel inverters use many switching devices as output levels increase. Also, these are symmetric inverters unsuitable for PV applications due to variable irradiance and temperature. To overcome these problems, this research proposed an asymmetric inverter using eight power switches, which give the 15-level output from the asymmetrical DC sources. The suggested topology's fewer switches minimize the size and switching losses, increasing system effectiveness. The SHEPWM controls this inverter. The inverter's output voltage profile and efficiency are further enhanced by the SHEPWM's effective reduction of the particular harmonics. The switching angles of the proposed MLI are optimized using a hybrid Adaptive Particle Swarm Optimization (APSO) and Newton Raphson algorithm (NR) to eliminate more complex harmonics.

**ICEMCE-050**

## OPTIMAL INTEGRATION OF HYBRID ENERGY SOURCES FOR POWER FLOW MANAGEMENT IN GRID SYSTEM

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The generation of solar and wind energy has grown significantly during the last few decades. Wind and PV cells are used to convert energy without emitting any pollution. This paper introduces a clean energy-based 3 ϕ that includes Photovoltaic (PV) energy and wind energy. For wind power generation and control the power flow in wind turbine, the Double Fed Induction Generator (DFIG) is utilized here. A Re-Lift Luo Converter has been employed to boost the voltage level of the PV, because it offers a broad conversion range and lower voltage stress. An Adaptive Network Fuzzy Inference System (ANFIS) based Maximum Power Point Tracking (MPPT) approach has been designed to track solar PV modules' highest possible output. The resulting DC voltage is sent to 3ϕ VSI in order to convert it to AC voltage. The resultant AC voltage is then delivered to the 3ϕ grid for additional use. This 3 ϕ mainly developed to control the grid voltage flow. The acquired results are validated

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using the MATLAB platform. The trial results clearly demonstrated that the suggested strategy surpassed the conventional methods in terms of effectiveness, dependability, and minimal ripples with a minimized THD value of 1.24%.

**ICEMCE-051**

## ASSESSMENT OF DFIG BASED WECS CONNECTED TO GRID USING AN OPTIMIZED CONTROL APPROACH

***S. Prakash (Aarupadai Veedu Institute of Technology, Vinayaka Missions Research Foundation)*; Akash A. S (Aarupadai Veedu Institute of Technology, Vinayaka Missions Research Foundatio); Devika Aji (Aarupadai Veedu Institute of Technology, Vinayaka Missions Research Foundation); Shijin Clive (Aarupadai Veedu Institute of Technology, Vinayaka Missions Research Foundation)***

Wind Energy Conversation Systems (WECS) that use a Doubly Fed Induction Generator (DFIG) aim to provide high efficiency control techniques. Future energy demands around the world will be mostly satisfied by RES. The Proportional-Integral (PI) controller tuned for power direct control of power scheme DFIG WECS is presented in this work with an intelligent metaheuristics-based design approach. Under non-smooth and nonlinear operational constrictions, gains adjustment of PI controller is represented as an optimization problem with constraints. The proposed Grey Wolf Optimizer (GWO) algorithm effectively resolves such a specified tuning problem. For reactive/actual power and DC-link voltage, the suggested GWO algorithm has the ability to execute out multiple required operational features of DFIG sequentially. The PI controller's parameters are optimized using GWO algorithm technique. Deployment of PI controller improves the operation of a Three-Phase Voltage Source Inverter (3ϕ VSI) linked to grid. Pulse Width Modulation (PWM) rectifier, which plays a role in WECS employing DFIG, converts AC to DC with the help of a PI controller. Grid is synchronized using D-Q theory which in turn reduces steady state error. Results from hardware implementation demonstrates the effectiveness of suggested control methodology. Finally, the proposed control approach is evaluated using hardware findings from the DSPIC30F4011 microcontroller to verify proposed controls and the outcomes demonstrates that proposed control system's capabilities in monitoring and controlling under various scenarios is effective.

**ICEMCE-052**

## AN IMPLEMENTATION OF SERIAL INTERFACE ENGINE WITH TRANSCEIVER USING VERILOG HDL

***Radha M (Francis Xavier Engineering College); Karthika R (Francis Xavier Engineering College); Dr.Andrew Roobert A (Francis Xavier Engineering College, Tirunelveli)*; Vignesh R (Francis Xavier Engineering College ); Philip Austin (Francis Xavier Engineering College )***

In this works, a serial bus transceiver for field-programmable gate array data transmission and packet manipulation is proposed. Data is received from the central processor unit of a computer through the SIE block and sent to the universal transceiver macro-cell interface, which manages data serialization and de-serialization, bit stuffing, clock recovery, and clock synchronization. The goal of this project is to design a distinctive weighted TPG for a scan-

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based architecture. The goal of this work is to create efficient weighted patterns for permitting scan chains with little power and storage need. This technique achieves low power consumption while reducing hardware overhead. The proposed weighted TPG also exhibits good performance in two different test-per-scan configurations.

**ICEMCE-053**

## NONLINEAR SWITCHING STRUCTURE-BASED ALL-OPTICAL MODULUS-3 COUNTER

***K Sai Kamal Kumar (RVS College of Engineering and Technology, Jamshedpur)*; Sushanta Mahanty (National Institute of Technology, Jamshedpur); Ajay Kumar (National Institute of Technology, Jamshedpur); Nilisha Kumari (RVS College of Engineering and Technology, Jamshedpur); Sushant Shekhar (RVS College of Engineering and Technology, Jamshedpur); Ojasvita Wagisha (RVS College of Engineering and Technology, Jamshedpur)***

Abstract—Optical switching methods when incorporated into logical circuits can provide optimum results in efficient and speedy communication. Optical switches, using the concept of non-linearity, an intensity-dependent phenomenon, take advantage of this fact and can be used to design an extremely rapid mechanism. The optical realization of the MOD-3 Counter is built upon the Micro Ring Resonator (MRR) structure. The utilization of the photonic D-flip-flop assists the purpose of switching action and helps in the realization of the MOD-3 Counter. The Boolean expressions are computed using K-map and verified using a truth table. MATLAB-simulated results back our proposition of optical implementation in digital logic design.

**ICEMCE-054**

## MODIFIED ZETA BASED PV SYSTEM FOR EV BATTERY CHARGING

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Photovoltaic (PV) systems are one of the most popular types of renewable energy in use today. The battery charge controller is crucial to the effectiveness of freestanding PV systems. The maximum power point tracking (MPPT) charge controller tracks the maximum power while managing the voltage level. Electric Vehicle (EVs) are a more advantageous option to gasoline-powered cars, and they are also more environmentally friendly for human travel. The charging of EVs is its key feature. Depending on the specifications, each battery charging station has a varied degree of power, and a power converter is employed in every charger. In this study, a redesigned zeta converter used to charge EV batteries produces improved results. The testing outcomes also support the proposed algorithm's to enhance performance. A demonstration of the suggested Artificial Neural Network (ANN-based MPPT) algorithm's qualities is given. Several effective power converters are examined and described in this work. The estimated efficiency and disadvantages are also covered.

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**ICEMCE-055**

## IOT-BASED HEART RATE MONITORING SYSTEM DESIGNED FOR PILOTS

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The core objective of the IoT-based Heart Rate Monitor for Pilots project is to enhance flight safety and reduce the likelihood of pilots experiencing heart-related issues during aviation operations. This system comprises two main components: a transmitting circuit integrated into the pilot's equipment and a receiver circuit that is under the supervision of a responsible guardian or flight supervisor. Central to this heart rate monitoring system is a highly sensitive heartbeat sensor that continually tracks the pilot's heart rate. Real-time heart rate data is then transmitted to a digital display screen. The transmitting circuit is equipped with an advanced AVR family microcontroller, which is powered by a dependable 12V electrical source. Conversely, the receiving circuit incorporates another AVR family microcontroller fitted with an RF receiver. Importantly, the receiver circuit is equipped with both LED indicators and a buzzer to promptly notify the guardian when the pilot's heart rate deviates from the normal range. The continuous heart rate monitoring and seamless communication between these circuits establish an effective early warning system. This system significantly bolsters pilot safety during flights, ultimately ensuring the well-being of both pilots and passengers. Furthermore, the success of this project serves as a testament to the potential of IoT-based solutions in revolutionizing aviation safety practices. In summary, the IoT-based Heart Rate Monitor for pilots represents a pivotal advancement in aviation safety technology. Its role in detecting potential heart failures and safeguarding the lives of pilots and passengers is invaluable. By delivering a dependable and efficient early warning system, this life-saving project has become an indispensable asset in the pursuit of safer and more secure flight operations.

**ICEMCE-056**

## AN IMPROVED GAIN S-BAND EDGE FED RECTANGULAR PATCH ANTENNA FOR WEATHER RADAR APPLICATIONS

***Thilagaraj Maiman Singh (MVJ College of Engineering)*; Arun Francis Gnanadoss (Karpagam College Of Engineering); Sathya R (Rajalakshmi Engineering College); Kottaimalai Ramaraj (Kalasalingam Academy of Research and Education)***

An improved gain S-Band rectangular edge-fed patch antenna for weather radar is suggested in this study. The conducting patch and dielectric substrate are built on a rectangular copper conducting plane. This plane is the design foundation for the antenna. Edge Feed with a defined length and breadth is used to excite this patch antenna. The antenna is constructed with 50 mm x 40 mm of Patch and 130 mm x 100 mm Rogers R/FLEX 3700 substrate for frequencies ranging between 2.205 GHz and 2.695 GHz. With a suitable fabricated prototype and measurement setup, the measured and simulated para-metric analyses are tabulated. The improved gain of 8.81 dBi the antenna can be used for stealth and weather radar applications.

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**ICEMCE-057**

## PERFORMANCE ANALYSIS OF AN ELECTRIC VEHICLE BATTERY USING REAL-TIME DRIVE CYCLES

***Nishanthy Jayasankar (Thiagarajar College of Engineering, Madurai)*; Charles raja S (Thiagarajar college of engineering); Sivakumar N (Thiagarajar College of Engineering); Arun Mozhi S (Thiagarajar College of Engineering)***

The impact of electric vehicles (EV) in the next decade will only depend on battery performance under different degradation test conditions. Battery parameters with various limitations in the market need to meet customer requirements with Chroma regenerative test pack system built 17020. This study lists the ability to improve durability, performance, lifespan, and energy density tests for making the rechargeable batteries compatible. In addition, to determine the life expectancy of the lithium-ion batteries, the load variation pattern is examined and the test system obtains the real-time driving cycle and an equivalent Constant Power (CP) at different time intervals. Therefore, based on the drive cycle, after calculating the power, a constant current discharge is then determined with a time step of 5 m/s at 100% State of Charge (SOC), and in addition a drive cycle is a collection of data points that plots a vehicle speed versus time. Different nations and organizations are developing driving cycles to assess a vehicle's performance in a variety of ways, including fuel efficiency, an electric car's driving range, and pollutant emissions. The modeled vehicle is developed in MATLAB and analyzes are performed for the different driving cycle patterns. Therefore, the consequence of the EV dynamics model is to analyze the type of battery at different driving cycles and distances traveled by the vehicle for a given time. In addition, the constant power with different time and constant current discharge with constant time of 100% SOC is studied by knowing that the distance traveled by the vehicle in the instant charge is reliable by integrating the reference speed.

**ICEMCE-058**

## SIGN LANGUAGE CLASSIFICATION WITH MEDIAPIPE HAND LANDMARKS

***Veluchamy S (Amrita Vishwa Vidyapeetham, Chennai)*; Saravanan R (Amrita Vishwa Vidyapeetham, Chennai)***

The research presented here offers a strategy for addressing the communication issues that the deaf-mute community face on a regular basis. The suggested method uses the open-source MediaPipe framework and machine learning algorithms in an effort to simplify Sign Language Recognition (SLR) by utilizing recent developments in artificial intelligence. The created prediction model is intended to be portable and adaptable to smart devices, allowing for easy integration into regular communication tools. Two datasets—the American Sign Language number system and American Sign Language gestures were used to assess the framework's capabilities. The model's astounding average accuracy of 97% demonstrates the Support Vector Machine (SVM) algorithm's dominance over other machine learning techniques in terms of effectiveness and accuracy.

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**ICEMCE-059**

## PREDICTION OF STATE OF CHARGE (SOC) OF ELECTRIC VEHICLE (EV) BATTERIES USING MACHINE LEARNING TECHNIQUE

***Selva Vengatesh M (Thiagarajar College of Engineering)*; Nishanthy Jayasankar (Thiagarajar College of Engineering, Madurai); Charles raja S (Thiagarajar college of engineering); Arul K Jeyaraj (Psna College Of Engineering & Technology)***

Accurate prediction of the state of charge (SOC) of electric vehicle (EV) batteries is essential for improving the operational efficiency, reliability and lifetime. The SOC of EV batteries is predicted comprehensively in this work utilizing machine learning (ML) techniques and a prototype. Using an on-board diagnostics system (OBD) during real-time drives, information on battery characteristics and SOC was gathered. The best models for predicting SOC were determined to be random forest regression and recurrent neural networks. A Grafana dashboard was created to show battery SOC estimates in real- time after a prototype was produced, tested, and confirmed. This methodology can help EV users to optimize their driving range and reduce battery damage due to over-discharge.

**ICEMCE-060**

## FFT-FCA BASED INDUCTIVE WPT SYSTEM FOR EFFECTIVE COUPLING WITH HIGH AIR-GAP ON EVS CHARGING APPLICATIONS

***Sivakumar N (Thiagarajar College of Engineering)*; Charles raja S (Thiagarajar college of engineering); Arun Mozhi S (Thiagarajar College of Engineering); Nishanthy Jayasankar (Thiagarajar College of Engineering, Madurai); Muthiah Geethanjali (Thiagarajar college of Engineering)***

Inductive wireless power transfer (Inductive WPT) system has been approved to be expedient and consistent interface for power transferring in electric vehicle (EV) applications. This method is generally considered by maximum effective coupling, high power transfer efficiency and output power at High Air-gap. This Inductive WPT system can help to precede, optimize, and assess its performance among the progress. It reduced the traditional charging method and its effects on the charging environment. The proposed Inductive WPT design has been classified according to the power transfer air gap amid primary and receiver coils and the oscillating frequency. The effects of primary side issues, magnetic interference can be addressed by harmonic filters and it's fixed by control algorithm. This paper presents a novel control design and harmonic extraction method as "FFT based Falconry control algorithm (FFT-FCA)". This paper, the FFT-FCA has optimized in the system to hunting the precise current and operating frequency for improving the effective coupling on inductive WPT. This proposed system acumen the perfect coupling for maximum Power Transfer Efficiency (PTE) 90% and high Air-gap (30cm) between coils.

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**ICEMCE-061**

## HARMONIC IMPACT ASSESSMENT FOR EV CHARGING STATIONS DEPLOYMENT IN THE DISTRIBUTION SYSTEM

***Preetha A (Thiagarajar College Of Engineering)*; Kavitha D (Thiagarajar College Of Engineering); Nagavi K (Thiagarajar College Of Engineering)***

This paper presents a multistage distribution expansion planning model where investments in distribution network assets, like Electric Vehicle Charging Stations, are considered. In Distribution System Expansion planning, the ideal placement and size of EVCS should be taken into account. As a result of potential detrimental impacts on the distribution system, which could result in increased power loss and a reduction in the voltage profile at some nodes, the improper location should not be used. Generally, EV charging stations are connected to the residential power distribution network. Its charging behavior caused it to become a new source of distributed harmonics. In this paper, three cases were analyzed for the expansion planning of the distribution system. The zeroth case discusses the impact of the number of EV charging stations on the increase in harmonics based on the voltage profile. In the first and second cases, the harmonic analysis is done for two different typical harmonic spectra for the vehicle charging at nominal currents of 13 A and 32 A. In the third case, an analysis of the real power when expanding the EVCS in the distribution system is done. While the harmonics produced by a single charging station may not be immediately noticeable, the collective harmonics produced by many charging stations are quite severe and cannot be disregarded for their influence and harm to the electrical system. Therefore, analysis of the harmonics while expanding the charging stations in the distribution system is necessary. The proposed method was tested on the TN 84 node bus system.

**ICEMCE-062**

## A NOVEL BACK TO BACK TOPOLOGY WITH ASYMMETRIC NINE SWITCH CONVERTERS FOR HYBRID POWER SYSTEMS USING VOLATILE POWER PERCEPTIVE TECHNIQUE

***Suba S (Mahendra Engineering College)*; Uthirasamy R (Mahendra Enginerring College)***

The focus of this research is the performance analysis of Doubly Fed Induction Generators (DFIG) systems. The grid connected wind power utilization is increase day by day in worldwide, but some problems are rise when the wind power is given to the grid. The main problem of the grid connected DFIG is power quality issue it should affect the system stability. Many converters are used to enhance the system stability but the output power quality is power and less efficiency. So the proposed Volatile Power Perceptive Technique (VPPT)is implemented to enhance the grid connected DFIG system stability and reduce power quality issues. When connected the wind power to the grid system the voltage sag and swell is occur corresponds to the wind flow of generator, at the time grid system meet the voltage variation under the unbalanced voltage condition, so the power quality is affected. In this proposed VPPT strategy is give the reactive power to the supply line and compensate the unbalanced grid voltage. The two converters rotor side and grid side is used to produce the reactive power with respect to the proposed Volatile Power Perceptive Technique (VPPT) controller, it should give the control signal of converter when the grid meet the unbalanced

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voltage condition. This proposed technique is improve the power quality of grid connected DFIG system, also it give better efficiency and loss less operation.

**ICEMCE-063**

## INTELLIGENT ENERGY TRANSFER AND NODE LOCALIZATION IN THE INTERNET OF THINGS USING DEEP REINFORCEMENT LEARNING

***Vinothini N (Thiagarajar College of Engineering)*; Aishwarya S (Thiagarajar college of engineering); Kiruthika D (Thiagarajar College of Engineering); ananthi govindasamy (Thiagarajar College of Engineering,Madurai)***

A novel idea to address energy transfer and node localization in the Internet of Things (IoT) using Deep Reinforcement Learning (DRL) techniques is provided in this paper. Leveraging DRL, we introduce a deep reinforcement approach that optimizes energy transfer and enhances node localization accuracy. The proposed DRL system model implements a data set consisting of thousands of IoT devices energy status and location information which is helpful for finding the IoT device localization based on energy levels. The action decisions for energy transfer and reward mechanisms are implemented in DRL. The results indicate that the suggested framework enhances energy efficiency.

**ICEMCE-064**

## DETECTION OF DATA INTEGRITY ATTACK IN CYBER PHYSICAL POWER SYSTEM USING DATA-DRIVEN METHOD

***Sree G.Y Varshini (Thiagarajar college of Engineering)****

A modernized and integrated electrical power grid called a cyber-physical power system (CPPS) combines conventional electrical infrastructure with cutting-edge digital communication, control, and monitoring technology. These systems increase the effectiveness, dependability, and security of electricity generation, distribution, and consumption by utilizing the Internet of Things, data analytics, and automation. In order to guarantee system security and dependability, sensitive data must be protected from Data Integrity Attack (DIA). If the attack is not reported, a tragic occurrence will take place. Because of this, DIA detection is absolutely necessary for the operator in the control centre to make a crucial choice about grid stability. This study discusses the impact of attacks on Wide Area Control (WAC) applications and data-driven methods of attack detection. The optimum detection technique is determined by comparing several detection approaches based on the validation of performance metrics. Simulation results infer that the Random Forest classifier outperforms other Machine Learning (ML) techniques such as Support Vector Machine (SVM) and K Nearest Neighbour (KNN) classifier in detecting anomalies. On the WSCC 3 machine 9 bus system, the efficacy of the suggested method is evaluated.

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**ICEMCE-065**

## AN EXTENSIVE INVESTIGATION ON BLOCKCHAIN INTEGRATED TUMOR SEGMENTATION APPROACHES ON MAGNETIC RESONANCE BRAIN IMAGES

***Mathankumar K (Kalasalingam Academy of Research and Education)*; Sumathi R (Kalasalingam Academy of Research and Education); Kottaimalai Ramaraj (Kalasalingam Academy of Research and Education)***

Segmenting a brain tumour entail dividing the various tumour tissues from healthy brain tissues. Image segmentation is incredibly important for the efficient extraction of properties as well as details from many kinds of multimodal images. Extraction of patient-specific critical clinical data and related diagnostic features is the principal objective of brain tumour imaging evaluation. Once an infection has been identified and localised, the data included in the multidimensional images can direct and track therapies, eventually resulting in expertise for the clinical assessment, illness stage, and intervention. One of the important concerns in the medical field is to secure the patient's personal and health information. In order to overcome this, a blockchain (BC) based healthcare system is adopted that enables safe, unintrusive, and rapid data transfer. Numerous experts in the fields of medical imaging and soft computing have previously conducted extensive research on the segmentation of brain tumours using both semi and fully automated techniques. In-depth literature reviews of current techniques for tumour segmentation and blockchain technology used for encrypted medical information transfer are addressed in this article. Modern techniques are used, and their performance and quantitative analysis are included. With the most current contributions from numerous researchers, various image segmentation techniques are briefly discussed. In this instance, an attempt is made to provide readers with fresh perspectives on the subject of the research.

**ICEMCE-066**

## ANALYSIS OF PID, FUZZY-PID, AND MPC WITH CUK CONVERTER INTEGRATION FOR SERVO MOTOR CONTROL

***Boobalan karthick A (Thiagarajar college of engineering); Vetri Selvan G K (Thiagarajar college of engineering); Julius Fusic S (Thiagarajar college of engineering)*; Ramesh H (TCE)***

This research paper presents a comparative study on speed control techniques for servo motors in industrial and automation applications. The three techniques under investigation are the conventional PID control, Fuzzy PID control, and Model Predictive Control (MPC). Each method's integration with a Cuk converter for non-isolated voltage conversion and high efficiency is explored. The paper begins with the development of a mathematical model of the servo motor system to facilitate fair comparison among the three control strategies. Design considerations for the Cuk converter and tuning parameters for each control technique (PID, Fuzzy PID, and MPC) are thoroughly discussed. MATLAB Simulink is utilized for the simulation and analysis of the proposed systems under various operating conditions. The simulation results showcase the performance of each speed control approach, including accuracy, stability, and dynamic response. The study reveals valuable insights into the

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strengths and weaknesses of each control technique when used in conjunction with the Cuk converter for servo motor speed control. By comparing PID, Fuzzy PID, and MPC approaches, this research contributes to a comprehensive understanding of advanced speed control methodologies, aiding in the selection of the most suitable strategy for specific servo motor applications. The findings are expected to pave the way for further advancements in industrial automation and contribute to the optimization of servo motor systems across various industries.

**ICEMCE-067**

## ENERGY ENHANCEMENT IN A PACKED-BED CROSSFLOW HUMIDIFIER

***K Srithar (Department Of Mechanical Engineering,Thiagarajar College Of Engineering,Madurai-625015); R Venkatesan (Department Of Mechanical Engineering,Thiagarajar College Of Engineering,Madurai-625015)*; R Saravanan (Department Of Mechanical Engineering,College Of Engineering-Guindy Campus,Anna University,Chennai-600025); R Srinivasan (Department Of Mechanical Engineering,R.V.S. College Of Engineering,Dinidgul-624005)***

By spraying water in air known as humidification process, the moisture content in air is increased, which has a significant impact on air conditioning and desalination processes. In a packed-bed humidifier, the major challenges are the improvement in water vapor content in exit air and pressure drop across the packing material in the humidifier. From the literature survey, cellulose packing, made of corrugated cellulose papers, appears to be the best. This paper addresses the research gap on the impact of packing material position on humidifier performance. Experiments are conducted by varying air and water flow rates and performance parameters, such as humidity efficiency, Coefficient of Performance (COP) and Specific Cooling Capacity (SCC) are measured. The system gave a maximum COP of 4.29, Specific Cooling Capacity of 2.3 kWh/kg and Humidification effectiveness of 81.86%. Overall, the performance of three PVC packing pads is superior when compared to two PVC packing pads in terms of Higher Relative Humidity, COP, Specific Cooling Capacity and Humidification Effectiveness.

**ICEMCE-068**

## WINDMILL PITCH PREDICTION AND ERROR CORRECTION WITH ADAPTIVE CONTROL AND CURRENT GENERATION ANALYSIS USING DATA ANALYSIS

***Rohit Suryaa S Saravanan (SRM Institute of Science and Technology)*; MINU M S (SRM Institute of Science & Technology); Jovan Titus Joshua Maharaj (SRM Institute of Science and Technology); Sharan Srinivasan (SRM Institute of Science & Technology )***

The escalating reliance on wind energy as a sustainable power source underscores the importance of enhancing wind turbine performance. At the heart of this challenge is the capability to accurately forecast and adjust the wind turbine pitch. This study delves into the efficacy of adaptive control strategies paired with real-time power generation analysis to improve the precision of pitch predictions. By harnessing sophisticated data analytics techniques, we analyze extensive wind data to grasp the fluctuations in wind velocities. These adaptive controls, rooted in live data streams, ensure the turbine's pitch is perpetually fine-

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tuned to maximize energy harnessing. Additionally, a comprehensive analysis of power generation is conducted, correlating instantaneous wind changes to energy production, guaranteeing steady and efficient electricity generation. By amalgamating these approaches, our research presents a pioneering resolution to a pivotal challenge in wind energy. The results emphasize the crucial role of live data analytics in green energy and set the stage for upcoming advancements.

**ICEMCE-069**

## PHOTOCATALYTIC ACTIVITY OF SONOCHEMICALLY SYNTHESIZED GO-AG NANOCOMPOSITE

***Sakthi P (M.Kumarasamy College Of Engineering)****

The demand of nanomaterial in various applications led to the development of many nanocomposite materials. Graphene oxide - silver nanocomposite is one such material which is synthesized due to the excellent properties of graphene and silver nanoparticles. The combined properties of graphene and silver nanoparticles are useful in the antibacterial activity, waste water treatment, dye detection, etc. Many researchers have developed the graphene oxide -silver nanocomposite for various applications which made it remarkable. In this article, the photocatalytic activity of the graphene oxide silver nanocomposite has proved to be the best compared to the pristine GO and AgNPs.

**ICEMCE-070**

## DESIGN AND IMPLEMENTATION OF SMART INTERNET-BASED REAL-TIME CONTROL OF ROVER WITH ARTIFICIAL INTELLIGENCE

***Ruba M (Velalar College of Engineering and Technology)*; Deebika Sri V (Velalar College of Engineering and Technology); Girinath V P (Velalar College of Engineering and Technology); Ponkarthika M (Kongu Engineering College); Santhini C (Velalar College of Engineering and Technology); Sakthi Priya V V (Velalar College of Engineering and Technology); Hemalatha R (Velalar College of Engineering and Technology)***

This project aims to control a rover from a remote location in real-time by utilizing live video streaming. To achieve this, a rover is equipped with an ESP32 Camera module that broadcasts a live video feed. The movement of the rover is recorded through the live video feed and is displayed on an Android app. By employing the Blynk dashboard application, the live video stream can be used to remotely maneuver the vehicle. Additionally, sensor data from HC-SR04, DHT11, and MQ2 sensors is transmitted to the Blynk cloud. This data is then utilized to generate alerts regarding the temperature and potentially harmful emissions at the rover's distant location. The DHT11 and ESP32 communicate using the single wire protocol for data transfer.

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**ICEMCE-071**

## IMPROVING BREAST CANCER DETECTION IN MAMMOGRAM IMAGES USING MOTH FLAME ALGORITHM OPTIMIZED CONVOLUTIONAL NEURAL NETWORK

*Sarathkumar M Muniasamy (Madurai Kamaraj University )*; Dhanalakshmi K.S (Kalasalingam Academy Of Research And Education); Rajkumar P (Madurai Kamaraj University)*

A woman's milk duct lining cells that have abnormal discontinuities can indicate breast cancer. Large numbers of breast cancer victims have symptoms in the milk ducts before passing away from the disease. The fatality rates could be lowered if the discovery is done quickly. Medical professionals and radiologists typically find it more challenging to identify breast cancer in mammography pictures. This research offers a Convolutional Neural Network based on Moth Flame Optimisation (CNN-MFO) for identifying breast cancer from mammography pictures in order to minimise manual assessment and streamline the job of classification. Because of the low quality of the acquired mammogram image, pre-processing is the most significant stage in mammography evaluation. The adaptive median filter have been developed in this work for finding a compromise between all-pass filtering and simple averaging with the goal to minimise the blurring effect of image. The adaptive median filter outperforms in terms of speckle reduction while keeping the edges. Furthermore, the U-Net model is used to segment the breast area from mammography images. This strategy assists radiologists in early detection and improves the effectiveness of the proposed system. Following segmentation, the optimal second order statistical features are extracted by employing Gray Level Co-occurrence Matrix (GLCM) method. Finally, the proposed MF optimized CNN classifier accurately predict the breast cancer from the mammogram images. Thus, the obtained results prove that, the proposed system outperforms than other existing methods.

**ICEMCE-072**

## ENHANCING PERFORMANCE OF CS0.5FA0.5PBI3-PSK BASED CELLS THROUGH MODELLING OF THICKNESS AND DEFECTS

*Aniket Verma (Chitkara University); Nikhil Shrivastav (Chitkara University)*; Jaya Madan (Chitkara University)*

This study is focused on the exploration of the SnO2/ Cs0.5FA0.5PbI3-PSK /Spiro-OMeTAD by the variations of the thickness and Donor Density of the Absorption layer. For the Simulation of the device Solar cell capacitance simulator (SCAPS-1D) is used. In this SnO2 is acting as the electron transport layer (ETL), Spiro-OMeTAD is acting as the hole transport layer (HTL) and Cs0.5FA0.5PbI3-PSK working as the absorption or active layer of the solar cell. The following structure SnO2/ Cs0.5FA0.5PbI3-PSK /Spiro-OMeTAD is already published work. The goal is maximizing the sunlight's photons absorption. The performance of the device is being studied in variations of thickness from 100nm to 1000nm and donor density from 1010 to 1016/cm3. The graphs shows that the PV parameters of the solar cell is increased with the increment in the thickness and PV parameters start decreasing with increment in the Donor density of the designed perovskite solar cell. The resulted PV

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parameters of the Cs0.5FA0.5PbI3-PSK based solar cell are as follows; FF:84.44%, PCE: 19.03%, Voc: 1.2338V and Jsc: 18.265mA/cm2

**ICEMCE-073**

## IMPURITY MONITORING USING IOT

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Today, the Internet of Things (IoT) technique is applied in a variety of study fields to observe, collect, and analyze data from remote locations. The quality of water has significantly declined as a result of the massive increase in global industrial output, the move from rural to urban areas, and the over exploitation of land and marine resources. Impurities can be found in the dying chamber's output water. Repeatedly, the same water is controlled in the ETP chamber and fed to the death chamber. The impact of the various physical water contaminations created during the hydrologic cycle and/or bacterial colonization relies on the unique circumstances of the water consumer. The different contaminants must be identified and calculated in order to examine the demand for treatment and the suitable technology. The most common application of qualitative differentiating is to describe the aesthetic or visual quality of water.

**ICEMCE-074**

## DEVELOPING CYBERSECURITY SYSTEMS BASED ON MACHINE LEARNING AND DEEP LEARNING ALGORITHMS FOR INDUSTRIAL CONTROL SYSTEMS

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Industrial control systems, often known as ICSs, are frequently utilized in serious infrastructure because of their widespread use in the support of key societal processes. This is because ICSs are able to monitor and regulate a wide variety of processes. As a result, the protection of these systems from cyberattacks is very necessary. Over the course of the last several years, a variety of distinct ideas for numerous kinds of cyberattack detection systems have been offered, with every concept making use of its own unique assortment of processes and methods. A substantial gap exists in the research on techniques for detecting cyberattacks in ICSs, and this research gap has to be addressed in order for the study to be considered

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complete. The key purpose of the proposed system is to recognize instances of cyberattacks that target ICSs. We describe an artificial intelligence-based approach for abnormality identification in industrial control systems (ICSs). The purpose of the technique is to act as a guide for any future research that may be conducted in this field. The suggested algorithms were evaluated on actual ICS datasets. The suggested system was developed in two phases, the first of which used binary classification and the second of which involved multiclass classification.

**ICEMCE-075**

## FAULT DIAGNOSIS IN TRANSMISSION SYSTEM USING WAVELET, RBFNN, LM-BPNN: A COMPARATIVE STUDY

***Kamalika S (Thiagarajar College of Engineering)*; Kavitha D (Thiagarajar College of Engineering)***

A transmission line fault is an uncommon event or an anomaly that can prevent the normal flow of electrical current. The entire power system is frequently severely impacted by asymmetrical faults. A method for locating and classifying transmission line problems using the wavelet transform in conjunction with Levenberg-Marquardt backpropagation Neural Network (LM-BPNN) and RBFNN is presented in this work. Using the mentioned techniques, data is gathered on an IEEE 9-bus system where faults are intentionally created for training and testing reasons. The comparison ofaccuracy provided by the LM-BPNN and RBFNN algorithms is analyzed.

**ICEMCE-076**

## AUTOMATIC TRAFFIC CONTROL IN HILLY AREAS

***Sherine Joy Antony Anand Raj (Thiagarajar College of Engineering)*; Kaviya Ramesh (Thiagarajar College of Engineering); Sivashankar G (Thiagarajar College of Engineering)***

This paper aims to reduce the number of road accidents occurring at hairpin bends in hilly regions and their serious impacts such as death and injuries by designing a Programmable Logic Controller system using sensors and a PLC. This system includes a programmable logic controller for communicating, monitoring, and controlling complex automated processes based on sensor inputs. The E18-D80 Proximity sensor detects when an object is nearby, initiating actions such as detecting the presence of a passing vehicle, and transmitting the signal to the controller. Controller is programmed using Ladder logic.

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**ICEMCE-077**

## ENHANCING PERFORMANCE OF METHYL-BENZOATE-PSK BASED CELLS THROUGH DEVICE SIMULATIONS

***Aniket Verma (Chitkara University); Nikhil Shrivastav (Chitkara University)*; Jaya Madan (Chitkara University)***

The research work focuses on the exploration of a SnO2/Methyl-benzoate-PSK/Spiro-OMeTAD solar cell by varying the thickness and defect density of its absorber layer. The simulations have been conducted using the Solar Cell Capacitance Simulator (SCAPS-1D) software. The device structure is based on previous work, with SnO2 as the electron transport layer (ETL), Spiro-OMeTAD as the hole transport layer (HTL), and Methyl-benzoate-PSK (MB-PSK) as the absorber layer. The goal is to enhance photon absorption from sunlight. The study examined the impact of varying absorber layer thickness from 100 to 1000 nm on the device's performance. Defect density variations, ranging from 1 x 1010 to 1 x 1015 cm-2, are also studied. The JV curves indicated that higher defect density led to decreased VOC while current density remained relatively constant. The EQE curve, however, remained consistent regardless of defect density. The obtained optimized PV parameters of the MB-PSK based cells are - FF: 84.87%, PCE: 23.21 %, VOC: 1.31 V, and JSC: 20.86mA/cm2.

**ICEMCE-078**

## OPTIMIZING SYSTEM COSTS IN LOCAL ELECTRICITY MARKET THROUGH PEER-TO-PEER ENERGY TRADING IMPACT OF PHOTOVOLTAIC AND BATTERY STORAGE ADOPTION

***Pratik Mochi (C.S.Patel Institute of Technology, CHARUSAT)*; Kartik Pandya (PIET, Parul University); Ricardo Faia (Polytechnic of Porto); Joao Soares (GECAD, Polytechnic of Porto)***

As the global energy landscape undergoes a paradigm shift towards decentralization and sustainability, local electricity markets have emerged as a promising avenue for efficient energy exchange among prosumers. This conference paper presents a comprehensive study focused on optimizing system costs within local electricity markets through peer-to-peer energy transactions. Our primary objective is to investigate the impact of photovoltaic and battery storage adoption on system costs, shedding light on the potential economic benefits of these technologies in diverse scenarios. The study encompasses a rigorous analysis of various cases and scenarios to provide a holistic understanding of the dynamics involved in local electricity markets. By simulating a range of scenarios, we explore the implications of different levels of PV and battery storage adoption, evaluating their capacity to mitigate system costs effectively. Our findings reveal that, in the best-case scenario, substantial cost savings of 24.42% can be achieved through the integration of PV and battery storage systems into the local electricity market. This research contributes to the growing body of knowledge on local electricity markets, emphasizing the pivotal role of peer-to-peer energy transactions in shaping the future of energy distribution. Furthermore, it provides valuable insights for policymakers, utilities, and consumers seeking to optimize their participation in decentralized energy systems while promoting sustainable energy practices.

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**ICEMCE-079**

## REAL TIME PV FAULT DETECTION IN SOLAR PV USING ENSEMBLE LEARNING ALGORITHM

***Kaushika R (Thiagarajar college of Engineering)*; Priyadarshni R (Thiagarajar College of Engineering); Manoharan P S (Thiagarajar College of Engineering)***

This research proposes a technique to detect and classify defects in large-scale photovoltaic (PV) systems, Adaptive boosting ensemble learning algorithms to achieve higher levels of precision. Monitoring and maintenance should be performed on a regular basis to maintain the system efficiency. It may be tedious to manually inspect or monitor a large-scale PV system, which may result in a loss of solar PV. The PV system available at Thiagarajar College of Engineering (TCE) in Madurai, was utilized for extraction of specifications such as voltage and current. The voltage and current readings were analysed, to classify the fault in the solar panels. The proposed ensemble algorithm was trained and validated using the real-time dataset. The algorithm achieves an accuracy of 99.9%for validation. The trained classification model was deployed in the real time environment using MATLAB/SIMULINK

**ICEMCE-080**

## SENTIMENTAL ANALYSIS USING DEEP LEARNING MODELS

***Bhuvaneshwaran A ( Thiagarajar college of Engineering ), Dr. S. Sridevi ( TCE )***

Textual data is a rich source of relevant information; however, extracting meaningful insights from unstructured texts can pose challenges. This research focuses on the critical task of text classification, particularly in the context of commercial sectors. The study explores a range of deep learning methodologies to effectively categorize review texts, addressing the complexities inherent in this process. Among the existing methods, the research identifies and presents the most accurate model for classifying reviews into positive and negative sentiments. The central theme of this investigation is categorization, a subject with widespread applications across industries such as marketing, product management, social media analysis, food reviews, customer satisfaction evaluation, spam detection, and intent recognition. Using movie reviews as a case study, this article delivers a comprehensive overview of the approaches employed and highlights the optimal review classification accuracy achieved through deep learning techniques. The findings of this study contribute to advancing text classification methodologies and underscore its relevance in diverse commercial domains. Among using all the existing model, the model with best accuracy for classifying the text (sentimental analysis) is 94.97%.

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**ICEMCE-081**

## THE EVOLUTION OF EMOTION RECOGNITION IN SPEECH: A DEEP LEARNING PERSPECTIVE

***Manolekshmi I (VELTECH, Chennai); Sherline Jesie R (Sathyabama Institute of Science and Technology)****

Speech emotion recognition (SER) has witnessed significant advancements in recent years, primarily driven by the emergence of deep learning (DL) techniques. This comprehensive literature review delves into the state-of-the-art research articles pertaining to SER, specifically focusing on DL-based approaches. Through an extensive examination of various studies, a thorough comparison and analysis of the implemented methodologies are presented. The results demonstrate the superiority of DL, over traditional models, yielding higher accuracy and lower error rates in emotion recognition tasks. The findings from this review offer valuable insights to researchers in the field, inspiring the development of innovative research ideas yet to be explored, paving the way for further advancements in the domain of speech emotion recognition.

**ICEMCE-082**

## HYBRID PSO-GWO DESIGN FOR A GRID-CONNECTED DESALINATION FACILITY POWERED BY RENEWABLE ENERGY SOURCES

***Sherline Jesie R (Sathyabama Institute of Science and Technology); Nandakumar N (Noorul Islam Centre for Higher Education)****

In order to supply a residential community with fresh water, this study suggests a reverse osmosis desalination plant and a grid-connected hybrid renewable energy system. The hybrid energy system's main energy sources are the wind turbine and solar module. Battery or hydrogen storage systems manage energy storage, having a backup energy supply of a diesel generator. Grey Wolf Optimization for Particle Swarm (PSO-GWO), a revolutionary multi-objective hybrid optimization approach, we aim to reduce CO2 emissions and the overall cost of providing fresh water over a 20-year timeframe. the ideal size of the various system components is established. Utilizing GWO only PSO alone, and the PSO-GWO optimization technique are contrasted. The weather station system is utilized in the residential area to gauge the temperature, wind speed, and sun radiation. Three separate optimization techniques are used to compare different hybrid system setups. Programming is used to create the full model for the study's optimization models and energy management strategies. The findings demonstrate that the proposed PSO-GWO hybrid outperforms either of the individual PSO or GWO optimization methods in selecting the optimization parameters. According to the results of the optimization, Compared to a hydrogen storage system, a battery storage device is more cost-effective. A diesel generator can be incorporated with the hybrid system to further reduce costs. Finally, sensitivity studies are carried out to demonstrate how changing a few parameters affects the overall cost of the investment. According to the estimates, the annual variation in solar radiation affects the cost of the investment more than the annual variation in wind speed.

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**ICEMCE-083**

## PLC BASED AUTOMATIC PAPER CUTTING MACHINE

***Vidhyalakshmi P (Kongu Engineering College ); Sasireka M (Kongu Engineering College ); Barathkumaran K S (Kongu Engineering College)*; Anurutha K V (Kongu Engineering College); Harisankar Kalirajan (Kongu Engineering College)***

Programmable Logic Controllers (PLC) are mechanical computers utilized for electro-mechanical forms. PLCs shift in estimate and frame components. PLCs are broadly utilized in a assortment of businesses since they're quick, simple to function and are considered simple to program. PLC's can be modified in a few ways, from step rationale, uncommonly adjusted programming dialects of Fundamental and C, to title some . In little scale handle industries, cutting of paper or card boards are done physically. It may be a time expending prepare additionally includes hazard components with regard to labourers included within the cutting prepare. This disadvantage can be sorted-out by mechanization within the cutting prepare by dumping a program into the PLC and the PLC is associated to a DC engine. The DC engine makes the transport belt move which passes on paper for the cutting prepare and at the conclusion, cutting of paper as per prerequisite is accomplished through programming.

**ICEMCE-084**

## CONTROL STRATEGY FOR FUEL CELL BASED QUASI Z-SOURCE INVERTER

***Angelin Nithya Shiny A (Thiagarajar College of Engineering)*; Manoharan P S (Thiagarajar College of Engineering); Deepamangai P (SRM TRP Engineering College)***

An impedance source inverter (ZSI) is created to improve performance and lower circuit complexity. Conventional inverters are crucial to many applications, including the integration of renewable energy sources and electric vehicle uses, because they are vital in converting DC to AC. However, the losses due the switching operation and voltage stress across load of these inverters are their limitations. The improved Z-Source Inverter (ZSI), known as the quasi -ZSI, is proposed in this study. A few benefits of the proposed q-ZSI are its high voltage gain, reliability, increased efficiency, and less stress. Fuel flow rate and air volume are two factors that affect the Fuel Cell (FC). To use the fuel cell efficiently, maximum power point tracking (MPPT) is required to obtain the FC output power under variable conditions. When the system voltage reaches its maximum power point, perturb and observe (P&O) will maintain the voltage and current. An appropriate control plan must be chosen in order to attain improved efficiency. In order to assess the system's efficiency, this research suggests a quasi-z-source inverter model based on fuel cells. MATLAB Simulink is used to implement the proposed topology in order to obtain the simulation results and to verify the result.

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**ICEMCE-085**

## CASE STUDY ON INTEGRATING LEGACY DEVICES IN INDUSTRY 4.0 FRAMEWORK USING OPC UA

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Legacy devices refers to outdated electronic equipment for which the manufacturer has discontinued firmware updates. Many PLC devices have become obsolete and are unsupported by newer software. It is very expensive to fully replace these devices. This is where OPC UA serves as a solution. Open Platform Communication Unified Architecture (OPC UA) is an open source machine to machine communication protocol used in Industrial Automation. This open interface standard is independent of the PLC manufacturer, the software developer, the operating system or the programming language. The existing communication protocols like profinet, Sercos are organization specific. And these protocols cannot communicate with each other. Also it has many feature limitations like the data cannot be pushed to the cloud and remote operation is not possible. We intend to automate the communication between the legacy devices with Siemens S7-1500 PLC using OPCUA. We are using a Raspberry PI, TIA Portal 14 software in windows PC and an Ethernet connection in-order to Push a data from legacy plc to cloud using OPCUA so it can be operated from anywhere in the world.

**ICEMCE-086**

## INVESTIGATION OF DATA INACCURACIES IN THE DATABASE OF THE SOLAR PHOTOVOLTAIC MONITORING SYSTEM

***Sneha Charis D (Thiagarajar College of Engineering)*; DEVIE P M (Thiagarajar College of Engineering); Manoharan P S (Thiagarajar College of Engineering); Usha N (Thiagarajar College of Engineering)***

Solar energy is sustainable and never runs out; thus, it's starting to contribute to electricity production. A modern power system's reliable and inexpensive operation depends on an accurate PV generation estimate. Weather factors like temperature, humidity, wind direction, and precipitation affect solar PV electricity generation based on location. There are worries about sensor, communication, or database-based issues that could make the forecasting model less accurate. These problems make integrating green energy into the grid risky. This paper used RMSE, R2, MAE, and MSE to fill in missing values in NREL meteorological data and Thiagarajar College of Engineering units for voltage, current, frequency, and power. MICE Imputation using LightGBM and Iterative Imputer, Backward Fill, Forward Fill, KNN, and Linear Interpolation were used to test on hourly and weekly datasets collected over the year to generate missing data.

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**ICEMCE-087**

## MAXIMIZING SOLAR ENERGY OUTPUT: A COMPARATIVE ANALYSIS OF MPPT STRATEGIES FOR PARTIALLY SHADED PV SYSTEMS

***Leelavathi M (Thiagarajar college of engineering)*; Dr. Suresh Kumar V ("AU,Chennai"); DEVI BALUCHAMY (Thiagarajar college of Engineering)***

Efficient energy extracting from photovoltaic (PV) modules working under partially shading environments are a pivotal concern in solar energy application. This article presents a methodical examination of the crucial role that Maximum Power Point Tracking (MPPT) algorithms contribute in enhancing the performance of solar PV systems in situations involving partial shading. Diverse MPPT algorithms are subjected to thorough analysis, including classical and bio-inspired approaches. Moreover, the article investigates cutting-edge Artificial Intelligence (AI) algorithms based on MPPT strategies that leverage the strengths of multiple algorithms to address the challenges posed by rapidly changing shading patterns. The evaluation encompasses several critical dimensions, such as computational principles, adaptability to varying shading conditions, and the practical complexities associated with real-world implementation. Insights into the benefits and limits of each algorithm type are presented, aiding in the collection of the most suitable MPPT algorithms for explicit PV system configurations and shading scenarios. This study reveals that an MPPT algorithm that is well-suited to the PV system and adjusting partial shading is essential to maximizing energy output. This article promotes sustainable solar energy use by illuminating MPPT techniques.

**ICEMCE-088**

## INNOVATIONS IN BATTERY TECHNOLOGIES OF ELECTRIC VEHICLE: A REVIEW

***Devi Baluchamy (Thiagarajar college of Engineering)*; Dr. Suresh Kumar V ("AU,Chennai"); Leelavathi M (Thiagarajar college of engineering)***

This paper explores the transformative impact of Electric Vehicles (EVs) on the automotive industry. It highlights the rapid expansion of the EV market worldwide, driven by increased options, reduced pricing, and advancements in battery technology.The significant progress made since the inception of EVs, this paper highlights the need for further research into optimizing battery designs for maximum energy efficiency and compactness. It anticipates a future where EVs can compete comprehensively with traditional combustion engine vehicles. Additionally, this work examines the Research into innovative battery materials aims to accelerate charging speed and enhance reliability, ushering in a new era of efficient energy storage solutions.

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**ICEMCE-089**

## ENHANCING PERFORMANCE AND ENERGY EFFICIENCY OF DIESEL-INDUCTION GENERATOR SYSTEM UNDER LINEAR AND NONLINEAR LOAD CONDITIONS

***Ron Carter (Rajalakshmi Engineering College); Siva Kumar (Rajalakshmi Engineering College); G Jai Sreedhar (Rajalakshmi engineering college)****

This paper focuses to Enhance the economic fuel saving technique for Wind-Diesel hybrid dispersed power generating during unbalanced nonlinear loading conditions, this isolated unbalanced load create the undesirable effects like voltage fluctuations, frequency deviations, pulsating torque, increase the harmonic pollu-tion factors and other effects can lead to the generation of energy losses in both diesel-driven alternators and wind-driven induction generators. An Induction Generator (IG) is typically powered by a wind turbine, while a synchronous gen-erator is driven by a diesel engine. The fuel consumption is increase from its normal value followed by pulsating electromagnetic torque due to sharing of un-balanced and non-sinusoidal current of consumer loads. Therefore, it is essential to appropriately distribute the load current between the power sources and the consumer load. However, a significant amount of non-sinusoidal and unbalanced current is being distributed to the consumer loads. This phenomenon can result in decreased fuel consumption and optimal cost savings. The integration of parallel wind-driven induction generators can effectively reduce fuel consumption in en-gine-driven generators by managing the distribution of unbalanced and non-linear loads. The proposed system model has been developed and implement through PSCAD-EMTDC simulation package and also evaluate the simulation results through experimental set up.

**ICEMCE-090**

## MODELLING OF PRIORITY BASED DECENTRALIZED HIERARCHICAL ENERGY TRADING SYSTEM: AN INITIATIVE TOWARDS C2C TRADING

***Vishnu Dharssini A C (Thiagarajar College Of Engineering)*; Charles Raja S (Thiagarajar College Of Engineering); Parameswari Subramanian (Thiagarajar College Of Engineering); Dr. Suresh Kumar V (''Au,Chennai''); Dinesh Kanna M (Thiagarajar College Of Engineering)***

The concept of transactive energy management (TEM) plays an inevitable role in reducing the reliance on centralized power generation. Integration of natural renewable kind of energy resources along with the grid helps to improve the economic benefit of users. The energy balance of a community can be enhanced with the help of a transactive energy framework. This architecture will alleviate the strain on the utility grid during peak hours. The cost of energy involved in the energy transaction depends on the bidding price of TEMS's users, which is quoted as the market clearing price. This paper provides a hierarchical energy transaction system framework based on the priority level of individual energy traders. In this study, a four-layer hierarchical architecture has been proposed in order to enhance the user's cost-benefit, which streamlines energy sharing among peers, the community, and the utility grid. Different pricing concepts have been used in the different layers of the proposed four-layer architecture. The residential community, which consists of 10 residential buildings, a community microgrid, renewable energy sources, and an EV charging station, has been taken

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into consideration for this study. The study results show that almost all the participants are economically benefited by the proposed PDHETS framework. It is also found that the proposed architecture reduces the electricity bill of every individual community by 25–50%.

**ICEMCE-091**

## AN INVESTIGATION ON STATIC RECONFIGURATION OF SOLAR PHOTOVOLTAIC PANELS BY ADOPTING ARITHMETIC ARRAY MODELLING

***Charles raja S (Thiagarajar college of engineering)*; J. Dani Abraham (Thiagarajar College of Engineering); Vishnu Dharssini A C (Thiagarajar College of Engineering); Arockia Edwin Xavier (Thiagarajar college of engineering); Prince Winston (Kamaraj Engineering College)***

Renewable energy has been widely utilized across various industrial sectors and domestic regions. The solar irradiation is harvested by applying numerous techniques. In all methods, the key hindrance is none other than the PSC which greatly affects the power extraction from the Photovoltaic (PV) panels. Whenever the Partial shading condition (PSC) situation arises, it creates a condition of uneven insolation on the panels. As a result, the current output from the panels will start to reduce from its rated value. In order to resolve these issues, numerous connection configurations are planned. Some of them are, Bridge Link (BL), Honey Comb (HC), Total Cross Tied (TCT), Series Parallel (SP), and combination of TCT with other three configurations which are reviewed by Chandrakant & Mikkili (2020). TCT technique of connecting the PV panels is one of the finest connection techniques to extract the maximum power. This method gives constant power at all types of PSCs. The static reconfiguration of PV panel arrangement explained by Moger (2020,) is one of the efficient methods to find the optimum placement of the solar PV panel in the available space to extract the maximum power at all circumstances of PSC. This method requires little or no sensors and switching devices for continuous monitoring, operation and control of the PV power system.

**ICEMCE-092**

## AN IMPROVED OCTET ITOH-TSUJII ALGORITHM FOR FPGA PLATFORMS

***Sanjana Arunachalam (Thiagarajar College of engineering )*; Venkatasubramani. V. R (TCE); Rajaram S (TCE Madurai); Kalaiarasi Murugesan (Ceremorphic Technology); Manikandan M.S.K ("TCE, Madurai"); Vinoth thyagarajan V Thyagarajan (Thiagarajar College of Engineering)***

Itoh-Tsujii algorithm is used to compute the multiplicative inverse over GF(2m) in cryptographic applications like Elliptic Curve Cryptography (ECC). The most intricate process that affects the general flow of the process is the computation of the modular inverse. With the focus on the NIST irreducible trinomial field GF (2193), this work presents a novel octet Itoh-Tsujii algorithm designed to minimize the complexity of multiplicative inverse operation for hardware implementation. Analysis of the outcomes reveals that the suggested algorithm increases performance while lowering complexity.

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**ICEMCE-093**

## ANALYSIS OF MINERAL OIL AND NATURAL ESTER PROPERTIES AFFECTED BY ANTIOXIDANTS IN ACCELERATED AGING CONDITIONS

***Ajumon Somasekharan Pillai (Noorul Islam Centre for Higher Education)****

Researchers are working to extend and improve the lives of the insulating systems used in transformers as a result of increased power densities. Addictives like Anti Oxidant is added to the insulating liquid to slow down the oxidation process and lengthen its lifespan (LI). This study's primary goal is to comprehend how LIs with AO additions behave when subjected to thermal aging. Here, accelerated aging tests are performed to analyze butylated hydroxytoluene Anti Oxidant and organic component such as rapeseed oil and sunflower oil. Examined and contrasted are significant existence characteristics of suppressed and unsuppressed mineral oil, rapeseed oil and sunflower oil extracts. According to the experimental findings, samples that have been inhibited degrade at a slower rate than samples that are not. In addition, inhibited SFO samples perform on par with or better than mineral oil and rapeseed oil extracts.

**ICEMCE-094**

## IMPACT OF COPPER PARTICLES ON INSULATING OIL'S RESISTANCE TO BREAKDOWN AT COMBINED AC AND DC VOLTAGE

***Ajumon Somasekharan Pillai (Noorul Islam Centre for Higher Education)****

The major component of a transmission system for high voltage direct current is the converting transformer. The insulation effectiveness of using transformer oil is significantly impacted by the solid suspended particles produced during the installation and use of converter transformers, particularly when a DC component is present in the applied voltage. Particles easily cause partial discharge and insulating oil breakdown in high electric fields. This study examined the impact of copper particles on transformer oil voltage breakdown is at a voltage that combines AC and DC. To interpret the particle impacting the breakdown strength of insulating oil, one copper particle was used in a simulation model that was created. The findings of the simulation and experimental work demonstrated that the particles disrupt the electric field. The breakdown voltage of insulating oil decreases as the amount of copper particles increases, and there is generally a significant association between the particle number logarithm and the voltage breakdown. As the DC component of the applied voltage increases, the breakdown voltage of contaminated insulating oil decreases. The simulation's findings indicate that when there is a larger amount of DC component present in the voltage applied, more often when the particle hits the electrode, causing greater discharge and a lower voltage breakdown for the insulating oil.

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**ICEMCE-095**

## DEEP LEARNING BASED EV BATTERY MANAGEMENT SYSTEM

***Arun Mozhi S (Thiagarajar College of Engineering)*; Charles raja S (Thiagarajar college of engineering); Nishanthy Jayasankar (Thiagarajar College of Engineering, Madurai); Sivakumar N (Thiagarajar College of Engineering)***

The invention of batteries has made a drastic effect on the transportation industry as vehicle technology was able to overcome their major concern for fuel. The state of Charge of a battery determines the charging and discharging rate of a battery, which in turn depicts its life expectancy. In the real world, estimation of SOC in real-time is quite complex due to the internal parameters of the battery. In this project, deep learning algorithms, Real Driving Cycles (RDC), and IoT are used to predict the SOC of a vehicle. The Real Driving Cycle is constructed using the On Board Diagnostic (OBD) II dongle for actual driving in a specified route, which is therefore collected as a .csv file using a diagnostic app. The deep learning algorithm predicts the speed in future time steps. The speed and throttle data with respect to time collected are then fed into the EV setup designed. As the motor of the EV setup operates, the corresponding battery consumption is recorded using a voltage sensor. In addition to that, speed is predicted in future time steps and respective battery consumption is recorded. Using battery voltage, SOC is calculated for both predicted and actual speed. The predicted data allows the user to foresee their journey concerning the charge of the battery. The concern of the assumption of the Indian Driving Cycle (IDC) as India's traffic congestion is homogeneous has been overcome by adopting RDC.As a result of experiments, it is confirmed that the Bi- directional Long Short Term Memory model predicts SOC more accurately than the other Recurrent Neural Networks.

**ICEMCE-096**

## SMART HOME AUTOMATION USING DISCORD CHAT BOTS

***Manoharan P S (Thiagarajar College of Engineering)****

This paper deals with smart home automation which is used for remote monitoring of home appliances and controlling them using Discord chat bots. The purpose of this paper is to create a Smart Home automation system with Raspberry Pi using Discord chat bots APIs. Discord is a free and popular messaging app used by tens of millions of people to talk and hang out. Discord chat bots have been chosen for this project since it is free, easy to use and highly flexible. Smart Home Automation helps to monitor our electrical devices and appliances remotely and also control them remotely such as turning on and off fans or air conditioners based on the room temperature. It is efficient at saving energy and time.

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**ICEMCE-097**

## INFLUENCE OF GROWTH TEMPERATURE ON SPRAY PYROLYTICALLY DEPOSITED COBALT FERRITE THIN FILMS

***P Sundararajaperumal (Thiagarajar College of Engineering,Madurai)****

Magnetic nanoparticle (CoFe2O4) have sparked momentous attention in recent decades due to their prospective uses in high-density magnetic recording, capacitors, sensors, magnetic fluids, solar cells, data storage, Spintronics, and catalysis. Chemical spray pyrolysis was used to investigate the structural, micro-morphological, compositional, electrical, optical, and electrochemical properties of CoFe2O4 thin films at various substrate temperatures. X-ray diffraction (XRD) analysis established the production of the spinel cubic phase with crystallite sizes in the 28 nm range. Images from scanning electron microscopy revealed a granular-like, porous, spherical surface shape. Between 2.02 and 2.09 eV, an optical bandgap with direct allowed-type transitions has been identified. The discharge peak at 382 nm is created by the recombination process of a CoFe2O4 thin film, whereas the emission peak at 360 nm is due to transformation of charge carrier between Fe3+ at octahedral sites and Co2+ at tetrahedral sites, as well as its neighboring O2- ions.

**ICEMCE-098**

## MODELING AND PERFORMANCE ANALYSIS OF THE UPQC INTEGRATED POWER SYSTEM USING AN INNOVATIVE CONTROLLER COMBINATION

***Ananthan J (Vel Tech MultiTech Dr Rangarajan Dr Sakunthala Engineering College); Suganyadevi M.V (Saranathan College of Engineering)*; Kuruseelan S (VIT University); Harish K (Vel Tech MultiTech Dr. Rangarajan Dr Sakunthala Engineering college); Gnanaprabha K (Saranathan College of Engineering); Pearlinekamalini C (Saranathan College of Engineering)***

Maintaining the quality of electric power in multi-bus systems is always a challenging chore, because of non-linear loads. Integrating the FACTS devices is the better solution for power system stability. The unified power-quality conditioner (UPQC) is employed to mitigate the presence of current and voltage-related power-quality (PQ) problems in power distribution systems. This paper presents the design and performance analysis of the UPQC assimilated IEEE 14 bus test system. Generally, the configuration of UPQC consists of two back-to-back converters with a single controller. Here a novel combination of two various controllers is separately introduced. Furthermore, this paper highlights comparing the power quality performance like current harmonic elimination indices and voltage compensation using UPQC with FLC and ANN-based controller schemes. The test system for the proposed work is modeled and simulated using MATLAB/SIMULINK

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**ICEMCE-099**

## AUGMENTATION OF COVERAGE IN IOT USING LICENSED LPWAN

***Karthigaichelvi R (Manonmanium Sundaranar University)****

The Narrowband Internet of Things (NB-IoT) is one of the private networks of Low Power Wide Area Networks (LPWANs) because it consumes low energy and covers a wide area. The bandwidth of the NB-IoT is 180 kHz for both uplink transmission and downlink reception. The modulation technique of the uplink transmission of NB-IoT is Single Carrier Frequency Division Multiple Access (SC-FDMA) similarly in the case of the downlink is Orthogonal Frequency Division Multiple Access (OFDMA). The main goal of the paper is to enhance the coverage of NB-IoT by a variation of BLER (Block Error Rate). If the targeted BLER is less than the reference BLER, then the number of repetition values is minimized and, also the Maximum Coupling Loss (MCL) is reduced. Therefore, we need less coverage to receive the information from the transmitter side likewise, if the targeted BLER is greater than the reference BLER, then the number of repetitions value is maximum and, also the MCL is enhanced. Hence, we require maximum coverage to receive information from the transmitter side.

**ICEMCE-100**

## MACHINE LEARNING APPROACHES FOR THE DETECTION AND CLASSIFICATION OF LEUKEMIA FROM HISTOPATHOLOGICAL IMAGES

***Karthikeyan Shanmugam (Bannari Amman Institute Of Technology)*; Leeban Moses (Bannari Amman Institute Of Technology); Dhyaneshwaran N J (Bannari Amman Institute Of Technology ); Akash M (Bannari Amman Institute Of Technology); Prasath P (Bannari Amman Institute Of Technology)***

Leukemia is a severe and potentially life-threatening ailment affecting the blood and bone marrow. Timely detection is of utmost importance as it can greatly enhance patient prognosis. In recent years, deep learning techniques have shown remarkable promise in the realm of medical image analysis. The primary aim of this project is to establish a deep learning framework tailored for the early identification of leukemia cancer cells within microscopic blood samples. Image dataset of blood samples were collected and pre-processing was done. For feature extraction VGG19 was used. The features were employed for both training and testing purposes across a range of machine learning classification algorithms, including Random Forest, KNN, NBC, Decision Tree, and SVM-RBF. The most effective one can be determined by assessing the classifiers' performance through metrics like accuracy, precision, etc. Here in the proposed model where we have two approaches – one with VGG19 used for feature extraction and the other without using VGG19. Without the VGG19, Random Forest classifier had the highest accuracy – 77.9%. With VGG19 used for feature extraction, SVM-RBF classifier performed well with an accuracy of 85.1%.

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**ICEMCE-101**

## NON-ISOLATED MULTIPORT CONVERTER FOR ELECTRIC VEHICLE APPLICATIONS

***Reshma T R (Thiagarajar College of Engineering)*; Arockia Edwin Xavier (Thiagarajar college of engineering); Charles raja S (Thiagarajar college of engineering)***

Power electronics systems must be effective and flexible due to the growing acceptance of electric vehicles (EVs) as a viable option for sustainable transportation. When delivering peak power, batteries perform less efficiently. On the other hand, ultracapacitors have a smaller energy storage capacity but can manage peak power. As a result, ultracapacitor and battery-based storage solutions are being researched. There are numerous configuration options and control strategies available for various systems. Due to their capacity to incorporate various energy sources, Multi-Input Converters (MIC) are a developing technology appropriate for sustainable energies. In this paper, an adaptive neuro-fuzzy inference approach and a hybrid power management strategy are proposed. The suggested model was developed using MATLAB and Simulink. The simulation's findings demonstrate that the proposed strategy can provide the needed power to complete a typical driving cycle.

**ICEMCE-102**

## BIDIRECTIONAL POWER FLOW GRID-TO-VEHICLE & VEHICLE-TO-GRID (G2V&V2G) IN ELECTRIC VEHICLE

***Shanmukasri G (Thiagarajar College of Engineering)*; Ashok Kumar B (Thiagarajar College of Engineering); Senthilrani Shanmugavelu (Velammal College of Engineering and Technology); Dr.Satheesh Kumar Sampath (University of Technology and Applied Sciences, Muscat )***

The growing number of electric vehicles (EVs) imposes greater stress on the power grid. One prospective remedy for this issue is the installation of a bidirectional charger that is also adept at aiding the power grid. The charging and discharging of the battery in an EV are both accomplished by bidirectional converters, one of which is an AC-DC and the other is a DC-DC. Changing the operating mode of a DC-DC converter can lead to it behaving differently. The plug-in hybrid electric vehicle (PHEV) has the conceivable to function as a mobility device that transmits power from ""vehicle to grid"" (V2G). Electric car batteries have the capability to engage in bidirectional electricity exchange with the grid. Peak load reduction, load balancing, voltage control, and enhanced electrical system stability can be achieved as a consequence. The utility grid can absorb the distributed stored power provided by V2G equipment in the manner of rotatory reserve power. The ability to transfer battery energy back to the power grid through V2G technology contributes to the enhancement of electrical system stability. If there is a bidirectional discharging circuit available, there is also an opportunity to supply power from the grid. We will be designing and building bidirectional charges for the battery in electric vehicles using MATLAB Simulink for this project. The simulation focuses on two primary modes of operation: - V2G and G2V. Both of these modes are depicted.

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**ICEMCE-103**

## A REVIEW ON MACHINE LEARNING MODELS FOR BREATHING PATTERN ANALYSIS OF SOLDIERS

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Since 2001, the U.S. military has sent 2.7 million people to support missions in Afghanistan and Asia. The experience of land-based employees is increased by exposure to additional inhalational exposures and particulate matter from a variety of sources. For the purpose of preventing significant loss to the nation and to the individual military soldier, post-traumatic stress disorder (PTSD) must be identified. Breathing pattern analysis is a key method for detecting PTSD, and various studies have used machine learning techniques for this purpose. This survey examines multiple ML models to determine the military soldiers' breathing patterns in distinct works. This overview discusses several ML models and strategies used over the past few decades for conducting extensive research. Military personnel' breathing patterns are analyzed using a variety of datasets, statistical factors, and methodologies. The effectiveness of various algorithms is compared using qualitative as well as quantitative approaches. The potential future study areas with major challenges are discussed to reach a conclusion.

**ICEMCE-104**

## SMART ENTRY SYSTEM FOR COLLEGE USING IOT AND RFID

***Veera Anusuya V (National Engineering College)*; Bency Jesline B (National Engineering College); Ramani vijay chelvi C (National Engineering College); Maheswari KS (National Engineering College)***

Smart technologies are being used more and more to make our lives better in every aspect. One of the most difficult and pervasive issues in organizations has a solution in Smart Entry Management. Checking is important in an organization. Attendance is essential for many institutions, including colleges and schools. We plan to solve this problem at college using some technology. Technologies have been used to address this problem. However, the best alternative to RFID (Radio Frequency Identification) to tackle this problem. Here, an object or person is identified and tracked via radio waves. RFID communication is conducted wirelessly by electromagnetic and electrostatic interaction, with the radio frequency spectrum serving as the medium of exchange. Radio Frequency Identification (RFID) based an entry system provides us with a solution that all students and staff should not exceed the fixed time and they must wear an ID card. This project describes the design of an RFID-based entry monitoring system that uniquely identifies each student and staff based on their RFID tag which is attached to their ID card. If a student or staff fails to come to the entrance on exact time that has been fixed, then their absence will be intimated to their parent’s mobile number and respective staff’s mobile number through ESP 32 Wi-fi module.

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**ICEMCE-105**

## IOT BASED BOTTLE FILLING SYSTEM USING PLC

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Bottle filling water, milk, soda etc. It is the main process of filling liquid products. Today, programmable logic controllers (computers designed for industrial control) are used to automate the water injection process. However, to start and finish this process, we need to manually monitor the factory operation. In this model, the filling of bottles is controlled by a controller called PLC and monitored via the Internet of Things. First, water is pumped through a motor and controlled by high and low water sensors on the treatment tank. Bottles are placed on the conveyor belt for the filling process. When the inductive proximity sensor detects the product and the position sensor shows the location of the bottle, the conveyor stops and the amount of water that should enter the bottle from the purification tank begins to pour. The signal output from the workstation is fed to the programmable logic controller (PLC), Siemens S7-1200, and continues through a 24-port switch. PCs, IoT 2040 gateways and human machine interfaces (HMIs) will also be connected to the switch.Totally Integrated Automation (TIA) is a portal to PLC ladder logic programming. In order for the PLC to communicate with the IoT2040 gateway, Python code will be written in a software called MobaXterm. Additionally, Python programs for communication between the IoT2040 gate and the cloud and between the cloud and the PLC were written in the same software. The entire system is managed by an online IoT platform called Ubidots, which provides a secure way to build IoT solutions.

**ICEMCE-106**

## FAULT DETECTION AND CLASSIFICATION ON TRANSMISSION LINES DURING ASYMMETRICAL FAULTS USING WAVELET TRANSFORMATION AND DECISION TREE ALGORITHM

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In recent years, the growth of electricity utilization for industrial applications as well as residential applications has increased. So, the power system must ensure the quality and reliability of the electric supply. Inorder to ensure the reliability of the system,the power protection system should operate quickly and accurately. Hence, protection devices need fast data acquisition systems. Initially, fault detection in a power system with a perfect time sequence is very important. In this work,Wavelet Transformation Technique(WTT) along with Decision Tree Algorithm (DTA) based fault detection and classification algorithm were proposed. Here, falut detection can be performed by the WTT algorithm and fault classification can be performed by the DTA algorithm. Both algorithms were working together to ensure fast identification and classification. The test system is considered with normal and fault conditions (Asymmetrical) and the faulted section of system is detected based on the above proposed method. The selected power system with faults is manifested in

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the MATLAB Simulink environment and simulation results for various types of faults are analyzed.

**ICEMCE-107**

## IOT-ENABLED SMART GRID MONITORING ENHANCED WITH SEPIC CONVERTER AND ANN BASED MAXIMUM POWER POINT TRACKING

***Nivedha M. (Arasu Engineering College)*; Titus S. (K. Ramakrishnan College of Engineering)***

Smart Grid and Internet of Things (IoT) technologies are essential for monitoring and improving applications across a variety of fields. The purpose of a solar cell, also known as a photovoltaic cell, is to collect solar radiation and generate electricity. The primary use of solar panels is the direct conversion of solar energy into electric power. In the smart grid, a single-ended primary-inductance converter (SEPIC converter) is utilised to execute an Artificial Neural Network (ANN)-based Maximum Power Point Tracking (MPPT) approach. This would improve smart grid monitoring with the use of the IoT. In the suggested system, a very capable SEPIC converter is used to increase PV array utilisation while maintaining a continuous current flow. An SEPIC converter increases the PV voltage, and the ANN technique helps to achieve the highest level of reliability. A 3 ϕVoltage Source Inverter (VSI) is used to feed the system's output to the 3ϕ grid, and sensors (NODE MCU) installed in the IoT module measure different parameters like temperature, intensity, converter voltage and current, grid voltage and current, and are further monitored by sensors and stored in IoT webpage. Fuzzy logic controller (FLC) is used to forecast the shortest distance, resulting in faster convergence. The data produced show that the entire configuration improves the monitoring of smart grid characteristics. While the reactive power initially varies and then stays constant at 600VAR throughout the system, the real power value is seen to be 8800W.

**ICEMCE-108**

## MACHINE LEARNING INFUSED TECHNO-ECONOMIC EVALUATION OF COMMERCIAL BUILDING HYBRID ENERGY SYSTEM

***Parameswari Subramanian (Thiagarajar College Of Engineering); Dr. Suresh Kumar V ("AU,Chennai")*; Charles raja S (Thiagarajar college of engineering); Vishnu Dharssini A C (Thiagarajar College of Engineering)***

The study explores multiple combinations of grid connected hybrid energy systems to supply power to a commercial building located in Madurai, Tamil Nadu, India. The study focuses on analyzing a Hybrid Energy System configuration comprising solar PV, a diesel generator (DG), batteries, and a converter. This analysis is conducted based on technical and financial factors with the aim of determining the most optimal design. Moreover, two distinct machine learning models were employed to forecast the system's performance concerning techno-environmental-economic factors. The results of the optimal configuration are input into two distinct regression models to determine the most effective using machine learning to anticipate the renewable share (Techno) and the Levelized Cost of Electricity (LCOE) (Economic).

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**ICEMCE-109**

## ARTIFICIAL INTELLIGENCE-RNN CONTROL OF DOUBLE FED INDUCTION GENERATOR-BASED WIND ENERGY CONVERSION SYSTEM

***E. Rajendran ( SKP Engineering college)*; Sridevi R. (S.K.P Engineering College); Raghul Vallarasu N. (S.K.P Engineering College)***

Wind power is a clean, endless basis of energy that leaves no trace behind. In this study, recurrent neural network (RNN) control for a wind energy conversion system (WECS) founded on a doubly fed induction generator (DFIG) is devised. While the rotor of the stator is mounted with a Back-to-Back converter, the stator winding is directly attached to the main network. The main unbiased of this study is to compare the energy construction shows of two types of controllers PI regulator and neural network regulator used for controlling the wind power adaptation system in order to assess the precision and durability of the controllers towards wind fluctuations as well as the effect on the quality of the influence generated. To control the energetic and reactive power a field-oriented control of the DEFIG stator is also described. To authenticate the efficiency of the performances and the resilience of the two control approaches, simulations were run using the Mat lab/Simulink programme. The preferred strategy was described by the outcomes. In the comparative analysis RNN controller has 0.2 s as settling time.

**ICEMCE-110**

## ADVANCING IOT SECURITY WITH A HYBRID DEEP LEARNING MODEL FOR NETWORK INTRUSION DETECTION

***Rigzen Norbu (Thiagarajar College of Engineering); Arun Kumar M (Thiagarajar College of Engineering)*; Ramanathan S (Thiagarajar College of Engineering); Nagendra Kumar D (Thiagarajar College of Engineering); Jigmet Dolkar (Thiagarajar College of Engineering); Subalakshmi Sujitha K (Thiagarajar College of Engineering)***

Intrusion detection systems play a pivotal role in safeguarding computer networks from a plethora of cyber threats. Traditional methods have demonstrated effectiveness, but the evolving nature of attacks demands novel approaches that can capture intricate patterns and relationships within network data. In this paper, we propose a groundbreaking CNN-Transformer hybrid deep learning model for Network Intrusion Detection Systems (NIDS) prediction, utilizing the Canadian Institute of Cyber Security dataset. The hybrid architecture capitalizes on the strengths of both Convolutional Neural Networks (CNNs) and Transformers. CNNs excel at capturing spatial features in data, making them suitable for identifying local patterns in network traffic. On the other hand, Transformers are adept at capturing global contextual relationships, thereby handling complex temporal dependencies in network sequences. By fusing these two powerful architectures, we achieve a comprehensive model capable of discerning both local anomalies and global attack trends. Our model is extensively evaluated on the Canadian Institute of Cyber Security dataset, and the results are nothing short of remarkable. We achieve an unprecedented accuracy of 99.4%, showcasing the efficacy of the proposed hybrid approach in the context of real- world network traffic. Furthermore, the model demonstrates a robust ability to generalize across diverse attack scenarios, effectively minimizing false positives and false negatives. As cyber threats continue to evolve, the significance of innovative models that offer superior detection

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accuracy and robust generalization cannot be overstated. This work not only furthers the field of intrusion detection but also underscores the potential of hybrid deep learning architectures in addressing complex cybersecurity challenges.

**ICEMCE-111**

## DESIGN AND ANALYSIS OF FELT BASED UWB RESONATOR ANTENNA FOR BODY WORN APPLICATIONS

***Evangelin P S (Karunya Institute of Technology and Sciences)*; Mary N T (Karunya Institute of Technology and Sciences); Diana Andrushia (Karunya Institute of Technology and Sciences)***

In recent years, there has been a growing interest in the development of wearable technologies due to their potential to revolutionize various fields, such as healthcare, sports, and entertainment. One of the main challenges in designing body-worn devices is ensuring their compatibility with the human body while maintaining optimal performance. This study proposes the design and analysis of a felt-based Ultra-Wideband (UWB) resonator for body-worn applications. The unique properties of felt make it a suitable material for integrating with wearable devices, offering enhanced comfort, flexibility, and biocompatibility. Through a series of simulations and experiments, we investigate the performance of the felt-based UWB resonator in terms of frequency response, impedance matching, and radiation characteristics. Our findings demonstrate that the proposed resonator exhibits excellent performance, making it a promising solution for body-worn applications. This research opens up new possibilities for integrating advanced sensing and communication functionalities into wearable devices, thereby enhancing their overall performance and user experience.

**ICEMCE-112**

## DESIGN OF SWITCHED Z-SOURCE CONVERTER FOR GRID TIED PV WITH HYBRID STORAGE SYSTEM

***Sridevi R. (S.K.P Engineering College)*; Rajendran E. (SKP Engineering College)***

Despite being essential parts of modern distribution networks, photovoltaic (PV) modules were previously employed primarily to produce money-making, eco-friendly electricity. Due to inverters with integrated Maximum Power Point Tracking (MPPT) algorithms, PV systems frequently reach their maximum power point while functioning effectively during the day. This article describes a method for MPPT prediction utilizing data on solar contact and ambient temperature called a Modified P&O based MPPT. The proposed method offers quick response, non-intrusive sampling, which is overall harmonic distortion reduction, better PV unit utilization, and simple MPPT algorithm training. An architecture for a switched Z-source converter is projected in this paper. In hybrid and renewable systems that store electricity, super capacitors have been employed as batteries to manage the source and the grid. Stable voltages are produced by using these devices. Combining switched-capacitor cells with common Z-source impedance networks results in a ground-breaking high step-up converter. The proposed converter provides a high voltage gain while limiting the responsibility of sequencing or needing an excessive amount of elements, while reducing the voltage demand on the diodes and the power switch to less than half the output voltage. The results of the simulation and testing are used to determine the productivity and position of the proposed

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converter. The comparison of the converters shows the greater efficiency of Switched Z-Source Converter as 93.6%.

**ICEMCE-113**

## DIAGNOSING PARKINSON'S DISEASE USING VOICE FEATURES BASED ON DEEP LEARNING AND INFORMATION GAIN

***N. Ramya (Vellalar College for Women (Autonomous) Affiliated to Bharathiar University)*; S. Devi Suganya (Vellalar College for Women (Autonomous) Affiliated to Bharathiar University)***

Many studies have worked hard in recent years to advance the field of Parkinson's disease early detection. Parkinson's disease (PD) is a condition that affects the brain and impairs speech, movement, and thought. Previous research has indicated that the use of specific computer programmes, such as SVM (Support Vector Machine), NB (Naive Bayes), K-NN (K-Nearest Neighbour), and ANN (Artificial Neural Network), can be highly beneficial in the diagnosis of illnesses based on subjective sensations or feelings. Selecting crucial speech traits to aid diagnosis and eliminate problems has been suggested as a novel approach. However, the input data reveals the issue of class imbalances has an impact on both the performances of the classifiers and the findings in previous studies that employed SVM, K-NN, NB, and ANN for classification. ANN is said to provide great accuracy. NN (neural networks) need a lot of data to train or learn. They are unable to extrapolate from small training data sets. They fail to generalise successfully to fresh cases because they memorise the training data. This paper developed an improved model for detecting PD utilising a DL (deep learning) approach to solve this issue. Initial data equalisation was carried out in this study using the SMOTE (Synthetic Minority Oversampling Technique). In order to normalize the input data in this study, min-max normalisation is used after data balancing. With the help of the information acquisition model, significant aspects are chosen. After the feature sets have been chosen, a classifier is used to identify Parkinson's disease. Finally, in this study, speech features processed using WRNN (weighted recurrent neural network) and samples with PD detected. The suggested approach's values of accuracy, precision, recovery, and f-scores were assessed where outcomes demonstrated that the suggested model outperformed other current models.

**ICEMCE-114**

## ARTIFICIAL NEURAL NETWORK BASED POWER QUALITY IMPROVEMENT FOR GRID CONNECTED WIND POWER SYSTEM USING PMSG AND SEPIC CONVERTER

***E. Rajendran (SKP Engineering college)*; Raji V. (SKP Engineering College ); Siddheshwar Kar (Medi-Caps University); Riyaz A Rahiman (Reva university); Mujahid Irfan (SR UNIVERSITY); D Karthikeyan (SRM Institute of Science and Technology)***

Wind energy is attractive into a highly valuable energy source. To meet the grid connections criteria in light of the growing penetration of wind power, changes are needed. The purpose of this chapter is to learn how to control output and discuss the output regulator of a Permanent Magnet Synchronous Generator (PMSG) that is connected to a utility for wind power generation. The unit powered by wind turbine is regulated by a Sepic converter by

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PMSG. In order to ensure that PMSG's power transmission can be commercially successful, their actual and reactive powers are strictly regulated. PI controller is contrasted with the suggested technique. Using MATLAB/Simulink, the effectiveness of the suggested approach and Sepic converter is proven.

**ICEMCE-115**

## DESIGN AND DEVELOPMENT OF BIOGAS PURIFER

***Surya K (Kongu Engineering College)*; Mouleeshuwarapprabu R (Kongu Engineering College); Mrunalini T (Kongu Engineering College); Sri Priyangka S P (Kongu Engineering College); Sathyanandhan K (Kongu Engineering College); Ramya Chinnasamy (Kongu Engineering College)***

The mini biogas amine scrubbing paper is dedicated to the development and construction of a compact biogas scrubbing system, which employs either amine or water scrubbing techniques to eliminate impurities like CO2 and H2S from biogas produced by small-scale anaerobic digesters or similar biogas-generating systems. This scrubbing system is tailored to be cost-effective, efficient, and user-friendly, making it an ideal solution for small-scale biogas producers seeking to utilize their biogas for heating, cooking, or electricity generation. The scrubber consists of a scrubbing vessel filled with an amine or water solution, a biogas inlet, and a clean biogas outlet. Biogas is channeled through the scrubbing vessel, coming into contact with the amine solution, which effectively removes impurities. The purified biogas is then collected and can be applied for a variety of purposes. This project encompasses the design and construction of the scrubbing system, the selection of the appropriate amine or water solution, and rigorous testing of the system's efficiency and effectiveness in eliminating impurities from biogas. The system's performance will be assessed at different biogas flow rates and impurity concentrations to evaluate its adaptability under diverse conditions. The anticipated outcomes of this project include a fully operational mini biogas scrubbing system capable of efficiently purifying biogas, along with valuable insights into the efficacy of various amine and water scrubbing solutions for small-scale biogas production.

**ICEMCE-116**

## CLASSICAL-QUANTUM COMPUTING MODEL WITH MOBILENET FOR PRECISE PEST CLASSIFICATION

***T Saranya (Thiagarajar college of Engineering)*; Deisy C (TCE Madurai); Dr. S. Sridevi (TCE)***

Pest classification holds immense significance in agriculture, serving as a cornerstone in safeguarding crop health and global food security. This paper introduces a hybrid classical-quantum machine learning model with the objective of revolutionizing pest classification. The proposed methodology embraces the Classical-Quantum (CQ) paradigm, amalgamating quantum circuit design, the Quantum-Enhanced Classical Network (QCN), and seamless integration with the MobileNetV2 architecture. Remarkably, this hybrid model outperforms MobileNetV2 in terms of accuracy, boasting an exceptional training accuracy of 98% and an impressive testing accuracy of 96%. These achievements are realized on a dataset encompassing 4263 images of tomato-specific pests categorized into 8 distinct classes. The CQ model attains this remarkable performance by harnessing the power of quantum

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computing to extract more distinctive features from pest images. The QCN component of the model facilitates efficient and scalable training of quantum-enhanced classical classifiers, contributing to its superior performance. The integration of the MobileNetV2 architecture provides the model with a lightweight and efficient architecture that is suitable for deployment on mobile devices.

**ICEMCE-117**

## LEVEL TRIGGERED GARBAGE COMPRESSOR BIN

***Sasireka M (Kongu Engineering College )*; vidhyalakshmi P (Kongu Engineering College ); Vishal C K (Kongu Engineering College); Prakash R (Kongu Engineering College); Sakthivigneshwari M (Kongu Engineering College)***

Waste production is increasing as urbanization spreads quickly. Waste management is an important factor to take into account in ully used in public spaces in smart cities. The waste is compressed by the model's self-compressing system when the trash can fills up, providing extra space for subsequent disposal. When a dustbin is full, a signal is delivered to the appropriate. The authorities and the garbage pickup vehicle informing them indicates the trash can is overflowing and requires quick attention.The efficient management of the garbage collection may be aided by this. This will prevent both the overflow of trash into the container and the disposal of waste near the landfill, which are the primary objectives of this study. The suggested methodology uses a GPS module to pinpoint the precise location of each smart container, an ultrasonic detector to measure the volume of trash in the bins, and an Arduino IDE-based ESP8266 for GSM communication with the authorized control room.

**ICEMCE-118**

## CHATBOT: A VOICE BASED VIRTUAL ASSISTANT

***Ashok Kumar B (Thiagarajar College of Engineering); Rajeswari J (Velammal College of Engineering and Technology); Senthilrani Shanmugavelu (Velammal College of Engineering and Technology)*; Abilashini M (Velammal College of Engineering and Technology); Shivani N (Velammal College of Engineering and Technology)***

Internet of Things (IoT) has really signified the possibilities of wireless communication. IoT is not only used to send, receive signals between compatible but also used to automate the devices from a remote distance. Chatbot is the virtual bot used as an interactive agent with many added functionalities. It really eases the specific job and makes it more effective and efficient. Smart speakers are really a perfect example of automation done using a virtual assistant (Chatbot).Additionally, when people work with large databases it becomes quite difficult to manage tasks. Searching about information on internet, opening files or documents manually can sometimes be hectic tasks. In a stressed condition, if there is any assistant that can perform all the tasks just through our voice command, then it will be much easier and comfortable. Based on individual verbal commands, the virtual assistant can perform defined tasks. Thus, human speech interpretation is responded via synthesized voices. The implementation of new trend of intelligent personal assistant (IPA) facilitates easy navigation through sites for users.

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**ICEMCE-119**

## OPTIMIZE 3D PRINTING MATERIAL PROCESS PARAMETERS: A CASE ON REGRESSION AND NEURAL NETWORK

***Mohammedazharudeen J Jainuladeen (Mohamed Sathak Engineering College)*; Kamalakannan R (M.Kumarasamy College Of Engineering); Umar Ahamed P (Mohamed Sathak Engineering College)***

This study optimizes the number of shells, layer thickness, printing speed and infill density while taking the single response of tensile strength into account. The range 3-5 nos for no of shell, 0.2- 3 mm for layer thickness, 40-80 m/sec for infill density and printing speed varying from 3600-6000 m/sec with experimental trails towards L9 orthogonal array were carried out. When using the ideal process parameters, the single response technique exhibits the best convergences where the maximum tensile strength results are obtained. Further, in order to identify important variable FDM process parameters, Regression and Artificial Neural Network as chosen for modelling and validated this model using SPSS.

**ICEMCE-120**

## EFFECT OF MAGNETIC FIELD ON STREAMER DYNAMICS IN TRANSFORMER OIL

***Mihir A Bhatt (CHARUSAT University)*; Praghnesh Bhatt (Pandit Deendayal Energy University)***

The formation and appearance of the arc is a particularly challenging phenomena to investigate during the pre-failure phases of fluid dielectrics. The existence of sparking channels causes catastrophic failure of transformers owing to fast excitation under the influence of massive electrical, mechanical, and heat shocks. Transformers are constantly susceptible to both electrical and magnetic forces since they are electromagnetic devices. A Lorentz force, composed of a combination of electric and magnetic forces, effects the momentum and orbits of charged atoms as well as the electrical discharge trajectory of a streamer. This research uses COMSOL Multiphysics to create a 3-dimensional needle-plane geometry model to examine the consequence of a magnetizing field on the streamer behaviors in transformer oil. The simulation-based research demonstrates that the existence of a magnetizing area influences molecule trajectories, hence diverting the projected path of a streamer discharge.

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**ICEMCE-121**

## CYCLONE INTENSITY ESTIMATION BASED ON DEEP - LEARNING USING INSAT 3D IR IMAGERY

***Divya Vasantha Sena S (Thiagarajar College of Engineering); Sanjay B (Thiagarajar College of Engineering); Julius Fusic S (Thiagarajar college of engineering)*; Hariprasad M (Thiagarajar College of Engineering)***

A cyclone is a tremendously sized rotating storm system positioned in the ocean. It's a veritably severe rainfall system that might beget severe damage to coastline areas. Due to the enormous quantities of meteorological data and surveillance data that are continually growing, traditional methodologies for prognosticating tropical cyclones face a variety of challenges. In this, we propose a deep learning approach to estimate the cyclone intensity. The proposed model was created with the aid of data from real tropical cyclones. The fashion is grounded on an analysis of the infrared (IR) imaging of the cyclone. The IR prints are used to infer the cyclone's temperature. The storm's inflexibility is projected grounded on the cyclone's temperature. Our approach also provides instructions on how to leave and help the cyclone's implicit detriment while reducing the threat to fishers and mariners.

**ICEMCE-122**

## ENERGY TRANSFER THROUGH LIGHT BEAM FOR EV CHARGING

***Sivakumar P (Rajalakshmi engineering college); G Jai Sreedhar (Rajalakshmi engineering college)*; JAINAM S MARDIA (Rajalakshmi Engineering College); Lokesh K B (Rajalakshmi engineering college)***

Electric vehicles (EV) are the current blooming outlets in India and these vehicles need a specialized charging system or charging unit, although current manufactures provide a separate outlet for the users which can be placed in their homes. But in real time in the fast moving world people tend to switch over to the wireless charging system in all the appliances they utilize in their daily usage and this also creates an impulse on the wireless charging system for EVs . Wireless power transmission is a new technique that is used to charge an electric vehicle battery over an air gap. even though few systems currently available for the wireless charging for EV utilizes the traditional induction method for transferring the energy on a wireless basis but need a huge infrastructure and has high amount of losses on transfer which might not be suitable in all the aspects and condition so this paper proposes a idea of charging the EV or transferring the energy using spectrum of waves majorly focusing on the visible and invisible light sources.

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**ICEMCE-123**

## FEM-BASED SOFT ROBOTIC GRIPPER DESIGN FOR SEAWEED FARMING

***Meenakshi S (Thiagarajar college of Engineering)*; Prabhakar G (Thiagarajar college of Engineering); Ayyanar Natesan (Thiagarajar college of Engineering); Nedumal P Pugazhenthi (Dr NGP Institute of technology)***

Seaweeds are large algae that grow on rocky shorelines, in shallow coastal waters, and in marine environments. It plays a major role in marine ecosystems and is abundantly available in the Gulf of Mannar Biosphere region. However, some species of seaweed clash with coral reefs and damage them severely due to the release of hydrophobic allelochemicals. Conventional methods are often labor-intensive, which results in adverse environmental effects. The solution to this problem is to involve underwater vehicles for seaweed farming. But the existing underwater vehicles need some soft materials to handle the targeted seaweeds carefully, without affecting the coral reefs and other species in the sea.

This study aims to develop a soft robotic gripper with pneumatic to grasp seaweed, which is abundantly available under the sea water nearer to coral reefs. The novel soft pneumatic robotic gripper design has been done for 8 chambers using Ansys FEA software. Gripper deformation analysis is carried out for different pressure levels to understand the behavior of the hyperelastic material.

**ICEMCE-124**

## AN EFFICIENT IOT DEVICE FOR CKD AFFECTED PATIENT DATA COLLECTION

***Dr. Kalpana Murugan (Kalasalingam Academy of Research and Education)*; Radha Murugan (Kalasalingam Academy of Research and Education)***

The development of the Internet of Things (IoT), which enables communication between people, things, data, and virtual platforms in the environment, is a result of the exponential rise of information technology (IT). Recently, numerous decision-support systems in the medical industry have been offered via IoT and cloud-based e-health services. Owing to the developments in IoT-enabled medical gadgets and sensing devices, several research communities are paying significant attention to this domain. The transition from hospital-based infrastructure to patient-based infrastructure is necessary due to the growth in expensive treatment and the prevalence of various diseases globally. IoT is an integration of healthcare devices and applications that can link to healthcare information systems by the use of networking technology. The main goal of this research work is to create an IoT-enabled Chronic Kidney Disease (CKD) that can be used for experimental experiments to assess the levels of urea and creatinine in the blood and saliva of CKD patients and healthy people.

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**ICEMCE-125**

## RETINAL DISEASE DIAGNOSIS REIMAGINED: A DEEP TRANSFER LEARNING AND MULTI-SCALE ATTENTION NETWORK ALGORITHM FOR PRECISION OPHTHALMOLOGY

***Ramanathan S (Thiagarajar College of Engineering)*; Arun Kumar M (Thiagarajar College of Engineering ); Susmanth Srinivas A (Thiagarajar College of Engineering); K SHANMUKHA Naveen (SSN College Of Engineering); Dr.Senthilkumar C (Associate Professor,Thiagarajar College Of Engineering)***

Multi-Scale Attention Networks(MSAN) and VGG16 Transfer Learning model have been used here. The novelty lies around the fact that our Custom-MSAN is our own proprietory model for the retinal disease detection task(91% accuracy) and the VGG16 model has not been used previously with this dataset and accuracy results that we have achieved is substantially high(93.40% accuracy).

**ICEMCE-126**

## CONTRASTIVE ANALYSIS OF PATH PLANNING ALGORITHMS FOR MOBILE ROBOTS

***Suriya pavithra J S (Thiagarajar college of engineering); Harini Karthika A (Thiagarajar college of engineering); Julius Fusic S (Thiagarajar college of engineering); Dr. P. Krishnapriya (Thiagarajar College Of Engineering)****

Path planning is an essential difficulty in mobile robotics, with applications spanning from autonomous vehicles to warehouse automation. This paper affords an extensive analysis of five prominent path planning algorithms, including Particle Swarm Optimization (PSO), Genetic Algorithms (GA), A*, Dijkstra, and Rapidly-exploring Random Trees (RRT). Our study evaluates these algorithms based on their performance, efficacy, and adaptability to numerous circumstances. We discuss the optimization capabilities of PSO, the genetic-inspired search of GA, the heuristicdriven approach of A*, the dependability of Dijkstra, and the probabilistic exploration of RRT. Parameters including path length, execution time, and solution quality are analyzed thoroughly. To validate the applicability of algorithms in real-life scenarios, experimental and simulation studies are conducted. Our findings provide vital insights into the comparative performance of these algorithms, allowing researchers and practitioners to select the most appropriate approach for their particular robotic applications.

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**ICEMCE-127**

## EFFICIENT AI-POWERED AUDIO-TO-TEXT TRANSCRIPTION: A GUI-ENHANCED STACK WITH EXE BUILD FOR INNOVATION IN COMMUNICATIONS

***Nirmala Devi M (Thiagarajar College of Engineering); Subbulakshmi S (Thiagarajar College of Engineering); Varsha S K (Thiagarajar College of Engineering)****

In today's digital age, the exchange of information via audio recordings plays a pivotal role in various communication channels, ranging from educational platforms to corporate meetings. Efficiently harnessing this audio data for improved comprehension and accessibility is a quintessential challenge in the realm of artificial intelligence (AI)-enabled communication. This presentation unveils an innovative solution that combines AI, audio processing, and speech recognition to revolutionize the way we transcribe spoken content into text. Our system employs a sophisticated stack of technologies to automate audio-to-text transcription, catering to diverse communication scenarios. Leveraging the power of Google's speech recognition service, the system intelligently segments audio recordings into manageable chunks based on silence intervals. These chunks are then subjected to speech recognition, producing highly accurate transcriptions.

**ICEMCE-128**

## A SMART MAXIMUM POWER POINT TRACKER SOLAR CHARGE CONTROLLER

***Pearline Kamalini (Saranathan College of Engineering)*; M V Suganayadevi (Saranathan College of Engineering); R Paul Roger (Saranathan College of Engineering); U.P Anush Aravind (Saranathan College of Engineering)***

This paper presents an innovative Solar Charge Controller with Maximum Power Point Tracking (MPPT) capabilities, leveraging Arduino integration and a combination of active and passive electronic components. The core principle of MPPT revolves around optimizing energy conversion processes. By employing MPPT Charging Technology, excess voltage is adeptly converted into current, significantly enhancing overall charging efficiency. The development of this system involves complex tasks, including the design of a schematic and printed circuit board (PCB), as well as the creation of Arduino code for visualizing charging parameters on a 20x4 LCD screen. These tasks demand specialized skills in both hardware and software design. Notably, this design has been tailored for efficiently charging a widely used 12V lead-acid battery using a 50W solar panel as the primary energy source.

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**ICEMCE-129**

## HEIGHT-BASED SORTING AUTOMATION: PLC AND FACTORY I/O INTEGRATION

***Thangatamilan M (Kongu Engineering College)*; Suji Prasad S J (Kongu Engineering College, Erode); Karthik G (Kongu Engineering College); DINESH KUMAR T (Kongu engineering college ); Dharun M S (Kongu Engineering College )***

The main method utilised for this is wired communication, which also uses a distinct process. But PLC programming accomplishes this. This will help when using PLC programming software to sort the objects by height. PLC makes it easier to obtain. This type of operation can be changed remotely as opposed to other types. According to height, it will arrange little objects on the left and large objects on the right. This is carried out in Factory I/O Software, where a simulation of it is shown.

**ICEMCE-130**

## MACHINE LEARNING BASED PARAMETRIC FAULT DIAGNOSIS OF CUK CONVERTER

***Prathiba RV (Thiagarajar College of Engineering)*; Saravanan M (TCE)***

With the advent of renewable energy systems, Electric Vehicles and smart grid, there is growing need for high performance DC-DC converters in various applications. Inorder to improve reliability and ensure sustained operation, fault diagnosis of power converters needs to be done. Parametric Fault diagnosis mainly deals with monitoring the deviation of components' parameters from its nominal operating range present in a converter circuit. This work focusses on predicting the parametric faults in a Cuk converter using Machine Learning. Different Fault scenarios are simulated in MATLAB Simulink and the results are used in training the machine learning model. The trained ML model can sense single component fault of Cuk converter. Performance of Machine learning classifiers in terms of accuracy, along with feature extraction is discussed in this paper.

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**ICEMCE-131**

## SMART AUTOMATION OF FERTILIZER RATIO MIXER USING PLC

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In the modern agriculture, the cultivation of crops heavily relies on the application of fertilizers to provide essential nutrients to the soil, thereby fostering robust plant growth and maximizing agricultural yields. The efficiency, precision, and sustainability of fertilizer application play a pivotal role in determining crop yield and quality. As the agricultural industry continues to evolve, the integration of advanced technology has become indispensable in streamlining processes and addressing significant challenges. One such challenge is the manual mixing of fertilizer ratios, a process prone to inconsistencies, errors, and inefficiencies that can impede the production process. The manual nature of traditional fertilizer mixing processes exposes them to a range of human related pitfalls, including miscalculations, misinterpretations, and mistakes in measurements, all of which can lead to incorrect ratios. Such inaccuracies have the potential to result in substantial financial losses and reduced agricultural output, undermining the core objectives of modern farming practices. To address these challenges, a state-of-the-art fertilizer mixing setup has been developed, leveraging advanced technological solutions to achieve precise and efficient blending. This innovative system comprises three distinct containers, each containing different fertilizer components. At the heart of this setup is a Programmable Logic Controller (PLC) programmed in ladder logic, which orchestrates and controls the entire mixing process with exceptional accuracy and reliability. Within each container, a valve is operated by a high-precision Direct Current (DC) motor.

**ICEMCE-132**

## DYNAMIC OPERATING ENVELOPE FOR COST OPTIMIZATION IN LOCAL PEER-TO-PEER ENERGY MARKET

*Pratik Mochi (C.S.Patel Institute of Technology, CHARUSAT)*; Kartik Pandya (Parul University)*

Local electricity markets have emerged as a possible route for effective energy exchange among prosumers as the global energy landscape undergoes a paradigm shift towards decentralization and sustainability. This conference paper offers a thorough analysis aimed at reducing system costs in local power markets through peer-to-peer energy exchanges. The main goal of this research is to examine how the adoption of dynamic operating envelopes affects system costs while illuminating the possible economic advantages of these technologies in various circumstances. In order to give a comprehensive knowledge of the dynamics involved in local energy markets with dynamic export and import constraints for prosumers, the paper includes a careful examination of several examples and situations. The study is carried out for 27 household customers. The results show that, in the best-case scenario, the incorporation of dynamic operating envelope into the local power market can result in significant cost reductions of 12.14%.

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**ICEMCE-133**

## DESIGN OF MINI SPIRAL TURBINE FOR OPTIMUM POWER GENERATION IN WATER SUPPLY

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Nowadays the need for electricity is increasing. Our idea is to generate power in small quantities which is efficient for greenhouse applications where in running water in the field. The main thing is to generate electricity in non-electric field areas with low head generation and dust resistance. The turbine is designed for a very small hydropower plant with a low head of 0.1m or 0.7m and a flow rate of 10l/sec or 50l/sec. this flow rate enables around 150 volts to 230 volts of power generation. The objective of this research was to create a compact spiral turbine capable of generating electricity. The generated power from the mini spiral turbine can be utilized in greenhouses for electricity purposes, supporting the operation of sensors and actuators. Compared to windmills, the implementation of mini spiral turbines in water supply systems provides an innovative and sustainable solution to meet energy demands.

**ICEMCE-134**

## A COMPREHENSIVE REVIEW OF OPTIMAL SIZING APPROACHES FOR BATTERY STORAGE TECHNOLOGY

***Shanmuga Kani J (Saveetha Engineering College )*; Ulagammai M (Saveetha Engineering College)***

As the world undergoes a transformation towards utilizing renewable energy sources, there is a growing preference for continuous, cost-effective power supply throughout the day. The primary drivers for this shift are the environmental pollution associated with non-renewable resources and the volatility in their costs. The expansion of renewable energy sources has resulted in an increased incorporation of energy from renewable sources into the electrical grid. However, since renewable energy generation is intermittent, the efficient and effective performance of the electric utility system necessitates the Battery Energy Storage Systems (BESS) integration. Typically, batteries are employed to store electrical energy. Moreover, the optimal size of energy storage devices must be identified in order to address power imbalances and voltage fluctuations at the distribution level. Therefore, this paper explores Battery Storage systems for energy in the perspective of the latest technologies, optimum sizing of energy storage devices, and their associated advantages.

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**ICEMCE-135**

## PROTECTION OF DIRECTIONAL OVER CURRENT RELAY IN MICROGRID PROTECTION

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In modern power systems, the electricity demand increased due to technological improvements and increased population. The solution to meet the demand is the penetration of RES (Renewable energy sources). In power system engineering, the protection scheme plays an important role as well as a challenging task due to the high integration of RES. In this paper, the relay coordination analysis has been developed to achieve sequence operation of the relay concerning fault current and minimum usage of relay and circuit breaker. The relay sequence operation with fault current can be carried out by over current and instantaneous protection scheme. For this analysis, an IEEE9 Bus Microgrid system has been designed by using ETAP industrial software. To achieve relay coordination with minimum relay tripping, the relay setting parameters need to be selected. The relay setting can be done with the help of the Load flow and short circuit analysis. In this paper load flow analysis and short circuit analysis are studied for different types of scenarios, and it defines how load flow and short circuit analysis results differ when integrating RES into the main system. The different scenarios are without the inclusion of a PV source and with the inclusion of a PV source.

**ICEMCE-136**

## RENEWABLE ENERGY POWERED TWO STAGE DC-DC BOOST CONVERTER FOR ELECTRIC VEHICLE APPLICATION

*Vimala Devi S (Thiagarajar College of Engineering)**

This article deals with design and execution of a dc-dc two-stage boost converter along lower switch grouping for Electric Vehicle applications. The dc-dc boost converter must interface between the lower voltages from solar to the high voltage in an Electric vehicle charging system. For high-voltage applications, an ordinary dc-dc boost converter not suitable. Hence this examine is aimed to do a simulation with DC-DC two-stage boost converter for higher voltage application with low input voltage. Also, the analogy between conventional dc-dc boost converter voltage and current output will be analyzed. MATLAB/Simulink 2022b software is implemented for the simulation, modulation and investigation of the planned system. This paper focuses on addressing the specific needs of Electric Vehicle charging systems by designing and simulating a two-stage DC-DC boost converter capable of efficiently converting low input voltages from solar sources to high voltages required for EV charging.

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**ICEMCE-137**

## BANANA RIPENESS CLASSIFICATION VIA THERMAL IMAGING WITH TRANSFER LEARNING

***Senthilarasi Marimuthu (Thiagarajar College of Engineering)*; Md Mansoor (Roomi); kurinji k kannan (thiyagarajar college of engineering); Methira R (Thiagarajar College of Engineering)***

Banana fruit grading is performed manually which may lead to misclassifications resulting in fruit boxes with different maturity stages. The objective is to predict the ripening of the banana fruit using digital thermal imaging and deep learning algorithm. Thermal image analysis were computed from the peel and deep learning process were implemented to predict ripening stage. More specifically, a total of 850 samples from 97 fruits were used for the experiments, and classified into three stages of maturity. After image acquisition and analysis, three color features were extracted and evaluated. The experimental analysis demonstrates that the outcomes exhibit training accuracy of 96.46%. This is then used to obtain a confusion matrix which shows an accuracy of 97.7% and have useful applications for small scale vendors, large scale vendors and export industry. Further the study can be extended to improve the accuracy by using more advanced or customized CNN models.

**ICEMCE-138**

## PRACTICAL APPLICABILITY OF SIMULATIONS IN CLUSTERED MICROGRID SYSTEM DESIGN: A COMPARATIVE ANALYSIS WITH REAL-WORLD DATA

***Raveen Sanjaya De Silva (University of Moratuwa); Reshan Perera (University of Moratuwa); Hasitha Eranga (University of Moratuwa); Nayanajith Kurukulasooriya (Rajarata University of Sri Lanka); Udayanga Hemapala (University of Moratuwa); Gnana Swathika OV (VIT University Chennai)****

Smart grids have been proposed as a solution to the challenges of sustainable rural electrification in most developing countries. The implementation of smart grids was driven by the need to address the growing energy demand, improve the quality of electricity supply, and reduce the environmental impact of the power sector. This study presents a case of a clustered isolated microgrid implementation in Sri Lanka, focusing on its potential for sustainable development. The study reviews the concept of smart grids and their benefits, including improved energy efficiency, reduced carbon emissions, socioeconomic benefits and increased reliability and security of the power supply. The results of the case study show the validation of simulations with actual data and a comprehensive understanding of local constraints which are crucial to ensure the effective performance of clustered microgrid systems and their contribution to sustainable energy solutions in diverse settings. This paper underscores the need to consider the broader operational context of clustered microgrid systems, including technology availability, local resources, and region-specific maintenance practices. Differences in component choices, energy storage technologies, solar PV modules, and customer behavior can significantly affect the performance and economic viability of clustered microgrid systems in real-world applications.

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**ICEMCE-139**

## AIR CANVAS: EXPRESSING CREATIVITY IN THE REAL WORLD WITH OPENCV AND PYTHON

***Shanthalakshmi Revathy J (Velammal College of Engineering and Technology)*; Sanjith Bala B (Velammal College of Engineering and Technology); Suresh A (Velammal College of Engineering and Technology)***

In today's world, online education has become one of the most important and widely used platform as it has spread all over the world. But online learning also has many challenges. One of the most important problems is to focus on the courses taught. To solve this problem, we created an “air canvas” that allows content to be delivered in real space and allows us to draw our needs by holding our fingers in the air. . It works by using a webcam to capture finger movements. It is built using the famous OpenCV library and python. Drawing includes many ways to write, such as using a keyboard, touch screen, digital pen, pencil, electric glove. But in this system, we use gesture recognition and computer vision programming in Python to create natural human-computer interaction

**ICEMCE-140**

## WORK ORDER BASED PRODUCTION SYSTEM FOR PUNCHING MACHINE ANNUNCIATOR

***Suji Prasad S J (Kongu Engineering College, Erode); R Subasri (Kongu engineering college); Thangatamilan M (Kongu Engineering College); GOBISH N (Kongu Engineering college )*; Deepika D (Kongu Engineering College, Erode. ); Harish K (Kongu Engineering college )***

In process industries the punching machines are controlled in manual mode without any limitation and indication. If any emergency situation occurred, the identification of problem is difficult. To overcome this production problem, the work order-based production system punching machine annunciator which works automatically by using AWS Textract and AWS Polly. This will be controlled by Text format to start and stop the machine and the status will convert it into audible indication and will announce through the text annunciator. The work order-based production system for a punching machine annunciator is an efficient and effective way to manage the production. It ensures that each order is processed accurately and efficiently and provides data that can be used to maintain the production data for analysis and to improve the efficient of the production.

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**ICEMCE-141**

## MEASURING THE VOLUME OF SPHERICAL TANK USING LOAD CELL

***Kiruthika G (Kongu Engineering College)*; Aswanth S (Kongu Engineering College); Kirubakaran T (Kongu Engineering College); Venkatesan B (Konngu Engineering College); Suji Prasad S J (Kongu Engineering College, Erode); Maithra S (Kongu Engineering College)***

Spherical tank is a non-linear system to maintain the pressure inside and maintains the fluid in the same state. Measuring the volume of a spherical tank is difficult and still remains as a problem to rese. Hence people are moving towards linear tanks like cylindrical, as the measurement is simple. The volume in linear tanks can be measured with the help of height where as it is difficult in spherical tanks applications as measured. The volume of the spherical tank by measuring the weight of the tank using a load cell. Load cell is connected to Arduino where the program is dumped and the program displays the weight of the tank and also the formula to calculate the volume of the tank. The formula is as follows Volume=Mass / Density. Spherical tank is measured using load cell where load cell is cost effective and is simple to calculate volume with the help of mass. Here, we are also using a leak detector around the tank where leakage can also be detected. Volume can be measured with the help of display.

**ICEMCE-142**

## DISEASE DETECTION BASED ON IRIS RECOGNITION

***Santhalakshmi revathy J (VCET); Yogeshwaran rajkumar (vcet)*; Vishal SK (VCET)***

Disease detection using iris recognition technology has emerged as a transformative paradigm in the realm of healthcare diagnostics. Leveraging the intricate patterns within the iris, this study explores the development and evaluation of a sophisticated machine learning model for disease identification. Through meticulous pre-processing and feature extraction, the iris patterns are translated into a comprehensive set of data points. Utilizing state-of-the-art machine learning algorithms, the model achieves a remarkable accuracy rate, revolutionizing the precision of disease diagnostics. Ethical considerations play a pivotal role in this research, with a strong emphasis on patient privacy and algorithmic fairness. Rigorous anonymization protocols and bias mitigating strategies are integrated, ensuring that patient data is handled responsibly and diagnostic outcomes are equitable across diverse demographic groups. Looking forward, the potential applications of iris recognition in healthcare is vast. From real-time disease detection to secure access control within the medical facilities, the technology's versatility promises transformative shifts in healthcare delivery. Moreover, the integration of iris recognition with telemedicine platforms opening doors for remote diagnostics, bridging healthcare disparities and ensuring accessibility to even the most remote populations.

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**ICEMCE-143**

## EFFICIENT LOAD FORECASTING IN EDUCATIONAL LABORATORY FACILITIES: AN ARIMA AND K-MEANS APPROACH

***Kanishka D (Thiagarajar college of engineering); Kavitha D (Thiagarajar College of Engineering)****

To meet and maintain the current and future commodity energy source needs, adequate maintenance and a review of the energy sources are required. Load forecasting is vital to maintaining an effective Energy Management System (EMS). This research suggests a model for predicting a building's energy use using machine learning algorithms. To identify the pattern of an individual building's energy usage, time series data are clustered using the k-means algorithm. Principle Component Analysis (PCA) is also utilized to perform the appropriate data pre-processing procedures. The Autoregressive Integrated Moving Average Time series (ARIMA) model demonstrated promising results in terms of predicting the model accuracy and is best suited for all types of time-series values used in forecasting methodologies. This model applies the ADF test to determine if the obtained data are stationary. By examining two terms, RMSE and AIC values, the model's correctness is determined. To create an effective Energy Management System and manage an effective Building Management (BM) System, the proposed ARIMA model shows astounding accuracy rates for load forecasting.

**ICEMCE-144**

## ENHANCING HUMAN ACTIVITY RECOGNITION: AN EXPLORATION OF MACHINE LEARNING MODELS AND EXPLAINABLE AI APPROACHES FOR FEATURE CONTRIBUTION ANALYSIS

***Kaushik A R (Thiagarajar College of Engineering)*; Guru Charan K S (TCE); Padmavathi Sakkarai (Thiagarajar College of Engineering)***

Human Activity Recognition (HAR) holds significant importance in people's daily lives due to its capability to extract comprehensive high-level insights into human activities from wearable or stationary devices. Extensive research has been conducted in the field of HAR, where the research community has leveraged various machine-learning approaches for the classification of human activities. In this study, we utilize an Activity of Daily Living (ADL) dataset collected from 30 participants who performed six distinct activities while wearing smartphones equipped with sensors. After partitioning the data into training and testing sets, we employed machine learning models such as the Random Forest Classifier, XGBoost Classifier, Gradient Boosting Classifier, k-Nearest Neighbors Classifier, AdaBoost Classifier, and Support Vector Classifier. Explainable AI (XAI) techniques like LIME and SHAP are used to understand the attributes significantly influencing model predictions. By conducting local interpretations on randomly selected samples for each class, the top 10 influential features were identified. SHAP provided both global and local explanations. These insights shed light on factors impacting predictions, enhancing our grasp of the dataset and model performance. This analysis informs decision-making and offers potential avenues for model improvement.

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**ICEMCE-145**

## HAND GESTURE RECOGNITION SYSTEM USING TRANSFER LEARNING

***Srilakshmi ravali M (Thiagarajar College of Engineering)*; Md Mansoor (Roomi); Dr.Sathyabama B (Thaigarajar College Of Engineering); Senthilarasi Marimuthu (Thiagarajar College of Engineering)***

The field of computer vision and gesture recognition has witnessed the emergence of strong real-time detection systems, spurred by the breakthroughs in deep learning. Nonverbal cues, especially hand gestures, are extremely important in human-vehicle interaction. A novel method for recognizing and classifying hand movements associated with requesting a lift or signaling to stop a vehicle is provided in this study. By utilizing the YOLOv8 (You Only Look Once version 8) paradigm, this research develops a methodical approach to obtain dataset that include a wide variety of typical hand gesture samples in traffic situations. The hand gesture dataset created is then used to train and optimize the YOLOv8 model, allowing for accurate distinction between these two crucial hand movements. The trained model with precision, recall, and a map50 of 78.7%, 75.3%, and 73.1% potentially helps in enabling the monitoring of the driver's conduct for adherence and integrity, enhancing interactions between autonomous cars, promoting road safety, and increasing accessibility for public transportation.

**ICEMCE-146**

## SYNTHESIS OF BIO SPONGE FOR DIABETIC FOOT ULCER

***Nedumal P Pugazhenthi (Dr NGP Institute of technology)*; Vijayakumar K (Dr NGP Institute of technology); Aishwaryashree B (Dr NGP Institute of technology); Akshaya V (Dr NGP Institute of technology); Deepika K (Dr NGP Institute of technology); Anbumani M (Dr NGP Institute of technology)***

A very dangerous consequence of diabetes is diabetic foot ulcer (DFU). Patients with a DFU have skin that is more prone to open sores and more challenging to heal than healthy individuals. Without early treatment, the condition will worsen and frequently result in amputation or even death. A few available ways to treat Diabetic FootUlcers are wound dressings using Hydrogels, Pressure releasing treatments like foot braces, Compression wraps, shoe Inserts, Surgeries and Vascular reconstruction. The majority of existing therapeutic approaches are unable to produce effective wound healing. The major downside of these therapies is that they are inexpensive; nevertheless, hydrogel dressings can induce peri-wound maceration or hyper granulation, as well as adhering to the wound and causing stress to the fragile skin. Inthis manuscript, an effort is made by the authors to develop an all-natural composite bio sponge that could heal the DFU using sodium alginate (SA). The research community has widely expressed the qualities of such similar bio sponges which include biocompatibility and non-toxicity in using biopolymer like sodium alginate in various biomedical applications as it has a good track record of healing DFUs.These bio sponges can bemodified by usingdifferent materials with wound-healing-friendly characteristics. Alginate isutilized to producevarious wound dressing materials, including alginate, hydrocolloid, hydrogel, foam, wafers, film dressings and nano fibers. Alginate wound dressings can minimize bacterial infections at the wound site by maintaining a physiologically moist environment, and absorb extra wound fluid.

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**ICEMCE-147**

## AI-POWERED DRIVER BEHAVIOR PREDICTION, DRUNK DRIVING PREVENTION, ACCIDENT DETECTION, AND INSURANCE INTEGRATION

*Nandini G. Iyer (Rajalakshmi Engineering College)*; Arulmozhi Muruganantham (Rajalakshmi Engineering College); Sivakumar P (Rajalakshmi Engineering College); Sudharsan S (Rajalakshmi Engineering College (REC), Chennai); Jeny Sophia S (Rajalakshmi Engineering College); Kavitha Ravi (Rajalakshmi Engineering College (REC), Chennai)*

According to CADD (The Community Against Drunk and Drive), 70% of road accidents in India occur due to drink and drive. This novel design ensures that the vehicle does not start unless the rider wears the helmet and passes the alcohol test. The accident detection system placed in the bike, senses the occurrence of an accident using a vibration sensor and passes the signal to Arduino and then the controller extracts the location and time of accident and sends to the cloud and also to the emergency number. If the rider is detected with alcohol the buzzer goes on and with the help of PWM, the speed is reduced slowly and then only the bike stops. The additional feature of the proposed model is that speed, time stamp and location of the accident that is uploaded to the cloud can be accessed by the concerned insurance company to decide if the victim is eligible for insurance. A core enhancement in the proposed design is real-time driver behavior prediction using machine learning analytics. It analyzes speed, acceleration and distance to vehicles to detect risky behavior patterns, issuing timely warnings to promote safer practices and minimize accident risks.

**ICEMCE-148**

## KEYLOGGER DEVELOPMENT: TECHNICAL ASPECTS, ETHICAL CONSIDERATIONS, AND MITIGATION STRATEGIES

*Nongmeikapam Thoiba Singh (Chandigarh University)*; Aditya Shukla (Chandigarh University); Ajay Nagar (Chandigarh University); Kartavya Arya (Chandigarh University); Ashwani Tiwari (Chandigarh University); Yash Varun (Chandigarh University)*

Keyloggers, software that records keystrokes on devices, have raised concerns about their dual utility in lawful and illicit contexts. This study explores the intricate landscape of keylogger development, encompassing technical foundations, ethical implications, and countermeasures. The paper begins by introducing keylogger technology, differentiating hardware and software types, and explaining recording techniques. Technical aspects, including low-level keyboard hooks, kernel-mode drivers, and API hooks, are discussed, with a focus on evading detection in compromised systems. Ethical facets are pivotal, contrasting malicious uses like espionage and identity theft with legitimate applications such as employee monitoring. The study probes conflicts between privacy, security, and ethical usage. Effective mitigation strategies are then detailed, evaluating detection methods from signatures to behavioural analysis. The role of education in countering keylogger threats is underscored. Through case studies, technical exploration, ethical insights, and precautions, this paper offers a comprehensive grasp of keylogger development.

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**ICEMCE-149**

## ENERGY EFFICIENT EV CHARGER USING BRIDGELESS CANONICAL CONVERTER WITH IMPROVED POWER QUALITY

*Muhammed Alaudeen Ashiq M (Thiagarajar College Of Engineering)*; Jessi Sahaya Shanthi L (Thiagarajar College Of Engineering); Sivasankar G (Thiagarajar College Of Engineering)*

Electric vehicles (EVs) imply an optimistic option for efficient and renewable transport technology. EVs are rising and renowned places as they are the surge of the fortune for conveyance. The increasing interest in EVs carries engagement towards the evolution of charging infrastructure. As the number of electric car charging stations grows to accommodate the expanding market, the harmonic pollution of electric vehicle chargers is rapidly increasing. The commercial proliferation of EVs poses additional complications for the power system's regular processes. Electric vehicle deployment in distribution networks gives several power quality control issues, including harmonic emissions. An Artificial Neural Network (ANN) based Electric vehicle charger has been proposed and implemented. This charger will provide improved power quality and mitigates power quality issues. It consists of a canonical switching converter and a buck-boost converter. This charger is more efficient as it draws power with a power factor close to unity. The developed EV charger can reduce the total harmonic distortion and improve the power quality. The simulation of the charger using ANN control is done and compared with the PID controller.

**ICEMCE-150**

## DEEP LEARNING-BASED WOMAN HAIRSTYLE CLASSIFICATION THROUGH INCEPTION RESNET-101

*Faazelah Mohamed farook ( Thiagarajar College of Engineering ) Md Mansoor ( Roomi ) jayanthi rajee R B ( Thiagarajar college of engineering ) Sasithradevi Anablagan ( Vellore Institute of Technology)*

Artificial intelligence and computer science's computer vision field is revolutionizing a number of industries, including healthcare, automotive, agriculture, security, and entertainment, by enabling robots to assess visual input. For tasks like object detection, classification, and 3D reconstruction, it makes use of methods from the fields of image processing, machine learning, deep learning, and pattern recognition. One promising application of this technology is the classification of hairstyles using pre-trained networks, which can be used for the detection of criminals who may be using certain hairstyles as a form of disguise or it can be used to identify a person through CCTV surveillance for further investigations. In this paper, a study using the performance of Inception Resnet 101, a popular learning architecture has been used for the classification of several common hairstyles. These hairstyles include ‘Bald’, ‘Braids’, ‘Free Hair’, ‘Pony Tail’ and ‘Short Hair’. Validation accuracy of about 89.7% and testing accuracy of 95.6% has been achieved. This approach demonstrates that the model can attain high accuracy even in the face of difficult real-world circumstances, such as changes in illumination, angles, and distances. A few of the industries that need to take this into account are marketing, trend analysis, and customized haircuts. Approaches utilizing computer vision and artificial intelligence facilitate innovation, enhance decision-making, and enhance the user experience.

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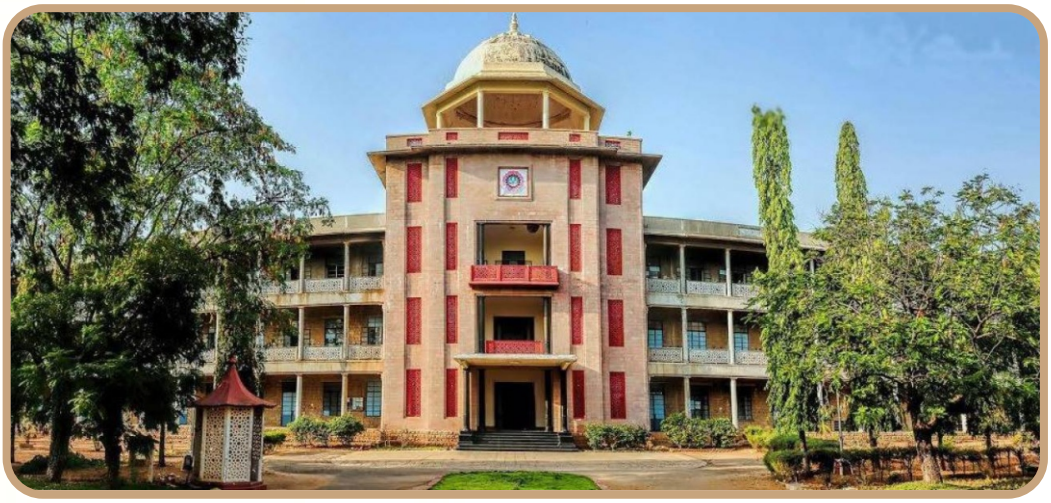

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