NEW HORIZON
COLLEGE OF ENGINEERING

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

AUTUMN TRONICALS

JULY - DECEMBER 2024

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Message from Chairman

Dr. Mohan Manghnani

Chairman of New Horizon Educational Institutions

It gives me great pleasure to pen my thoughts for the Autumn Edition of our Biannual EEE magazine. The Department of Electrical and Electronics Engineering continues to be a cornerstone of excellence within our Institute, showcasing dynamism, innovation, and a commitment to nurturing talent.

Our Institute has embarked on transformative changes in curriculum design and pedagogy, and I am proud to see the EEE Department leading the way with its proactive approach. The introduction of updated course structures for senior undergraduate and first-year students reflects our dedication to staying ahead of the curve in this ever-evolving field. We eagerly await constructive feedback from all stakeholders to fine-tune these advancements for the betterment of our academic journey.

What makes this magazine truly special is the platform it provides to our students and faculty for exploring and sharing their creative pursuits, technical insights, and research endeavors. The diverse contributions here are a testament to the talent and enthusiasm that define our EEE community.

My best wishes to the editorial team and contributors for putting together yet another inspiring edition. Let this magazine ignite curiosity, spark innovation, and celebrate the spirit of our vibrant EEE Department.

Message from Principal

Dr. Manjunatha

Principal
New Horizon College of Engineering

At New Horizon College of Engineering, we strongly believe in nurturing well-rounded Engineers who are not only technically proficient but also equipped with the critical skills required to excel in today's dynamic industries. With constant feedback from industry experts, we understand the growing need to bridge the gap between academic learning and employability. Our institution is committed to addressing this challenge through innovative teaching methodologies, skill enhancement programs, and holistic development initiatives.

It brings me immense joy to introduce the latest edition of the EEE Department's in-house magazine, "Autumn Tronicals." This thoughtfully crafted edition serves as a window into the vibrant activities of the Department, featuring an inspiring collection of technical articles, achievements, and event highlights. It stands as a testament to the creativity, hard work, and passion of our students and faculty.

I extend my heartfelt congratulations to the Editorial Team and all contributors for their dedication and effort in bringing this publication to life. May this magazine inspire and engage readers while reflecting the spirit of innovation and excellence that defines the EEE Department.

Wishing you all an enlightening and enjoyable reading experience.

Message from HoD-EEE

Dr. Sakthivel Aruchamy
Professor & HoD EEE, NHCE

It is with great pleasure that I share my thoughts for the Biannual Edition of our EEE magazine, "Autumn Tronicals 2024." The Department of Electrical and Electronics Engineering has long been recognized as one of the most vibrant and forward-thinking Departments in our Institute, and it continues to inspire pride and admiration.

In keeping with the evolving needs of the industry and academia, our institution has initiated several key reforms in curriculum design and course structures. The EEE Department has enthusiastically adopted these changes, confident that they will greatly enhance the learning experience and career prospects of our students. These updated course plans are now shaping the academic journeys of both first-year students and senior undergraduate cohorts, and we eagerly look forward to receiving valuable feedback to refine them further.

What truly sets this magazine apart is its role as a creative and intellectual platform. It showcases the diverse talents of our students, whether through technical articles, innovative projects, or artistic expressions. Equally, it serves as a stage for our faculty and students to exchange ideas and insights from their research pursuits, fostering a culture of learning and collaboration.

I extend my heartfelt congratulations to the Editorial Team and all contributors for their hard work and dedication in bringing this publication to life. May this edition inspire, inform, and reflect the excellence that defines the EEE Department.

Wishing you all the very best in this endeavor and beyond!

NEW HORIZON COLLEGE OF ENGINEERING

VISION

To emerge as an institute of eminence in the fields of Engineering, Technology and Management in serving the industry and the nation by empowering students with a high degree of technical, managerial and practical competence.

MISSION

To strengthen the theoretical, practical and ethical dimensions of the learning process by fostering a culture of research and innovation among faculty members and students.

To encourage long-term interaction between the academia and industry through their involvement in the design of curriculum and its hands-on implementation.

To strengthen and mould students in professional, ethical, social and environmental dimensions by encouraging participation in co-curricular and extracurricular activities.

QUALITY POLICY

To provide educational services of the highest quality both curricular and co-curricular to enable students integrate skills and serve the industry and society equally well at global level.

VALUES:

- Academic Freedom
- Inclusiveness
- Professionalism
- Integrity
- Innovation
- Social Responsibility

ABOUT THE DEPARTMENT

Welcome to the Department of Electrical & Electronics Engineering (EEE) at New Horizon College of Engineering (NHCE), Bangalore. EEE is one of the prestigious branches of Engineering and one among the oldest Departments of NHCE-Bangalore. The EEE Department has been playing a vital role in producing engineers and technologists of high caliber ever since it was established in the year 2001. The Department is accredited by NAAC with 'A' Grade and accredited by NBA. The vision of EEE Department is to create contemporary Engineers, innovators and entrepreneurs to make a better nation and in turn, a better world. A critical investigation and innovation into the modern state-of-the-art and cutting edge technology lead to the fact that an electrical graduate fits better in today's competitive world.

The strength of the Department is highly qualified faculty members with expertise in various fields of Electrical Engineering, state of the art laboratory facilities. The Department is inclined towards bridging the gap between Industry and Academia by collaborating with Multinational Companies in the field of Electrical Engineering.

Indo-French Center of Excellence in Electricity, Automation and Energy (IFCEEAE) is one such initiative evolved through "MoU" with French Ministry of National Education and Schneider Electric India Pvt. Ltd., The main objectives of IFCEEAE are

- To train the students of all streams of Engineering in Automation field.
- To facilitate interdisciplinary and applied research with a focus on innovative product development .
- To provide excellent career opportunities to students through Exchange Programs with French Universities, Industrial Training, Innovative learning and R & D activities especially in the areas like Smart Grid, Internet of things (IoT), Energy Management Systems, Embedded Systems, Supervisory Control and Data Acquisition (SCADA) and Industrial Automation.

The Department nurtures the young minds beyond the curriculum by facilitating technical clubs in promoting technical events, community development/society impact and universal value/ethics programs. In supporting this, Department of Electrical and Electronics Engineering has established Institute of Electrical and Electronics Engineers (IEEE) – Power Electronics Society (PELS) Student Branch Chapter (Geo-Code: SBC66131). Industrial Electronics Society (IES) Student Branch Chapter (Geo-Code: SBC66131B). Power and Energy Society (PES) Student Branch Chapter (Geo-Code: SBC66131D). which is the non- profitable, world's largest technical professional organization for the advancement of technology. The students have a greater exposure and flexibility in campus placements in core industries, IT sectors and Public Sector Units (PSU).

VISION

To evolve into a Centre of Excellence in Electrical and Electronics Engineering for bringing out contemporary engineers, innovators, researchers and entrepreneurs for serving the nation.

MISSION

- To provide suitable forums to enhance the teaching-learning, research and development activities.
- Framing and continuously updating the curriculum to bridge the gap between industry and academia in the contemporary world and serve society.
- To Inculcate Awareness and responsibility towards the environment and ethical values.

PROGRAM OUTCOMES (POS)

PO1: Engineering Knowledge: Apply the knowledge of Mathematics, Science, Engineering fundamentals and an Engineering specialization to the solution of complex Engineering problems in Electrical and Electronics Engineering.

PO2: Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems in Electrical and Electronics Engineering reaching substantiated conclusions using first principles of Mathematics, Natural Sciences, and Engineering Sciences.

PO3: Design / Development of Solutions: Design Solutions for complex Engineering problems and Design System components or processes of Electrical and Electronics Engineering that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct Investigations of Complex Problems: Use Research-based knowledge and research methods including design of experiments in Electrical and Electronics Engineering, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and Modern Engineering and IT tools including prediction and modelling to Complex Engineering activities in Electrical and Electronics Engineering with an understanding of the limitations.

PO6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Engineering practice in Electrical and Electronics Engineering.

PO7: Environment and Sustainability: Understand the impact of the professional engineering solutions of Electrical and Electronics Engineering in societal and environmental contexts, and demonstrate the knowledge of and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of Engineering practice.

PO9: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication Skills: Communicate effectively on complex Engineering activities with the Engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of Engineering and Management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: To provide good learning environment, to develop entrepreneurship capabilities in various areas of Electrical and Electronics Engineering with enhanced efficiency, productivity, cost effectiveness and technological empowerment of Human Resource.

PEO2: To inculcate research capabilities in the areas of Electrical and Electronics Engineering to identify, comprehend and solve problems and adopt themselves to rapidly evolving technology.

PEO3: To create high standards of moral and ethical values among the graduates to transform them as responsible citizens of the nation.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Graduates will be able to solve real life problems of Power System and Power Electronics using MiPower, PSPICE and MATLAB software tools and hardware.

PSO2: Graduates will be able to develop and support systems based on renewable and sustainable Energy sources.

EDITORIAL TEAM

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Senior Assistant Professor EEE, NHCE

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CLUB ACTIVITIES

Unlocking Potential: Unleash Your Inner Developer, Unlock the Future!

09.07.2024

The New Horizon College of Engineering had organized a social and technical outreach program titled “Unlocking Potential: Unleash Your Inner Developer, Unlock Future,” in collaboration with the Green Energy Club and the FOSS Club at Government Higher Primary School in Ibbalur on 09/07/2024. The initiative aimed to educate young students about green energy, renewable resources, energy conservation, and computer-related topics. The program focused on nurturing the next generation of leaders by promoting both social and technical skills. By integrating green energy principles and free open-source software (FOSS), the event highlighted the importance of sustainable practices and technological innovation. By combining the expertise of the Green Energy Club and the FOSS Club, the outreach program represented a unique and powerful collaborative effort. The Green Energy Club, with its focus on sustainable practices and renewable energy solutions, brought valuable insights into environmental conservation and the importance of green technologies.

Workshop-Scratchpad
14.11.2024 to 22.11.2024

From November 14th to 22nd, 2024, an insightful series of events was organized, focusing on various aspects of Electrical Engineering, 3D Design, and renewable energy. The objective was to introduce principles of microchip design and large-scale electrical systems, emphasizing the importance of protective devices in circuit design. Participants gained foundational knowledge of advanced electronics and electrical systems used in the industry. Attendees were capable of creating realistic and functional 3D models and gained hands-on experience in converting 3D models into tangible objects, learning the operational principles of 3D printers and the advantages of rapid prototyping.

Field Visit to Jakkur Lake: A Step towards Sustainability
27.11.2024

The Green Energy Club, in collaboration with the Institution's Innovation Council (IIC), organized a transformative field visit to Jakkur Lake on 27th November 2024. The visit aimed to immerse students in real-world challenges while promoting innovative problem-solving aligned with the United Nations Sustainable Development Goals (UN SDGs). Participants, including students and faculty, engaged in hands-on activities and observations at Jakkur Lake, a vital ecological hub. The agenda included studying lake ecosystems, identifying pressing environmental issues, and brainstorming technological interventions to address them. Discussions focused on critical topics such as water quality, biodiversity, and renewable energy integration.

Key Takeaways

- Real-World Problem Identification: Students identified challenges such as pollution, inefficient waste management, and the lack of renewable energy infrastructure.
- Technological Applications: Explored possibilities for implementing

IoT-based water quality sensors, solar-powered tools, and waste-to-energy systems.

- Collaboration for SDGs: Highlighted the power of interdisciplinary teamwork in crafting sustainable solutions.

Impact

The visit provided a platform for students to observe and analyze ecological challenges, fostering critical thinking and a problem-solving mindset. It reinforced the institution's commitment to sustainability and inspired participants to contribute meaningfully to global goals. Through such initiatives, the college continues to nurture environmentally conscious innovators ready to tackle the world's pressing issues.

SEMINARS AND WORKSHOPS

Workshop on IPR in Electrical Engineering

06.09.2024

Department of Electrical and Electronics Engineering, in association with the Department of Research and Development – IPR Cell, IIC-NHCE and IEEE IES student branch Chapter, NHCE had organized a workshop on IPR in Electrical Engineering on 06/09/2024 for all the Teaching and Non-Teaching staff of the Department to focus on obtaining and publishing patents. The session's speaker, Dr. Agalya V, Head-IPR Cell, department of R&D, NHCE, took the stage to deliver an interactive, hands-on workshop focused on identifying the novelty of a product before filing, along with tips and best practices for securing a patent or design grant. She clearly outlined all the steps in filing a patent, making the presentation accessible and easy to understand for the audience.

Motivational Session - From Idea to Impact
07.11.2024

The Institutional Innovation Council (IIC) and the Department of Electrical and Electronics Engineering organized an inspiring session "From Idea to Impact" on 7th November 2024. The keynote speaker, Dr. Siddharth Nair, a distinguished entrepreneur and founder of Zeuron.ai, shared insights from his 17 years of experience in startups and research in the fields of Medical Technology and Artificial Intelligence. Dr. Nair highlighted the significance of innovation and smart strategies over sheer hard work, captivating the audience with his expertise in neuromorphic computing, healthcare technology, and entrepreneurial success. The session also explored opportunities for potential investments, consulting projects, and collaborations with his firm, sparking interest among attendees. The event received enthusiastic feedback, with participants expressing keen interest in future workshops on similar topics, underlining its success in inspiring innovation and fostering collaboration.

Workshop-Industrial Power Quality Audit and Its Benefits
15.11.2024

The Department of Electrical and Electronics Engineering at NHCE organized a workshop on "Industrial Power Quality Audit and Its Benefits" on 15th November 2024. The event was held in association with the IEEE Power and Energy Society Bangalore Chapter and IEEE PES NHCE SBC. Dr. N. Prasanna, Proprietor and BEEE-certified Energy Manager at Pranav Clean Energy Engineers, Chennai, served as the resource person. He provided insightful sessions on the

fundamentals of power quality, the significance of power Quality Management, and the challenges faced in this domain. The workshop also featured a live demonstration of power quality auditing instruments, conducted by experts from Fluke, Bangalore, enriching the learning experience for all participants.

Webinar on Advanced Data Structures

23.11.2024

The EEE Department organized a webinar on Advanced Data Structures on Saturday, November 23rd, 2024. Mr. S. Sathish, a Project Engineer at Pantech E-Learning, served as the resource person. The session aimed to provide an in-depth understanding of advanced data structures, focusing on their applications, optimizations, and usage in solving complex software development problems. The webinar offered a comprehensive overview of advanced data structures and their crucial role in addressing real-world computational challenges. Mr. Sathish's extensive knowledge and practical insights helped participants gain a deeper understanding of both the theoretical and applied aspects of data structures.

EXPERT TALKS/ GUEST LECTURERS/ GUEST TALKS

Guest Lecture on Advanced Technologies in Electrical Engineering
12.11.2024

In collaboration with IEEE PES Bangalore Chapter, the Department of Electrical and Electronics Engineering organized an insightful guest lecture on "Advanced Technologies in Electrical Engineering" on Tuesday, November 12th, 2024. The event was organized under the aegis of IEEE PES NHCE SBC.

Dr. Z.H. Sholapurwala, Managing Director of Zeonics Systech, Defence and Aerospace Engineers Pvt. Ltd, Bengaluru, led the session. His expertise brought a wealth of knowledge to the audience, offering a deep dive into advancements shaping the future of electrical engineering. Dr. Sholapurwala captivated students with live demonstrations of various electrical components from his lab.

He explained their applications and showcased the functioning of several working models, bridging the gap between theoretical concepts and real-world implementations.

The lecture provided an excellent platform for students to explore current and emerging trends in the field, leaving them with a comprehensive understanding of cutting-edge Electrical Engineering technologies. The session was highly appreciated for its practical insights and engaging content.

Guest Talk-Campus to Corporate Connect: Technical Skills
14.11.2024

The Department of Electrical and Electronics Engineering, in collaboration with IEEE PELS NHCE SBC and IEEE PELS Bangalore Chapter, organized a guest lecture "Campus to Corporate Connect: Technical Skills" on Friday, November 14th, 2024. The session was led by Mr. Jyothinath Vanne, Senior Managing Director at Synergetic Software Engineering and Consultancy Services Pvt Ltd, headquartered in Bengaluru. The lecture provided students with valuable insights into navigating the transition from campus to corporate life, emphasizing the importance of honing technical skills. It encouraged participants to reflect on

their motivations for pursuing placement opportunities and underscored the need to continuously upgrade their skillsets to meet industry standards.

Guest Lecture-Study Abroad Strategy Session
22.11.2024

The Department of Electrical and Electronics Engineering, in collaboration with IEEE PES NHCE SBC and IEEE PES Bangalore Chapter, organized a Guest Lecture on "Study Abroad Strategy Session" on November 22nd, 2024. Ms. Salome Rachana, an English Specialist and Verbal Trainer at Jamboree Education, conducted the session alongside Ms. Namratha, the City Head of Bangalore at Jamboree Education. The session equipped students with valuable tools and strategies to navigate their study abroad journey confidently, making it a truly enriching experience.

Expert Talk-Powering the EV solutions: Battery swapping,
BaaS and Capacity Management
22.11.2024

The Department of Electrical and Electronics Engineering organized an expert talk on "Powering the EV Solutions: Battery Swapping, BaaS, and Capacity Management" on Friday, November 22nd, 2024, .Dr. Mohan Krishna S, a distinguished individual with 13 years of experience in industrial Consulting and Research Projects in Sustainability, Electric Mobility, and Energy Management, led the session. Dr. Mohan Krishna is currently associated as Manager – Research, with the TCI-IIMB Supply Chain Sustainability Lab at the Supply Chain Management Center (SCMC), IIMB. The expert talk covered topics such as electric vehicle battery management and swapping systems, and included a case study on Sun Mobility.

Guest Talk- Technological Advancements in Electric Vehicles
03.12.2024

The Department of Electrical and Electronics Engineering organized a guest lecture on Technological Advancements in Electric Vehicles on Friday, 3rd December 2024, from 10:30 AM to 2:00 PM. The session was led by Mr. Venkata Vinod Pasumarthi, a seasoned professional in Program Management and Product Strategy at Ather Energy. With extensive expertise in electric vehicles, powertrain systems, embedded systems, and software development across the frontend and backend, Mr. Pasumarthi provided valuable in sights.The talk delved into key topics, including electric vehicle battery management and swapping systems, and featured an engaging case study on Sun Mobility, offering attendees a deeper understanding of cutting-edge EV technologies.

Guest Talk-Exciting Opportunities in Energy Management and Automation Industry
06.12.2024

The Department of Electrical and Electronics Engineering (EEE), in collaboration with Automation and Energy (IFCEEAE) and Schneider Electric, hosted a highly anticipated guest talk titled “Exciting Opportunities in Energy Management and Automation Industry” on 6th December 2024. The event featured Mr. Sai Krishna Rao, the Head of Education Equipment Services at Schneider Electric India, as the guest speaker. With extensive experience in the energy industry, Mr Rao shared his expertise on global trends, challenges, and solutions in Energy Management and Automation, highlighting Schneider Electric’s pivotal role in driving technological advancements and sustainability in the industry. The session emphasized the critical role of innovation, sustainability, and cutting-edge technology in shaping the future of the energy sector. The session also strengthened the partnership between New Horizon College of Engineering and Schneider Electric, fostering a collaborative environment for future academic-industry initiatives.

INDUSTRIAL VISITS

Industrial Visit on DC Machines and Transformers
09.11.2024

The IEEE Power Electronics Society NHCE Student Branch Chapter from the Department of EEE, in collaboration with the IEEE PELS Bangalore Chapter, organized an industrial visit on “DC Machines and Transformers” on November 9th, 2024, at Rajamane & Hegde Services Pvt Ltd, Tumkur. Established in 1975 by Mr. S.K. Rajamane, a former Design Engineer for rotating machines at Kirloskar Electric, the company leads in the repair and servicing of large LT/HT-AC/DC electric motors, generators, and servo motors. Recognized by several global and original equipment manufacturers as their authorized service partners in India, Rajamane & Hegde Services operates advanced facilities in Bengaluru, Tumkur, and Hubli. This visit provided students with valuable industry exposure, enabling knowledge exchange on the latest advancements in electrical machines.

Industrial Visit- Shivanasamudra Hydro Power Plant
11.11.2024

On November 11th, 2024, the Department of Electrical and Electronics Engineering at New Horizon College of Engineering organized an enriching industrial visit for 5th semester, Section-A, EEE students. A group of 60 students, accompanied by a faculty member and a lab technician, explored the Shivanasamudra Hydro and Solar Power Plant in Mandya, Karnataka.

The Shivanasamudra Hydro Plant, established in 1902, proudly stands as Asia's first hydroelectric facility, with a capacity of 42 MW. The visit also included insights into the Shimsha Hydel Plant (17.2 MW), the Solar Plant (10 MW), and the Cauvery Hydro Plant (3 MW). Guided by Mr. Saurav, a technician at the facility, students gained valuable knowledge about the intricacies of power generation, enhancing their practical understanding of renewable energy systems.

Industrial Visit - Shivanasamudra Hydro and Solar Power Plant
12.11.2024

The Department of EEE at New Horizon College of Engineering organized an industrial visit to the Shivanasamudra Hydro and Solar Power Plant in Mandya, Karnataka, on Tuesday, November 12th, 2024, for 5th semester EEE students. Shivanasamudra is home to Asia's first hydroelectric plant, established in 1902 by the Government of Karnataka, with a power generation capacity of 42 MW. Additionally, the solar power plant, maintained by Bharat Heavy Electricals Limited (BHEL) under Power Corporation, Karnataka, is a 10 MW facility divided into three parks with capacities of 3.5 MW, 1.5 MW, and 5 MW. These parks are integrated into a common power station using SCADA supervisory and cloud technologies, making it a unique and pioneering power facility.

Industrial Visit on DC Machines and Transformers
23.11.2024

The IEEE Power Electronics Society NHCE Student Branch Chapter, in collaboration with the IEEE PELS Bangalore Chapter, organized an Industrial Visit on "DC Machines and Transformers" on November 23, 2024, at Rajamane & Hegde Services Pvt Ltd, Tumkur. Founded in 1975 by Mr. S.K. Rajamane, a former Design Engineer of rotating machines at Kirloskar Electric, the company is a pioneer in the repair and servicing of large LT/HT AC/DC electric motors, generators, and servo motors. Recognized as a trusted service partner by numerous global and OEM manufacturers, Rajamane & Hegde Services operates state-of-the-art facilities in Bangalore, Tumkur, and Hubli, setting industry benchmarks in quality and expertise.

Industrial Visit to Karnataka Hybrid Micro Devices Limited (KHMDL)
05.12.2024

On December 5th, 2024, the Department of EEE had organized an industrial visit for 7th semester students to Karnataka Hybrid Micro Devices Limited (KHMDL). Sixty students, a faculty member, and a lab technician participated. KHMDL, established in 1992, is a leader in hybrid microcircuits for various sectors including defence, healthcare, automotive, and aerospace. The visit included an overview of production processes, quality assurance procedures, and product applications, emphasizing the company's commitment to innovation and reliability.

Industrial Visit-Zeonics Systech Defence and Aerospace Engineers Pvt. Ltd
16.12.2024

The Department of Electrical and Electronics Engineering (EEE) organized an insightful industrial visit for 7th semester students to Zeonics Systech Defence & Aerospace Engineers Pvt. Ltd., Bangalore on 16th December 2024. Thirty students participated in this visit to Zeonics Systech, a prominent organization renowned for its expertise in designing, developing, and manufacturing cutting-edge defence and aerospace systems. The company is celebrated for pioneering innovations in electronic warfare, radar systems, and high-precision components essential for strategic applications. This visit allowed the students to witness firsthand the advanced technologies and processes employed in the Defense and Aerospace industry, enhancing their understanding and instilling a sense of hope and motivation for their future career aspirations.

Industrial Visit-Dynaelectric Equipment Ltd
16.12.2024

The Department of Electrical and Electronics Engineering, in collaboration with IEEE PELS NHCE SBC and IEEE PELS Bangalore Chapter, organized an industrial visit to "Dynaelectric Equipment Ltd" on December 16th, 2024, for 4th year EEE students. The visit offered practical insights into transitioning from campus to industry, focusing on transformer design and core industrial skills. Students learned about technical training, resources, and support systems to become industry-ready engineers. They articulated their placement goals, explored the skill gap between academia and industry, and gained specialized training on various transformer designs. The visit was invaluable in equipping students with essential technical skills for industry-oriented careers.

TEDx TALKS

17.10.2024 & 18.10.2024

The Department of Electrical and Electronics Engineering (EEE) organized a TEDx Talk (Recorded) event on the 17th and 18th of October for students of the 3rd, 5th, and 7th semesters. The event featured influential speakers sharing visionary insights on the future of technology and energy.

Day 1 (October 17th):

The session featured Mr. Vinod Khosla, who presented "12 Predictions for the Future of Technology." His talk explored the rapid pace of technological innovation and the profound changes we can expect in the coming years, including advancements in AI, renewable energy, and healthcare, inspiring students to think critically about their role in shaping this future.

Day 2 (October 18th):

The second day began with Mr. Julio Friedmann's talk on "How to Harness Abundant, Clean Energy for 10 Billion People." He delved into the challenges and opportunities of creating sustainable energy solutions for a rapidly growing global population. Following this, Mr. Ramez Naam presented "A Faster Way to Get to a Clean Energy Future," offering practical insights into accelerating the transition to clean energy through innovation and policy reforms. Both days provided students with thought-provoking ideas on the intersection of technology and sustainability, fostering a deeper understanding of the future's challenges and opportunities in engineering.

CO-CURRICULAR ACTIVITIES

Coding Contest #1

09.11.2024

The Department of Electrical and Electronics Engineering at New Horizon College of Engineering, in collaboration with the IEEE PES NHCE SBC (Geo Code: SBC66131D), hosted a coding contest on November 9th, 2024. The event took place in two sessions: the first from 9:30 AM to 12:30 PM and the second from 1:00 PM to 4:00 PM, specifically for 5th-semester EEE students. During the contest, participants solved three complex coding problems, each accompanied by seven test cases for validation. Competitors were free to use any programming language they preferred. To maintain the integrity of the contest, invigilators were present to ensure accurate test case validation, assess code efficiency, and document completion times. Winners were determined based on their accuracy, speed, and time complexity in solving the problems.

ACHIEVEMENTS

Pictionary event held at NISARG – 2024

10.07.2024

Roshan P (1NH22EE093) and Kavin N (1NH22EE058), Semester 4-B students of the EEE Department, New Horizon College of Engineering has demonstrated exceptional skills in the Pictionary event held at NISARG – 2024, an intercollegiate cultural fest organized by the SATRANG Cultural Club, New Horizon College,

Kasturinagar, on 10th July 2024, and won first prize in the competition. Their success is a testament to their hard work and dedication.

State Level Powerlifting Championship
10.07.2024 to 11.07.2024

Yashas R. Yadav (1NH21EE126) from the Department of Electrical and Electronics Engineering (6th semester, B section) has won 3rd place in the VTU State Level Intercollegiate (M&W) Powerlifting Championship 2024–2025. His commitment, strength, and perseverance have paid off in a big way

Student Achievement in Table Tennis, Women State Level Tournament/Competition
18.07.2024 to 20.07.2024

Shreya N (1NH22EE101) from the Department of Electrical and Electronics Engineering, New Horizon College of Engineering (4th Semester, B – Section) has won 3rd place in the Table Tennis, VTU Inter Collegiate Women State Level Tournament / Competition held at Vidyavardhaka College of Engineering, Mysuru from 18.07.2024 to 20.07.2024.

Shreya N (1NH22EE101) from the Department of Electrical and Electronics Engineering, New Horizon College of Engineering (4th Semester, B – Section) has secured Winner place in the Table Tennis, VTU Inter Collegiate Bangalore Central division level Tournament / Competition held at BMS College of Architecture, Bangalore from 01.07.2024 to 02.07.2024.

Electric Bike Design Challenge (EBDC 4.O)
24.09.2024 to 27.09.2024

We are thrilled to celebrate the outstanding achievements of our students in the field of electric bike design. Their innovative spirit and dedication have led to remarkable accomplishments, showcasing their talent and hard work. The following EEE students of New Horizon College of Engineering were involved in this Electric Bike Design Challenge (EBDC 4.O):

K Jagan (USN: 1NH22EE055)
Kavin N (USN: 1NH22EE058)
Preetham Raj S (USN: 1NH22EE081)
R Gagana (USN: 1NH22EE085)
Roshan P (USN: 1NH22EE093)
Sudeep Kumar Dutta (USN: 1NH22EE108)
Tirotaman K (USN: 1NH22EE120)
Srinivas Abinay Gandla (USN: 1NH21EE112)
Shashank B S (USN: 1NH21EE107)

Event name: Electric Bike Design Challenge (EBDC 4.O)
Venue: Sri Ramakrishna Institute of Technology, Coimbatore, India

Awards won:
(i) Best in Endurance – Cash prize- Rs 5k
(ii) Best Innovation – Cash prize- Rs 5k
We are incredibly proud of our students' achievements and look forward to seeing their continued success.

Best Innovation Award in RIDE'2024 National Level E-bike competition at Karpagam College of Engineering, Coimbatore
04.10.2024

Team Akruth, students from the Department of Electrical and Electronics Engineering, New Horizon College of Engineering, Bangalore, participated in the RIDE'2024 National Level E-bike competition held on 04.10.24 at Karpagam College of Engineering, Coimbatore, Tamil Nadu, and won the Best Innovation Award

1. K Jagan (USN:1NH22EE055)
2. Kavin N (USN: 1NH22EE058)
3. Preetham Raj S (USN: 1NH22EE081)
4. R Gagana (USN: 1NH22EE085)
5. Roshan P (USN: 1NH22EE093)
6. Tirotaman K (USN: 1NH22EE120)

VTU Basket Ball (Men) Inter Collegiate Tournament
17.10.2024 to 18.10.2024

Rakshan L (1NH21EE093) has demonstrated outstanding performance in VTU Basket Ball (Men) Inter Collegiate Bangalore Central Division Level and State Level Tournament, held at New Horizon College of Engineering. His remarkable achievements are as follows:

1. Rakshan L (1NH21EE093) has secured the Runnerup position in the VTU Basket Ball (Men) Inter-Collegiate Bangalore Central Division Level Tournament held at New Horizon College of Engineering from 17th October to 18th October 2024.
2. Rakshan L (1NH21EE093) has secured Third place in the VTU Basket Ball (Men) Inter-Collegiate Bangalore Central Division Level Tournament held at New Horizon College of Engineering from 19th October to 21st October 2024.

These accomplishments highlight Rakshan's skill, dedication, and sportsmanship in basketball. Congratulations to him for his commendable success!

Short Movie Making - SARGAM-24
29.11.2024 to 30.11.2024

Mohmmad Arsalan Wani (1NH22EE408) secured first place in the Short Movie Making event at SARGAM-2024, a prestigious national-level inter-collegiate cultural festival. The event took place at New Horizon Knowledge Park in Bengaluru on November 29th and 30th, 2024. His exceptional creativity and filmmaking skills distinguished him from many talented participants, earning him this esteemed recognition. Congratulations to Mohmmad Arsalan Wani on this outstanding achievement!

Dr. M S Ramaiah Memorial State Level Inter-Engineering Colleges Basketball Tournament
03.12.2024 to 04.12.2024

Rakshan L (1NH21EE093), a student in the Electrical and Electronics Engineering Department at New Horizon College of Engineering, participated in the 16th Dr. M S Ramaiah Memorial State Level Inter-Engineering Colleges Basketball Tournament for Men and Women, which took place on December 3rd and 4th, 2024. Rakshan and his team demonstrated exceptional skills and teamwork, ultimately securing the 2nd Runner-Up position in this highly competitive tournament. Congratulations to Rakshan and his team for their commendable performance!

Runners-up-Handball event at CMRIT's annual sports fest, SPARDHA
06.12.2024

EEE students of New Horizon College of Engineering, Baru Tejesh (USN: 1NH22EE017) and Pavan Kumar M (USN: 1NH23EE406) achieved an impressive feat by securing the II (Runners-up) position in the Handball event at CMRIT's annual sports fest, SPARDHA, held on December 6th, 2024, at CMR Institute of Technology. Their dedication, teamwork, and athletic prowess were evident throughout the competition, earning them well-deserved recognition. Congratulations to Baru Tejesh and Pavan Kumar M for their outstanding performance!

OHM-AZING-BUILDATHON - MAGNOVITE 2024
06.12.2024 to 07.12.2024

Kudumula Sivakumar Reddy (1NH23EE046), Jagan Panigrahi (1NH23EE034), N Shrikanth (1NH23EE061), Shashank A (1NH23EE094), and Hrutik Guralingappa Katageri (1NH23EE033) has secured the 1st place in the prestigious OHM-AZING-BUILDATHON event at the Inter-Collegiate Fest MAGNOVITE 2024, organized by Christ University, on December 6th and 7th, 2024. Their exceptional innovation, teamwork, and technical prowess shone brightly throughout the competition, leading them to this remarkable victory. In addition to their well-deserved first place, the team was awarded a cash prize of 10,000 INR. Congratulations to each team member for their outstanding performance and for representing us so magnificently.

State Level Inter-Collegiate Sports Fest-Basketball
08.12.2024 to 10.12.2024

Rakshan L (1NH21EE093), an Electrical and Electronics Engineering student, secured the Runner-Up position in the Men's Basketball event at the State Level Inter-Collegiate Sports Fest. This competitive event was held at New Horizon College of Engineering from December 8th to 10th, 2024. Rakshan's exceptional performance and teamwork were key to achieving this prestigious recognition. Congratulations to Rakshan and his team for their remarkable achievement!

VTU Inter Collegiate Central Karnataka State Level Tournament-Tug of War (Men)
09.12.2024 to 10.12.2024

Aneel Kumar Madarkhandi (1NH21EE015) and Mohmmad Arslan Wani (1NH22EE408) from the Department of Electrical and Electronics Engineering secured the third place in the Tug of War (Men) event at the prestigious VTU Inter-Collegiate Central Karnataka State Level Tournament. The event was held at Akshaya Institute of Technology, Tumakuru, on December 9 and 10, 2024. Competing against numerous skilled teams, Aneel and Mohmmad showcased exceptional dedication and teamwork, earning them this well-deserved recognition. Congratulations to both for their remarkable achievement!

VTU Inter-Collegiate Division Level Tournament-Tug of War
09.12.2024 to 10.12.2024

Aneel Kumar Madarkhandi (1NH21EE015) and Mohmmad Arslan Wani (1NH22EE408), students from the Electrical and Electronics Engineering Department at New Horizon College of Engineering, achieved the Runner-Up position in the Men's Tug-of-War event—VTU Inter-Collegiate Division Level Tournament—held at CMR Institute of Technology on December 9th and 10th, 2024. Their teamwork and determination were key to their success in this competitive event. Congratulations to both for their outstanding performance!

VTU Bengaluru Central Division Inter Collegiate Handball (Men's) tournament
13.12.2024 to 14.12.2024

Congratulations to Baru Tejesh (1NH22EE017) and Pavan Kumar M (1NH23EE406) from EEE Department for securing the Runner-Up position in the VTU Bengaluru Central Division Inter Collegiate Handball (Men's) tournament held at B.M.S College of Engineering from December 13-14, 2024. It's a fantastic achievement and a testament to their hard work and dedication.

ALUMNI TALKS

Career Compass: Navigating IT Careers with Web Technologies

The Department of Electrical and Electronics Engineering (EEE) organized an Alumni Talk "Career Compass: Navigating IT Careers with Web Technologies" on October 15th, 2024. The event aimed to bridge the gap between student's perceptions of the corporate world and real-life industry dynamics. The session was led by Mr. Dony Snehit P, a 2024 alumnus and Full Stack Developer at Société Générale. His presentation was highly informative, offering students valuable insights into careers in the IT sector.

Exploring the Future of Electrical Engineering: Innovations, Trends, and Emerging Opportunities
29.10.2024

The Department of Electrical and Electronics Engineering at New Horizon College of Engineering, Bengaluru, hosted an Alumni Talk titled “Exploring the Future of Electrical Engineering: Innovations, Trends, and Emerging Opportunities” on October 29th, 2024, from 10:00 PM to 12:00 PM. The event aimed to bridge the gap between students’ academic understanding and real-world corporate scenarios. The session was conducted by Nischal Dinesh, who works as a Hardware and Firmware Development Engineering Intern at Cardiac Intel, Inc. and is currently studying at San José State University, USA. The talk was highly informative and interactive, providing students with insights into both the IT and core sectors. Nischal discussed the level of coding proficiency required to enter the IT industry, the significance of coding in the field, and the technologies used to develop websites from scratch, particularly for those with a core engineering background. He also advised students to consider pursuing higher studies after gaining industry experience. The session was well-received by all student participants and faculty members, offering valuable guidance and knowledge about future opportunities in electrical engineering.

PLACEMENT DETAILS: 2024-2025

Sl.No	Name	USN	Placed in Company
1	Achinth Hs	1NH21EE005	Microland
2	Aneelkumar Madarakhandi	1NH21EE015	Capgemini
3	Anusha L	1NH21EE016	Capgemini
4	Apoorva Kulkarni	1NH21EE018	Siemens
5	Bhuvan Singh Rajput	1NH21EE024	BOSCH Limited
6	Gowthami A	1NH21EE033	Capgemini
7	Harshitha N	1NH21EE036	Capgemini
8	K Rajini	1NH21EE040	Siemens
9	Kruthika Dc	1NH21EE048	L&T Technology Services Ltd
10	Jeevan M	1NH21EE052	Capgemini
11	Monika C	1NH21EE065	Siemens
12	N S Meghana	1NH21EE068	Siemens
13	Nikhita Ghalagi	1NH21EE073	Siemens
14	P Indra Reddy	1NH21EE074	Capgemini
15	Poojitha M Reddy	1NH21EE078	Siemens
16	Prakash Raj M	1NH21EE081	Capgemini
17	R Puneeth Kumar	1NH21EE090	Capgemini
18	Raghu Nandan Ks	1NH21EE091	Capgemini
19	Raksha Shankar Kajagar	1NH21EE092	Siemens
20	Riddhi B N	1NH21EE096	Capgemini
21	Kavya S	1NH21EE098	Capgemini
22	Salanke Anni Rao	1NH21EE100	Capgemini
23	Sandeep Naikar	1NH21EE103	Capgemini
24	Shashank B S	1NH21EE107	Stratergi Automation Pvt Ltd
25	Spoorthi R	1NH21EE110	Capgemini
26	Srinivas Abhinay Gandla	1NH21EE112	Capgemini
27	Suchithra .	1NH21EE113	Infogain
28	Suprith U	1NH21EE115	Capgemini
29	Tannu Priya .	1NH21EE119	Capgemini
30	Thanuja K	1NH21EE120	Capgemini
31	Uday A Kammar	1NH21EE122	Capgemini
32	Vaishnavi D	1NH21EE123	Capgemini
33	Jayasourya U	1NH22EE402	Capgemini
34	Mallesha K	1NH22EE407	Capgemini
35	Sagar	1NH22EE410	Capgemini
36	Akshata Sutar	1NH22EE400	Capgemini
37	Likith R	1NH22EE406	Blue liquid solutions
38	Monica G	1NH21EE064	Blue liquid solutions
39	Rishab R	1NH21EE097	EY
40	Shankaranand Anandu Maha	1NH21EE112	DYNALEKTRIC EQUIPMENT PVT LTD
41	Manohar J S	1NH21EE056	DYNALEKTRIC EQUIPMENT PVT LTD
42	Keerthi T E	1NH21EE042	DYNALEKTRIC EQUIPMENT PVT LTD
43	Darshan Mk	1NH21EE028	DYNALEKTRIC EQUIPMENT PVT LTD
44	Mahima Yadav	1NH21EE053	intellipaat
45	Harshitha S	1NH21EE037	intellipaat
46	S Praveen Babu	1NH21EE085	intellipaat

PUBLICATION DETAILS: 2024-2025

Sl. No.	Faculty name	Paper Title	Month/ Year	Journal/Conference details	Source (Scopus/Wos)	Publication type	DOI
1.	R.Mohan Das	Explosive metal detection using sensors and microcontroller	August 2024	2024 2nd International Conference on Sustainable Computing and Smart Systems (ICSCSS)	Scopus	Conference	10.1109/ICSCSS60660.2024.10625134
2.	Anitha Nair A.S	Explosive metal detection using sensors and microcontroller	August 2024	2024 2nd International Conference on Sustainable Computing and Smart Systems (ICSCSS)	Scopus	Conference	10.1109/ICSCSS60660.2024.10625134
3	Surat Pyari Atti	An innovative method for improving lifetime ratio in a wireless sensor network for EV vehicles using improved cybernated clustering scheme	October 2024	024 2nd World Conference on Communication & Computing (WCONF)	Scopus	Conference	10.1109/WCONF61366.2024.10691913.
4	Sujitha S	Design of Electric Vehicle with Self-Balance Approach using Gyroscopic Effect and Autonomous Systems	September 2024	2024 8th International Conference on Inventive Systems and Control (ICISC)	Scopus	Conference	10.1109/ICISC62624.2024.00095
5	Sujitha S	Implementation of Intelligent Farm Guards: Utilizing Bidirectional Monitoring for Motor Efficiency	September 2024	2024 8th International Conference on Inventive Systems and Control (ICISC), Coimbatore	Scopus	Conference	10.1109/ICISC62624.2024.00113
6	Sujitha S	Electromagnetic Compatibility in Wireless EV Charging System	October 2024	2024 Second International Conference on Intelligent Cyber Physical Systems and Internet of Things (ICoICI), Coimbatore	Scopus	Conference	10.1109/ICoICI62503.2024.10696865
7	Sujitha S	Therapeutic Treadmill and Foot Pedal for Physically Challenged Children	August 2024	2024 Second International Conference on Intelligent Cyber Physical Systems and Internet of Things (ICoICI), Coimbatore	Scopus	Conference	10.1109/ICoICI62503.2024.10696163
8	Karthika M	Modified Arithmatic optimization algorithm based torque ripple minimization for a sensorless BLDC motor	October 2024	International journal of electronics	Scopus	Journal	10.1080/00207217.2024.2408789
9	Mausri Bhuyan	Frequency analysis in a combined hybrid microgrid tuned by DBOA algorithm	November 2024	2024 IEEE third international conference on power electronics intelligent control and energy system	Scopus	Conference	10.1109/ICPEICES62430.2024.10719105
10	Mausri Bhuyan	Solution of economic load dispatch for dealing with solar power uncertainity using pelican optimization algorithm	November 2024	2024 IEEE third international conference on power electronics intelligent control and energy system	Scopus	Conference	10.1109/ICPEICES62430.2024.10719195
11	Vinoth Kumar K	An analysis of IOT based smart garbage level of detection system	December 2024	2024 8th International Conference on Electronics, Communication and Aerospace Technology (ICECA), Coimbatore	Scopus	Conference	10.1109/ICECA63461.2024.10800952.
12	Satish Kumar D	Optimized thermal control of EV battery systems with fuzzy logic and PSO on Arduino Uno	December 2024	2024 3rd International Conference for Advancement in Technology (ICONAT), GOA	Scopus	Conference	10.1109/ICONAT61936.2024.10774666

PATENTS FILED / PUBLISHED DETAILS: 2024-2025

SL. NO	TITLE OF PATENT	JURISDICTION/ PUBLISHED IN INDIAN PATENT JOURNAL/ PUBLISHED DATE	INVENTORS' NAME (FACULTY / STUDENTS)
1.	**Design of harnessing highway wind for sustainable lighting solutions using vertical axis wind turbines** Application Number: 202441071492 A dated 21/09/2024	India Dated 27/09/2024	Soumya KV, Vinoth Kumar K, Sangeetha CN, Mausri Bhuyan, R Kiran Kumar, Md Faizan, Abhishek Rajkumar
2.	**Design of smart balanced battery system** Application Number:202441071472 A dated 21/09/2024	India Dated 27/09/2024	Vinod Kumar S, Vinoth Kumar K, Aashish Thomas Oomen, Achutha EB, Bhuvan Gowda SS
3.	**Design of dual axis smart solar tracking for EV charging station** Application Number: 202441071468 A dated 21/09/2024	India Dated 04/10/2024	Sangeetha CN, Vinoth Kumar K
4.	**Design of motorist tiredness recognition and vigilant system** Application Number: 202441071469 A dated 21/09/2024	India Dated 04/10/2024	Vinoth Kumar K, Sangeeth CN
5.	**Design of an smart rechargeable push bike** Application Number: 202441071466A dated 21/09/2024	India Dated 04/10/2024	Vinoth Kumar K
6.	**Design of portable freezer for pastoral process** Application Number: 202441071465A dated 21/09/2024	India Dated 04/10/2024	Vinoth Kumar K
7.	**Design of smart street light with inbuilt collision warning system** Application Number: 202441071480 A dated 21/09/2024	India Dated 04/10/2024	Vinoth Kumar K, Rishab R, Shashank BS, Uday A Kammar
8.	**Design of two probe neurodiagnostic EEG system** Application Number: 202441071493 A dated 21/09/2024	India Dated 04/10/2024	Mausri Bhuyan, Soumya KV
9.	**Design of monitoring voltage in batteries using IOT** Application Number: 202441071501 A dated 21/09/2024	India Dated 04/10/2024	Vinoth Kumar K
10.	**Design of wearable electrocardiogram monitoring device for remote cardiac health management** Application Number: 202441071505 A dated 21/09/2024	India Dated 04/10/2024	Vinod Kumar S, Vinoth Kumar K
11.	**Design of waste segregation bin in smart cities** Application Number: 202441071463 A dated 21/09/2024	India Dated 04/10/2024	Vinoth Kumar K
12.	**A design of paralysis healthiness administration for hospitals** Application Number: 202441071464 A dated 21/09/2024	India Dated 04/10/2024	Vinoth Kumar K
13.	**Design of smart indoor air quality monitoring device for healthcare system** Application Number: 202441071471 A dated 21/09/2024	India Dated 04/10/2024	Vinoth Kumar K, Vinod Kumar S
14.	**Silent chain for enhanced E-Bike performance** Application Number:202441081796 A dated 26/10/2024	India Dated 08/11/2024	Dr. R Mohan Das, Dr. Sujitha S, Jayasourya U, S Suhel Ahmed
15.	**Safety integrated multi pin harness system for two wheelers** Application Number: 202441081787 A dated 26/10/2024	India Dated 08/11/2024	Dr. Sujitha S, K Jagan, Kavin N, Preetham Raj, R Gagana, Roshan P, Tirotaman K

ARTIFICIAL INTELLIGENCE (AI) TECHNIQUES IN EEE

Artificial Intelligence (AI) techniques are increasingly being adopted in Electrical and Electronics Engineering to improve system efficiency, automate processes, and enhance decision-making. Below is a detailed overview of the most common AI techniques and their applications in the field:

Machine Learning (ML)

ML is a subset of AI where algorithms learn from data to make predictions or decisions.

Applications:

- **Power Systems:**
- Predicting energy demand and load forecasting.
- Fault detection in transmission and distribution networks.
- Optimization of power generation in renewable energy systems.

- **Electrical Machines:**
- Condition monitoring and fault diagnosis in transformers, motors, and generators.

- **Control Systems:**
- Adaptive control strategies for systems like HVAC or motor drives.

- **Smart Grids:**
- Load balancing and dynamic energy pricing.

Deep Learning (DL)

DL is a subset of ML using neural networks with multiple layers to model complex relationships.

Applications:

- **Image Processing:**
- Fault detection in solar panels using drone or satellite imagery.
- Quality inspection of electronic components.
- **Speech and Pattern Recognition:**
- Voice control systems for home automation.
- Recognizing fault patterns in signal processing.
- **Autonomous Systems:**
- Control of electric vehicles (EVs) using convolutional neural networks (CNNs).

Fuzzy Logic

Fuzzy logic is used to handle imprecision and uncertainty, making it ideal for control applications.

Applications:

- **Control Systems:**
- Speed control of motors using fuzzy controllers.
- Voltage and frequency control in microgrids.
- **Battery Management Systems (BMS):**
- Thermal management of EV batteries.
- Optimization of battery charging/discharging cycles.
- **Power Electronics:**
- Fuzzy-based modulation schemes for inverters and converters.

Optimization Techniques

These techniques include Genetic Algorithms (GA), Particle Swarm Optimization (PSO), and Sine-Cosine Optimization (SCO).

Applications:

- **Power Systems:**
- Optimal placement of renewable energy sources and energy storage systems.
- Economic load dispatch and unit commitment.
- **Electrical Machines:**
- Design optimization of motors and transformers.
- **Control Systems:**
- Tuning PID controllers for industrial processes.
- Optimizing energy usage in HVAC systems.

Expert Systems

Expert systems mimic human decision-making using rule-based inference.

Applications:

- **Diagnostics:**
- Fault diagnosis in power systems and electronics.
- Predictive maintenance of electrical equipment.
- **Protection Systems:**
- Designing protective relays for power grids.

Reinforcement Learning (RL)

RL is used to train agents to make sequences of decisions by maximizing a reward.

Applications:

- **Power Grids:**
- Real-time optimization of energy distribution.
- Demand-side management in smart grids.
- **Autonomous Systems:**
- Path planning for robots and drones in inspection tasks.
- **Control Systems:**
- Autonomous tuning of controllers in dynamic systems.

Natural Language Processing (NLP)

NLP enables machines to understand and process human language.

Applications:

- **Customer Support:**
- Chatbots for troubleshooting electrical and electronics devices.
- **Technical Documentation:**
- Automatic generation of reports and manuals.

Computer Vision

Computer vision techniques process images or videos for automation.

Applications:

- **Inspection:**
- Detecting defects in printed circuit boards (PCBs).
- Quality assurance in manufacturing lines.
- **Monitoring:**
- Real-time monitoring of power plants using video feeds.
- Surveillance in substations for security.

Hybrid AI Techniques

Combining multiple AI methods, such as fuzzy logic with neural networks (Neuro-Fuzzy) or GA with ML, enhances performance.

Applications:

- **Control Systems:**
- Neuro-fuzzy controllers for complex systems like power electronics.
- **Energy Management:**
- Optimization of hybrid renewable energy systems using GA-ML hybrid approaches.

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