ANRF Sponsored Two-Day Seminar Report

Title: AI & ML-Driven Power Electronics: Smart Embedded Systems and Next-Gen Batteries for the Future of E-Mobility and Defense Technologies
Organized by: Department of Electrical and Electronics Engineering, New Horizon College of Engineering, Bengaluru
Date: 16th and 17th July, 2025
Sponsored by: Anusandhan National Research Foundation (ANRF), Department of Science & Technology (DST), Govt. of India

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Day 1: Power Electronics and Smart Embedded Systems

Date: 16th July, 2025

Session 1: Inauguration

Time: 9:30 AM - 10:30 AM

The event commenced with an inaugural session featuring dignitaries from New Horizon College of Engineering. The Principal welcomed the guests and highlighted the significance of AI and ML in revolutionizing power electronics and smart systems. The Chief Guest emphasized the need for research-driven innovation in electric mobility and defense technologies.


HOD – EEE


HOD – EEE

Session 2

The Future of Power Electronics in E-Mobility and Defense: The Role of AI and Machine Learning

Speaker: Dr. Siddhartha Nair, Founder & CEO, Zeuron.ai
Time: 10:30 AM - 12:00 PM

Dr. Siddhartha Nair shared insights into AI-powered neuro-compute platforms developed by Zeuron.ai and their applications in autonomous mobility, cognitive health, and emotion-aware driving systems. He presented MiMo, a brain-inspired AI platform, and explained how it is being adapted for human-centric computing in automobiles and defense. The session bridged AI with real-time embedded applications in power systems.

Session 3: High-Efficiency Power Converters for Electric Vehicles (EVs), Charging Infrastructure, and Wireless Power Transfer

Speaker: Mr. K. Pranay Chowdary, Sr. Manager, EPD, Entuple Technologies Pvt. Ltd.
Time: 1:00 PM - 2:30 PM

This session covered the architecture and operation of high-efficiency EV powertrains using Entuple's WAVECT Real-Time Controllers. Mr. Pranay detailed challenges in EV motor testing, loading techniques using AC dynamometers, and methods for optimizing motor control through model-based design and MATLAB/Simulink-based control systems. He also demonstrated dynamic load emulation and advanced hardware integration.

Session 4: AI-Enhanced Smart Embedded Systems for Power Management

Time: 3:00 PM - 4:30 PM

This interactive session included demonstrations of embedded AI systems applied in Smart Energy Management, including edge AI applications, dynamic power control, and integration with smart grid systems. Experts discussed the challenges in designing intelligent systems for real-time power monitoring, especially in constrained environments such as electric vehicles.

Day 2: Next-Generation Batteries and Defense Applications

Date: 17th July, 2025

Session 5: Solid-State Batteries, Advanced Lithium-ion Technologies and Beyond Lithium: Sodium-ion and Hydrogen Fuel Cells

Speaker: Dr. Thiruvonasundari Duraisamy, Director, QuGates Technologies
Time: 9:30 AM - 10:30 AM

Dr. Thiruvonasundari presented an in-depth analysis of battery evolution, including advanced lithium-ion, solid-state, and sodium-ion battery technologies. She discussed battery modeling, electrochemical impedance spectroscopy (EIS) tests, and future trends like hydrogen fuel cells. The session offered practical insights into the safety, reliability, and energy density challenges of modern battery technologies.

Session 6: High-Energy-Density Batteries for Military Use and Energy Storage for Unmanned Systems

Speaker: Mr. Prasanthkumar Palani, Chief Technical Consultant, Haritha Mobility
Time: 10:30 AM - 12:00 PM

Mr. Prasanthkumar highlighted innovations in battery pack designs for eMobility and defence, such as Cell-to-Pack architecture, AB battery design, and NASA's solid-state battery research. He discussed the specific energy needs of defence systems, including silent operations, ruggedization, and EMI/EMC compliance.

Session 7: AI-Enhanced Battery Management Systems (BMS) and Power Electronics for Battery Charging and Discharging

Time: 1:00 PM - 2:30 PM

This session covered AI's role in enhancing battery safety, performance, and lifecycle through intelligent BMS solutions. Topics included adaptive charging algorithms, real-time thermal and SoC/SoH monitoring, and predictive control for battery degradation. Industry case studies illustrated AI's capability to automate and improve power delivery in EVs and drones.

Session 8: AI-Driven Innovations in Power Electronics and Battery Technologies

Speaker: Dr. Saravanakumar Thangavel, Project Engineer, Hitachi Energy, Chennai
Time: 3:00 PM - 4:30 PM

Dr. Saravanakumar explored AI's applications in predictive control and diagnostic analytics for high-voltage and energy storage systems. He detailed Hitachi Energy's advancements in digital substations, smart converters, and edge computing. Special focus was given to AI-based fault detection and optimization in grid-connected EV infrastructure and unmanned defence platforms.

Valediction Ceremony

Time: 5:00 PM Onwards

The valedictory session featured a summary of all technical talks, participant feedback, and certificate distribution. The organizing team expressed gratitude to ANRF-DST, all speakers, and attendees. The event concluded with a group photo and a networking session.

Conclusion:

The two-day ANRF-sponsored seminar provided an enriching platform for academicians, industry experts, and students to exchange knowledge on AI & ML applications in power electronics and battery technologies. The sessions bridged theoretical foundations with real-world innovations, contributing to the development of a sustainable and intelligent energy ecosystem for e-mobility and defense sectors.

NEW HORIZON COLLEGE OF ENGINEERING

ANRF, Department of Science and Technology,
Government of India, New Delhi

Department of Electrical and Electronics Engineering, NHCE

Seminar

AI & ML - Driven Power Electronics: Smart Embedded Systems and Next-Gen Batteries for the Future of E-Mobility and Defense Technologies

16th - 17th July 2025 | 09:00 AM to 05:00 PM

Falconry Seminar Hall (A 107)

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ANRF, Department of Science and Technology,
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www.newhorizoncollegeofengineering.in