National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Machine Learning Based State of Charge Estimation and Real-Time Battery Monitoring System
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Venue	: Seminar Room, EE-205
Date and Time	: 02 Jan 2025 (10:30 AM)
Abstract	: Accurately estimating the state of charge (SOC) is essential for the safety and longevity of lithium-ion batteries in electric vehicles (EVs) but is challenging due to nonlinear battery dynamics, especially with online methods. With rising EV demand, efficient and consumer-friendly battery monitoring is needed. This work uses voltage and current sensors and an ESP32 development board to monitor terminal voltage and load current, displaying SOC on mobile phones via Bluetooth. However, SOC can not be displayed directly, as it can not be measured directly. To estimate battery SOC, terminal voltage and load current must be accurately estimated. The measured data is used to estimate battery SOC accurately using Random Forest Regression (RFR) algorithm. The estimated SOC using the proposed method has been compared to the Simulated results to validate the estimation results. The results demonstrate that SOC estimator provides sufficient accuracy and surpasses traditional artificial intelligence-based methods to create an affordable, user-friendly system for remote EV battery monitoring, enhancing performance and supporting wider EV adoption.