

ICRERA 2025 – Short CV and Abstract



Short CV

Name: Shantanu Saxena

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Research Interests: Renewable energy systems, solar-powered electric vehicles, smart charging infrastructure, distributed energy management, and power electronics.

Shantanu Saxena is currently pursuing a Ph.D. in Electric Vehicles at IIT Jammu, focusing on distributed energy management and real-time monitoring of solar-powered EV charging systems. He has published in peer-reviewed journals and presented at international IEEE conferences on sustainable mobility and power systems. His research integrates renewable energy forecasting, EV infrastructure optimization, and IoT-based energy monitoring for cleaner transport solutions.

Recent Achievements:

- Indian Patent published on “Electric Vehicle Charging and Solar Monitoring System” (2023)
- IEEE ITEC Asia-Pacific 2023 paper on automatic battery swapping in solar EVs
- Qualified GATE in 2021 and 2022

Abstract

Paper ID: 199

Title: Distributed Energy Management in Solar-Powered EV Charging: Monitoring and Forecasting

This paper presents a real-time solar power monitoring and forecasting system designed for a solar-powered electric vehicle (EV) battery charging application, integrating cloud-based telemetry and machine learning (ML) techniques for predictive analytics. The experimental setup comprises a 48 V EV battery charged by a 290 W solar panel, with key electrical parameters—voltage, current, power, and energy—measured using a DC energy meter and transmitted to a cloud-based database for persistent storage and analysis. Google Firestore is utilized to efficiently manage historical data and enable long-term trend evaluation. A range of ML models, including Linear Regression, Random Forest, XGBoost, Support Vector Regression (SVR), and Long Short-Term Memory (LSTM) networks, are implemented and evaluated for solar power forecasting. Among these, Random Forest and XGBoost demonstrated the highest predictive accuracy, achieving R^2 scores of 0.9971 and 0.9937, respectively. The results highlight the potential of combining low-cost embedded hardware with cloud-integrated ML analytics to enable intelligent energy forecasting in solar EV charging systems, thereby enhancing energy utilization, enabling predictive maintenance, improving energy management, and increasing system reliability.