

ABSTRACT

In the realm of cutting-edge electric vehicle (EV) technology, "Electra Synergy" presents a pioneering methodology. This project introduces a revolutionary classification technique for EV charging session types and optimal charging strategy optimization, leveraging the K-Nearest Neighbours (KNN) algorithm and the Random Forest algorithm. This ensemble technique takes a unique approach diverging from conventional methods. It combines the simplicity, implementation ease, and adept handling of multi-class classification tasks offered by KNN with the robustness and accuracy of the Random Forest algorithm. By combining these algorithms, the project aims to enhance battery longevity, minimize charging expenditures, and tailor charging strategies to user preferences and operational requirements. The integration of real-time data and State-of-Charge (SoC) data, coupled with feedback loops, augments the model's adaptability, ensuring a refined charging regimen over time. This innovative approach promises to usher in a new era of sustainable and cost-effective EV charging practices, marking a paradigm shift in the field.

Furthermore, "Electra Synergy" harnesses a robust dataset comprising over 5000 elements, significantly surpassing previous endeavors. This larger dataset contributes to heightened predictive accuracy, marking a substantial advancement in comparison to existing projects. A pivotal aspect of our initiative lies in harnessing the power of machine learning models and the integration with web applications. This integration ensures an effortless and interactive user experience, allowing users to input diverse factors influencing EV charging optimization easily. This user-friendly interface enhances accessibility and provides clear and transparent charging recommendations, facilitating a rich user experience. By providing accurate real-world range information for EVs, "Electra Synergy" aims to empower users with reliable data for making well-informed decisions, countering manufacturers' tendency to inflate claimed ranges. This ensures that EV owners have reliable information for planning their journeys and fosters trust in the EV industry.