

Advanced techniques for battery charging(TATA Motors)

Description: During my internship at Tata Motors' Electric Vehicle Business Unit in Pune (2021-2022), I conducted research on advanced battery charging techniques to support the development of electric vehicles like the Nexon EV. My study focused on improving charging efficiency and reducing charging times for lithium-ion batteries. I reviewed literature on fast-charging protocols, such as Combined Charging System (CCS) and high-voltage systems (e.g., 800V architectures), and explored Tata's Ziptron technology for insights into battery management systems (BMS). I analysed data on regenerative braking to understand energy recovery potential and studied thermal management strategies to ensure battery safety during fast charging. My research summarized key trends, such as the adoption of silicon-based anodes for faster charging and was documented in a report shared with my mentor, Mr. Nitin Kolekar. This project deepened my knowledge of EV battery systems and their role in sustainable mobility.

9-Automatic Automobile Parking Systems (Tata Motors)

Description- As part of my internship at Tata Motors in Pune (2021-2022), I worked on developing an automatic parking system for passenger vehicles, aimed at enhancing driver convenience and safety. The project focused on integrating sensors and control algorithms to enable semi-autonomous parallel and perpendicular parking, a feature aligned with Tata Motors' roadmap for Advanced Driver Assistance Systems (ADAS). I assisted in testing ultrasonic sensors and cameras on a prototype vehicle, collecting data on obstacle detection accuracy. I also contributed to mapping the parking algorithm using MATLAB, ensuring the system could calculate optimal steering angles and vehicle paths. My role included documenting test results and suggesting improvements to reduce parking time. This project strengthened my skills in sensor integration and vehicle dynamics, supporting Tata Motors' goal of incorporating smart technologies in vehicles like the Nexon and Curvv.