Proposal for graduation project (2025-2026)

Project Title: EV Drive System Testing Unit with IoT Integration

Supervisor(s)

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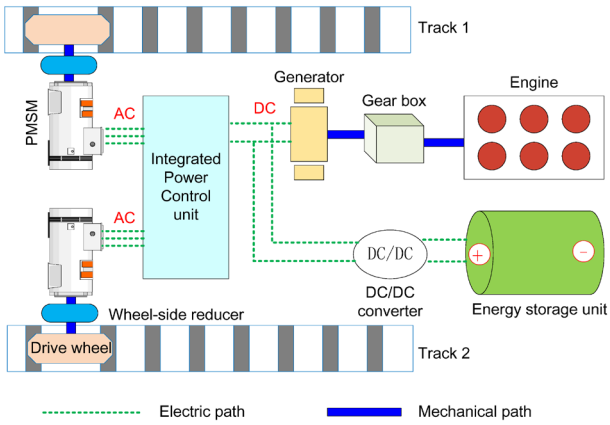
Abstract:

The transition to sustainable transportation requires rigorous evaluation of electric vehicle (EV) drive systems under controlled and real-world conditions. This project aims to design and operate a versatile EV drive system testing unit capable of supporting both static and dynamic evaluation. The static model will allow testing of electric motors, batteries, and converters on a test bench, while the dynamic model will extend testing to installed EV systems, either through chassis dynamometer integration or on-road experimentation. To enhance usability and monitoring, an IoT-enabled layer will be integrated, enabling real-time data acquisition, wireless communication, and remote monitoring of performance parameters. Given the lack of existing facilities, the project will also include the design of a modular testing infrastructure that can accommodate different EV powertrains, measurement instruments, and safety protocols. This initiative will serve as a foundation for research, teaching, and industrial collaboration in the field of electrified transportation.

Project details.



The proposed project focuses on the design and implementation of a comprehensive EV drive system testing unit, addressing the need for systematic performance assessment of electric powertrains. The project will be developed in two phases:

1. **Static Testing (Bench-Level)**
   - Testing individual components such as traction motors, inverters, and battery packs on a stationary bench setup.
   - Measurement of efficiency, torque-speed characteristics, thermal performance, and energy consumption.
   - Development of simulation models to complement hardware testing and validate results.
   - **IoT Integration**: Sensors for temperature, current, voltage, and vibration connected to a cloud platform for real-time monitoring.
2. **Dynamic Testing (Vehicle-Level)**
   - Integration of the drive system into an EV platform.
   - Testing on a chassis dynamometer or through controlled on-road evaluations.
   - Analysis of system by varying driving cycles, road grades, and environmental conditions.
   - IoT Integration: Remote monitoring of drive system parameters (battery SOC, motor load, speed, efficiency) with dashboard visualization via web or mobile application.