Automobile

Real-Time Battery Management System with Dual Protection Thresholds
Technology Domain: Electric Vehicle
Patent Application Number: 202541008281
Status (Patent/TRL): Patent Pending / TRL 3
Technology Summary: This invention introduces a sophisticated dual-layered Battery Management System (BMS) for electric vehicles, designed to significantly enhance battery safety, longevity, and performance. The system's core innovation lies in its ability to monitor critical battery parameters in real-time—including cell and pack voltage, current, and temperature—against two distinct safety thresholds. If the first threshold is breached, the BMS provides an immediate LED warning to the user; should the condition worsen and cross the second, more critical threshold, the system automatically triggers trip-off conditions to protect the battery, regulating charge and discharge via MOSFET switching. This proactive, multi-level protection, validated using realistic inputs from a vehicle traction model and real-time testing, effectively prevents overcharging, over-discharging, and thermal runaway, thereby extending battery lifespan, optimizing energy efficiency, and ensuring reliable operation in electric vehicles.