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On Board Integrated Chargers and Battery Management Systems for Electric Vehicle

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Abstract: This paper presents the design and development of an On-Board Integrated Charger and Battery Management System (BMS) aimed at enhancing the safety, efficiency, and sustainability of electric vehicles (EVs). The proposed system integrates multiple modules, including a real- time battery monitoring unit, intelligent charging control, wireless communication via Bluetooth, and environmental safety features such as temperature and smoke sensors. The battery management unit continuously monitors critical parameters such as voltage, current, state of charge, and temperature, ensuring optimal charging cycles and protecting against overcharging or thermal anomalies. A solar-powered charging mechanism is incorporated to promote green energy utilization, with automatic charging cutoff based on voltage thresholds to improve battery longevity. Additionally, the system includes an Android-based user interface for wireless control and live data visualization, along with alert mechanisms using a buzzer and mobile notifications in case of hazardous conditions. The integration of sensor data, control logic, and wireless interfacing provides a comprehensive solution for efficient power management, user convenience, and enhanced vehicle safety, making it well-suited for nextgeneration electric mobility applications

Keywords: Electric Vehicles, Battery Management System, On- Board Charger, Wireless Monitoring, Safety Sensors.

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