Analysis on Internet of Things-Based Battery Management Systems: ML-SDWSN-Based Real-Time Data Gathering of Battery Parameters

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Abstract:

Internet of Things has transformed Battery Management System monitoring and management with real-time battery parameter acquisition, analysis, and control for safety and performance. Traditional battery management systems lack flexibility, scalability, and data processing speed. This applies especially to the increasingly complex battery-powered systems used in electric vehicles, renewable energy storage, and portable devices. This study examines battery management systems combining s and Machine Learning to collect data and make choices in real time for the Internet of Things. We looked into how Internet of Things frameworks could improve Battery Management System performance by making it easier for sensors in different places to share data. This would let us keep an eye on important battery metrics like temperature, voltage, Stare of Health (SoH), and State of Charge (SoC) all the time. Machine Learning algorithms and Software Defined Wireless Sensor Networks improve data aggregation and processing. Machine learning models can optimise charging and discharging cycles, predict battery behaviour, and identify breakdown signs. Software Defined Wireless Sensor Networks offer diverse types of networks to guarantee fast data transfer over large systems with minimal energy consumption. This paper analysed and evaluated advantages, disadvantages, and prospects of Battery Management System based Internet of Things topologies Machine learning algorithms. In addition, Internet of Things enabled Battery Management System need to consider scalability, energy efficiency, and security. The survey is on the status and future trends of intelligent battery management systems. There is a need to incorporate IoT and machine learning for optimizing battery usage, lifespan, and safety in various industries.

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