Research on battery intelligent management and control technology

This study analyzes and evaluates the role of AI approaches in enhancing the battery management system (BMS) in EVs and guides future researchers in developing emerging BMS technology for sustainable operation and management in EVs.

This article first analyzes the application of digital twin technology in battery management, creates an intelligent battery operation and maintenance management and advanced measurement system based on the Internet of Things, and provides a certain reference for improving the detection level of battery operation and maintenance management systems.

A control branch known as a "Battery Management System (BMS)" is modeled to verify the operational lifetime of the battery system pack (Pop et al., 2008; Sung and Shin, 2015). For the purposes of safety, fair balancing among the cells of the battery package has to be under instantaneous supervision. The utilization of BMS will provide a robust system ...

This research paper analyzes the impact of AI-based algorithms on battery performance, safety, and overall EV operation, and identifies potential research directions for future advancements...

The increasing demand for electric vehicles (EVs) has brought new challenges in managing battery thermal conditions, particularly under high-power operations. This paper provides a comprehensive review of battery thermal management systems (BTMSs) for lithium-ion batteries, focusing on conventional and advanced cooling strategies. The primary objective ...

BMS optimizes battery via SOC monitoring, cell balancing, and safety control. FLC, SVM, PSO, ANN, and GA algorithms improve SOC estimation accuracy. Cell balancing extends battery life, performance, and safety in EVs.

This study analyzes and evaluates the role of AI approaches in enhancing ...

Battery management system (BMS) plays a significant role to improve battery lifespan. This review explores the intelligent algorithms for state estimation of BMS. The thermal management, fault diagnosis and battery equalization are investigated. Various key issues and challenges related to battery and algorithms are identified.

In EV battery management, neural-based networks encompass various approaches, including deep learning, reinforcement learning, and other network architectures, utilized to optimize thermal management, predict battery degradation, and enhance overall battery efficiency and safety. Each of these methodologies plays a

crucial role in leveraging data ...

For that purpose, a variety of Artificial Intelligence (AI) techniques have been proposed in the literature to enhance BMS capabilities, such as monitoring, battery state estimation, fault...

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BMS optimizes battery via SOC monitoring, cell balancing, and safety control. ...

In this paper, a critical issue related to power management control in autonomous hybrid systems is presented. Specifically, challenges in optimizing the performance of energy sources and backup ...

In recent years, the operation life of energy storage power station is increasing, and its safety problem has gradually become the focus of the industry. This paper expounds the core technology of safe and stable operation of energy storage power station from two aspects of battery safety management and safety protection, and looks forward to the development trend ...

A reliable battery management system (BMS) is critical to fulfill the expectations on the reliability, efficiency and longevity of LIB systems. Recent research progresses have witnessed the emerging technique of smart battery and the associated management system, which can potentially overcome the deficiencies met by traditional BMSs. Motivated ...

To address these concerns, an effective battery management system plays a crucial role in enhancing battery performance including precise monitoring, charging-discharging control, heat...

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