Short Communication
Volume 15:6, 2022

Journal of Computer Science & Systems Biology

ISSN: 0974-7230

Open Access

Implementation of Digital Technology in Battery Management Systems for Long Term Energy Storage

Marlon Oliveira*

Department of Information Science, University of Cairo, Cairo, Egypt

Introduction

The implementation of Energy storage systems had received widespread attention. However, monitoring of these ESS has paved the way for implementing battery-management systems to detect abnormalities and allow fault detection in ESS. Depicts the global market for battery-management systems for various applications, which is expected to grow at a compound annual growth rate (CAGR) of 54.8% due to wireless bifurcation based on connection. With the need to reduce wires and the use of IoT, wireless battery-management systems are quickly gaining traction. The United Nations (UN) has emphasised the use of renewable energy to reduce carbon emissions. Many countries are embracing renewable energy as part of this.

Furthermore, a battery-management system ensures that unusual circumstances in a device's architecture have pre-configured corrective measures. A battery-management system also validates the proper method for controlling a device's temperature, as temperature affects the power-intake profile [1,2]. Lithium-ion batteries charge faster than conventional battery technology because they have a higher energy density and provide a higher power density for longer battery life in a more compact package. Their self-discharge is less than half that of nickel-based batteries, and they do not require prolonged priming (priming is a conditioning cycle used as a service to improve battery performance during usage or after long periods of storage).

Description

Traditional charging techniques include constant current (CC), constant voltage (CV), constant-current-constant-voltage (CCCV), and multi-stage constant current (MCC). CC charging is a method of charging that employs a constant current to charge the battery. For fast charging, the CV charging approach is environmentally friendly; the approach is dependent on the battery's technologies, but such charging harms the battery's capabilities. The CCCV charging strategy is a hybrid strategy that combines CC and CV. The MCC charging technique uses several CC phases, and the current gradually decreases as the terminal voltage approaches a preset voltage threshold. The battery is charged to the point where the terminal conditions are met. Overheating, overvoltage, deep discharge, overcurrent, pressure, and mechanical stress are all risks associated with traditional battery charging techniques. To prevent battery failure and reduce potentially dangerous situations, a supervisory system that ensures batteries work properly in the intended application is required.

This monitoring device is known as a battery-management system. There are many features available in BMS today that help the battery run more efficiently and safely. Among these functions are monitoring, battery protection, state of health (SOH), state of charge (SOC), mobile balancing, charging control, and thermal management [3,4]. Because there are concerns about the safety, dependability, and overall performance of lithium-ion battery systems, particularly in stand-alone systems, a well-designed battery-management system is essential. WSN, IoT, cloud computing, AI, ML, NN, deep learning, blockchain, big data, cyber security, and other digital technologies are gaining traction for real-time sensing, monitoring, fault detection, fault diagnosis, real-time alert generation, and real-time analytics with prediction. The cost of storing electricity remains high, and fully charging a battery takes a long time. The cost of a battery is also determined by the components that comprise the battery. Public charging infrastructure is still lacking.

Many technologies are used in a battery-management system, but there are still some limitations, such as cell balancing, temperature control, charge control, environmental influence on the system, exact reading of State of Health (SoH), State of Charge (SoC), and logbook functions, among others. Various systematic reviews of battery-management systems have also been conducted, such as the study, which conducted an extensive literature review on state-of-health estimating approaches, and, which presented a comprehensive review of the most widely used battery modelling and state estimation methodologies for battery-management systems. A recent study looked at the evolutions and issues with cutting-edge battery technologies and battery-management systems. Furthermore, data-driven technologies such as AI, cloud computing, and blockchain technologies are investigated in data-driven electrothermal models. It was concluded as a result of this that previous studies focused on discussing the review of individual technology implementation in battery-management systems [5].

Conclusion

This study discussed and reviewed the progress and implementation of these technologies in battery-management systems, which empowers an inclination towards industry 4.0. The novelty of this study is that in previous studies, the impact of digital technology on battery-management systems has been discussed separately. Despite the numerous approaches proposed, only a few types of literature have attempted a comprehensive evaluation of strategies for monitoring battery-management systems using multiple digital technologies.n.

References

1. Kelton, K.F and Daan Frenkel. "Preface: special topic on nucleation: New concepts and discoveries." *J Chem Phys* 145 (2016): 211501.
2. Bai, Guoying, Dong Gao and Zhang Liu. "Probing the critical nucleus size for ice formation with graphene oxide nanosheets." *Nat* 576 (2019): 437-441.
3. Zhang, Tian Hui, and Xiang Yang Liu. "How does a transient amorphous precursor template crystallization." *J Am Chem Soc* 129 (2007): 13520-13526.
4. Haleblian, John and Walter McCrone. "Pharmaceutical applications of polymorphism." *J Pharm Sci* 58 (1969): 911-929.
5. Fours, Baptiste, Yohann Cartigny and Samuel Petit. "Formation of new polymorphs without any nucleation step. Desolvation of the rimonabant monohydrate: directional crystallisation concomitant to smooth dehydration." *Faraday Discuss* 179 (2015): 475-488.

***Address for Correspondence:** Marlon Oliveira, Department of Information Science, University of Cairo, Cairo, Egypt, E-mail: MarlonOliveira5@gmail.com.*

Received: 07-June-2022, Manuscript No. jcsb-22-73854; **Editor assigned:** 09-June-2022, Pre QC No. P-73854; **Reviewed:** 23-June-2022, QC No.73854; **Revised:** 28-June-2022, Manuscript No. R-73854; **Published:** 04-July-2022, DOI: 10.37421/ 0974-7230.2022.15.420.

How to cite this article: Oliveira, Marlon. "Implementation of Digital Technology in Battery Management Systems for Long Term Energy Storage." *J Comput Sci Syst Biol* 15 (2022):420