BATTERYGO

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ABSTRACT

The growing use of mobile devices among university students has increased the need for flexible and reliable charging solutions. At Universiti Teknologi MARA (UiTM) Dungun, the limited number of fixed charging stations and high student mobility often lead to inconvenience due to low smartphone battery levels. This project introduces BatteryGo, a portable, sustainable, and secure charging solution for the campus. The main objective of this project is to create an intelligent, eco-friendly, and safe power bank system for UiTM Dungun. The project also aims to provide a portable and convenient charging solution for students, staff, and visitors, reduce dependency on fixed charging stations across the campus, promote environmental sustainability through the use of a hybrid solar and conventional charging system, prevent loss and misuse of power banks through student ID–linked rental and tracking mechanisms, as well as ensure the timely return of power banks using a low-battery warning and monitoring system. BatteryGo uses a hybrid charging system that combines conventional electricity with solar energy to promote environmental sustainability. Instead of limiting usage by rental time, the system allows users to keep the power bank until its battery is nearly depleted. Each rental is linked to a student identification system and includes an embedded tracking feature to prevent misuse and theft. When the battery level reaches 10%, a warning prompts users to return the power bank before it is fully discharged. Also, the system reduces electricity use and minimizes loss of power banks, requiring little supervision. This innovation improves user convenience while ensuring security and accountability. BatteryGo supports UiTM's smart campus and green technology initiatives, offering strong potential for practical use and commercialization.

KEYWORDS: Charging solution, **e**nvironmental sustainability, smart campus, green technology

PROBLEM AND OBJECTIVES

The main objective of this innovation is to develop a smart, sustainable, and secure power bank system for UiTM Dungun.

The specific objectives are:

- To provide a portable and convenient charging solution for students, staff, and visitors.
- To reduce dependency on fixed charging stations across the campus.
- To promote environmental sustainability through the use of a hybrid solar and

conventional charging system

- To prevent loss and misuse of power banks through student ID–linked rental and tracking mechanisms.
- To ensure the timely return of power banks using a low-battery warning and monitoring system.

DESIGN DESCRPTION

Mobile devices have become a key tool for university students to support academic learning, communication, digital payments, and access to online platforms. In UiTM Dungun, students often spend long hours on campus, moving between lecture halls, libraries, cafeterias, and residential colleges. As a result, the shortage of batteries on smartphones became a common problem, especially due to the limited availability of fixed charging facilities (Hild et al., 2013).

Existing charging solutions require users to stay in a specific location, which is uncomfortable and inefficient for students with tight schedules. In addition, concerns about energy consumption, equipment safety, and misuse of shared facilities further underscore the need for a smarter solution. This project, therefore, proposes a Battery Go that combines portable charging, renewable energy consumption, and intelligent tracking. Through flexible use and accountability through student IDlinks and monitoring, this innovation provides convenience and security in the open campus environment.

VISUALS



NOVELTY AND UNIQUENESS

The novelty of this innovation lies in the integration of battery-based usage control with student identification and tracking, rather than conventional limited-term rental systems. Unlike existing power bank vending machines that limit users based on fixed rental periods, this system allows users to fully use the power bank battery, improving the user experience and practicality. Each power supply is uniquely identified and linked to a registered student during the rental process. An integrated tracking mechanism allows monitoring within the campus boundary, ensuring accountability without relying on expensive GPS technology. In addition, a low-battery warning system is activated when the battery level reaches 10%, allowing users to return the power supply promptly for recharging. Combined with a hybrid solar charging system, this innovation offers a unique combination of flexibility, sustainability and safety, making it more advanced than conventional vending solutions.

BENEFITS TO MANKIND

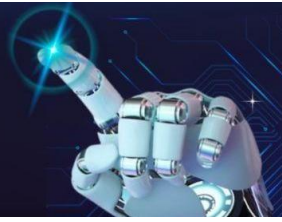
The proposed system is suitable for implementation at UiTM Dungun as it is simple to operate and fits well with students' daily routines. Power bank vending machines can be placed in strategic areas such as faculty buildings, the library, and cafeterias to ensure convenient access for students (Pramono et al., 2022). By using their student identification cards, students can rent power banks easily while enabling proper monitoring and accountability. The battery-based usage approach allows students to use the power banks without strict time restrictions, supporting continuous usage throughout the day. Additionally, the low-battery alert feature promotes responsible usage and reminds users to return the power banks promptly. From an operational perspective, the hybrid energy system helps reduce electricity consumption, while the tracking system minimizes the chances of power banks being misplaced or lost. Overall, the system requires minimal supervision, making it an effective and sustainable solution for long-term campus implementation.

COMMERCIAL POTENTIAL

BatteryGo shows strong potential for commercialization because of its scalable design and the rising demand for mobile charging services. Income can be generated through rental charges, penalties for late returns, and advertisements displayed on the vending machine interface. The system can also be expanded to other UiTM campuses, public universities, and transportation centers. Partnerships with renewable energy companies and digital payment platforms could further increase its market value. In addition, the use of solar energy helps reduce long-term operating costs, improving both profitability and sustainability. As the focus on smart infrastructure and green technology continues to grow, this innovation has significant potential for commercialization and wider adoption.

CONCLUSION

In conclusion, BatteryGo provides an effective solution to the mobile charging issues experienced by the UiTM Dungun community. By integrating hybrid solar charging, a rental system linked to student IDs, built-in tracking, and a low-battery return reminder, the system ensures both user convenience and operational security while supporting sustainability. This innovation contributes to smart campus initiatives, encourages responsible use of resources, and helps improve student productivity. Its practicality, uniqueness, and strong commercialization potential show that the system is a feasible and beneficial solution for modern campus environments.



REFERENCES

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