

## ABSTRACT

The significant increase in electric motorcycle sales in Indonesia has brought new challenges especially in terms of safety, convenience for users. This suggests the need for the development of an effective and accurate security and monitoring system for electric motorcycles, including battery level monitoring to ensure users can make informed decisions regarding their trips. The main problem of this research is security, which focuses on preventing theft and misuse of electric motorcycle rentals. In addition, battery level monitoring is important to ease the maintenance process by providing an accurate history. Another problem that often occurs is that users often forget their location when parking, especially in large areas.

This research provides a solution by designing and implementing an IoT-based Tracking and Monitoring system and distance prediction for electric motors. The system includes several features that can help users perform real-time monitoring of battery voltage and percentage levels, distance prediction and real-time location tracking. The tracking feature can help users if their electric motor is stolen and can also help when users forget to park their electric motor. The tracking system does not affect the battery of the electric motorcycle because it is equipped with a separate battery for its operation. When the battery of the tracking system runs out, the kinetic energy from the electric motor is converted into electricity to charge the battery of the tracking system. Quantitative methods are used to collect and analyze data to assess the performance and effectiveness of the system in preventing theft, monitoring battery status, knowing the remaining distance that can be traveled, and remembering the parking location.

The test results show that the hardware system can run and send data to the database and the website can successfully display validated data. The system successfully provides useful and relevant information, with sufficient accuracy in location tracking, battery condition monitoring and distance prediction. In conclusion, the implementation of this system can improve the safety of electric motors, efficiency in battery monitoring, and convenience for users in finding their vehicles in the parking area.

Keyword: *IoT, Tracking, Monitoring, Predict, Real-time.*