ABSTRACT

This research designs and develops a reminder system to detect the presence of vehicle tires using Ultra High Frequency Radio Frequency Identification (UHF RFID) technology and an ESP32 microcontroller, which aims to prevent theft or unauthorized replacement of tires. The system implements UHF RFID directly on vehicle tires, with the ESP32 microcontroller serving as the center of data processing and management, which is then sent to an Internet of Things (IoT)-based web *interface for real-time monitoring. The research methodology applied is a prototyping approach, which involves iterative stages of system design, testing, and development. The research also includes a comparative analysis of the performance of two types of RFID readers, namely EL-UHF-RF014 and BR-20, to optimize the effectiveness of the system at various reading distances and evaluate the response time. Based on the test results, the EL-UHF-RF014 reader showed superior performance compared to the BR-20, with a maximum reading capability of up to 12 meters and a response time of up to 5 seconds. These findings indicate that the developed system has potential as an efficient and reliable tire presence detection solution, and contributes to improving driver safety and comfort.*

Keywords: UHF-RFID, ESP32, Tire presence detection, IoT