ABSTRACT

Parking in congested areas is often a challenge for drivers due to the difficulty of finding an empty parking space. The lack of a real-time information system regarding the availability of parking slots further exacerbates this situation. This research develops an IoT-based parking recommendation system using ESP32 and infrared sensors to detect slot availability in real-time. This system is integrated with an Android application that displays the latest information and provides recommendations for the closest parking space to the entrance. Firebase is used as a database to store and manage parking information, ensuring data remains up to date.

The test results show that the application successfully processes sensor data with 100% accuracy, with an average data delivery delay of 65.36 ms. However, the LED system that displays visual recommendations has an accuracy of 94%, with 3 out of 50 attempts experiencing data reception failure, and an average delay of 488.191 ms. The total system delay from the sensor to Firebase reached 754.45 ms. However, the system still provides optimal parking recommendations with high accuracy. Improvements to the LED system are needed to increase accuracy and reduce delays, especially in large-scale implementations..

Keywords : Android, Esp32, Firebase, Parking, Recommendation