ABSTRACT

Parking in crowded areas is often a challenge for drivers because it is difficult to find an empty parking space. This problem is further exacerbated by the lack of an information system that can provide real-time data on parking slot availability and optimal parking space recommendations. This study offers a solution in the form of a parking space recommendation system that uses ESP32 and infrared sensors to detect parking space availability in real-time. This system is integrated with an Android application that provides users with the latest information and recommends the closest parking space from the entrance. The Firebase database is used to store and manage parking space data, ensuring that the information presented to users is always up-to-date. The test results show that the application successfully processes sensor data with 100% accuracy, and has an average data delivery delay from the application of 65.36 ms. However, in the LED system that displays visual recommendations, there is an accuracy of 94% with 3 out of 50 trials failing to receive data, and an average delay of 488.191 ms. The total delay of the entire system, from the sensor to Firebase, reaches 754.45 ms. Although the LED system experienced some failures, the application was still able to provide optimal parking recommendations in real-time with a high level of accuracy. Some improvements are needed to improve the accuracy of the LED system and reduce delays, especially in applications in larger parking areas.

Keywords : Android, Esp32, Firebase, Parking, Recommendation