

ABSTRACT

The outdoor parking area of the Telkom University Landmark Tower (TULT) at Telkom University currently uses a conventional parking system without integrated technology. However, with the implementation of an IoT-based smart parking system, parking space usage can be better organized. The difficulty of finding a parking spot during peak hours results in wasted time. To address this issue, an IoT-based smart parking system needs to be developed. This system will use sensors installed in each parking slot in the outdoor area of the TULT building to provide real-time information on parking availability to vehicle users, particularly car drivers. This will make it easier for users to find available parking spots and increase the efficiency of parking space utilization at Telkom University.

In this final project, a smart parking system is designed to provide information on the availability of parking spaces via a display screen. Each parking slot will be equipped with an ultrasonic sensor connects in real-time. This system is powered by solar panels as the main power source, with a solar charger directly connected to a battery for power storage. The ultrasonic sensor will detect the presence of vehicles parking and send data to a NodeMCU equipped with a Wi-Fi module. The data will be stored in the cloud using the Blynk application, and the display screen will show information on the availability of parking slots in the outdoor area of the TULT building.

Based on the results of testing the device system, it is known that the system can run well, providing real-time information on whether parking slots are available. In addition, the system is powered by a 60-watt solar panel, which charges a 12V 35Ah battery, with a fully charged battery, the system can operate optimally for 3 days, even without additional energy input from the solar panel. In the process of sending data from the NodeMCU microcontroller to Wi-Fi, this system shows excellent quality of service (QoS), with an average throughput value of 1,708.30 bps, packet loss of 0.34%, and an average delay of 100.35 ms.

Keywords: Outdoor area of the TULT building, Smart parking system, Internet of Things, Ultrasonic sensor, Solar panel.