Topik: Perangkat IoT

A Unified IoT-Android Platform for Multi-Location Parking Monitoring

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ABSTRAK

Finding an available parking slot is a critical issue that causes traffic congestion and resource waste. Existing smart parking solutions generally lack the capability to integrate real-time data from multiple, separate locations. This research addresses this gap by designing and developing an integrated multi-location parking monitoring system based on the Internet of Things (IoT) to provide accurate, real-time parking information from various sites through a single mobile platform. The system employs a three-layer architecture: a physical layer with ESP32 microcontrollers and HC-SR04 ultrasonic sensors (detection threshold < 8 cm), a cloud layer using Firebase Realtime Database for data aggregation, and an Android application layer for data visualization. To validate the system's reliability, a series of tests were conducted, covering functionality, device compatibility, and information conformity. The information conformity test, which compared the application data against the physical prototype's condition across various scenarios, demonstrated a 100% accuracy rate, confirming that the system successfully presents field data precisely and reliably.

Keywords: *Internet of Things, Smart Parking System, ESP32, Firebase, Android Application*