IoT-Enhanced Vehicle Density Monitoring and Smart Parking Management System with Blynk Integration for Urban Mobility Optimization

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Abstract*: The escalating issue of car parking in congested urban areas necessitates innovative solutions to optimize parking space utilization and enhance driver convenience. In response, this project introduces an IoT- based Smart Parking Management System, integrating advanced technologies such as RFID tags, GPS sensors, and the Blynk app. The system accurately counts vehicles using RFID tags, senses parking slot occupancy, and tracks locations via GPS sensors. Real-time data is transmitted to a centralized server for storage and processing, enabling users to monitor parking availability and make reservations through the Blynk mobile app. Additionally, users receive booking notifications, including time duration and cost, via SMS or the mobile app interface. Automated gate opening mechanisms streamline vehicle entry, while LCD displays at parking plots provide visual indications of free parking slots. This comprehensive solution aims to alleviate urban parking challenges, reduce unnecessary travel, and enhance overall parking management efficiency.*

Keywords: Arduino, IR-Sensor, RFID-tag, LCD display, Blynk app