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The Smart Car Parking System with IoT

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Abstract: *Urban parking congestion results in unnecessary delays, increased fuel consumption, and traffic buildup within confined areas. To address these challenges, this paper presents The Smart Car Parking System with IoT, an automated parking management solution developed using low-cost hardware com- ponents and cloud connectivity. The proposed system employs a NodeMCU ESP8266 microcontroller, infrared sensors for vehicle detection, servo motors for gate automation, and a cloud-based database for real-time monitoring. The NodeMCU is powered directly through a laptop USB interface, eliminating the need for an external power supply during prototyping. Parking slot occu- pancy information is transmitted to a Supabase cloud database and visualized using a web-based dashboard. When all slots are occupied, the system restricts vehicle entry by keeping the gate closed. The implementation demonstrates reliable operation and effective synchronization between physical infrastructure and cloud services, making it suitable for small-scale smart parking applications.*

Keywords: Internet of Things, Smart Parking System, NodeMCU ESP8266, Infrared Sensors, Cloud Monitoring, Au- tomation

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