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Smart Parking System

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Abstract: *Parking being a bigger and bigger issue in cities (our) as the number of cars keeps increasing while the parking spaces remain fixed. Drivers frequently don't know which slots are available, causing traffic jams and wasting time and fuel. To address this challenge, we developed a smart parking system that display available parking slot in real-time.*

In that system there is a sensor in each parking slot to determine free or busy. This information is transmitted by the sensor to a control unit, which automatically clears the slot status. Users can check which slots are available via an interface or straight through their mobile phone. The system is convenient to implement, cost-effective, and easy to install and operate; it is therefore applicable in shopping malls, office buildings, hospitals and public parking.

To tackle these problems, I have designed and implemented a smart parking system to display the status of parking slots in a real-time manner. This smart system consists of ultrasonic sensors placed inside every parking slot to check whether a car is there or not. The status is continuously observed and transmitted to a microcontroller unit to check whether a particular parking slot is occupied or vacant. Depending upon this information, an update of this parking status is done automatically without human interaction.

The updated parking data is shown to users on a display unit at the entrance of the parking lot. This setup helps drivers easily find free slots. Needless car movements within the parking area are minimized, and also ensures smooth traffic. The installation of the system is straightforward and inexpensive.

The experimental results show that the smart parking system identifies the status of parking slots with minimal delays. This system will improve parking efficiency, reduce parking time, and make the parking experience more convenient.. The smart parking system may be improved in the future by incorporating mobile app support and analysis capabilities.

Keywords: Smart parking system, ultrasonic sensor, parking slot detection, real-time monitoring, microcontroller- based system