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Smart Car Parking System using Arduino

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Abstract: ***A simple and easy task such as parking is thought of as a tedious and time-consuming process due to mismanagement of the parking system. Current parking systems involve huge manpower for management and require users to search for parking space floor by floor. Such conventional systems utilize more power and the user's valuable time. In this paper, we have suggested and designed a Smart Parking System using IOT Technology, IR sensors, LCD screen, and servo motor***
Keywords: IoT, IR sensor, Smart City, Arduino UNO

I. INTRODUCTION

The concept of smart cities has gained significant attention in recent years, and one of the critical components of a smart city is an intelligent parking system. Smart car parking systems utilize various technologies to streamline the process of parking, optimize space utilization, and provide real-time information to drivers. In this research paper, we propose the design and implementation of a smart car parking system using Arduino, IR sensors, LCD displays, and servo motors. Arduino, an open-source electronics platform, serves as the backbone of the system, enabling the integration of various components and the execution of smart parking algorithms. IR sensors are utilized to detect the presence of vehicles in parking spots. These sensors emit infrared radiation and measure the reflected signal to determine if a spot is occupied or vacant. By strategically placing these sensors in parking spaces, the system can accurately detect the availability of spots in real time. LCD displays are integrated into the system to provide visual feedback to drivers. The displays show the number of available parking spaces in each section of the parking lot, allowing drivers to make informed decisions and reduce time spent searching for parking. Servo motors are employed to control the opening and closing of parking barriers or gates.

II. METHODOLOGY

A. Materials/Components/Flowchart/Block

The smart car parking system consists of four main components: the Arduino Uno microcontroller, IR sensors, servo motor, and LCD display. The system makes use of four IR sensors to detect the presence of a car in a parking slot (there are 4 parking slots in our model) and two IR sensors to detect the entry and exit of the car. The servo motor is used to control the opening and closing of the gate, allowing entry and exit of the car. The LCD display is used to display information about the parking spaces available and occupied. The IR sensors are placed in each parking slot to detect the presence of a car. The sensors are connected to the Arduino Uno microcontroller, which processes the data received from the sensors. When a car is detected in a parking slot, the microcontroller sends a signal to the servo motor to close the gate. When the car leaves the parking slot, the microcontroller sends a signal to the servo motor to open the gate. The LCD display is used to display information about the parking spaces available and occupied. The display shows the number of parking spaces available and the number of parking spaces occupied. When a car enters a parking slot, the display updates the number of available parking spaces. This information makes it easier for the driver to find the empty slot available. Also note that the system will not allow entry of vehicles if all slots are full. In our model, there are 4 parking slots, hence when all 4 of them are full, the system will restrict the entry of more vehicles.

B. Figures

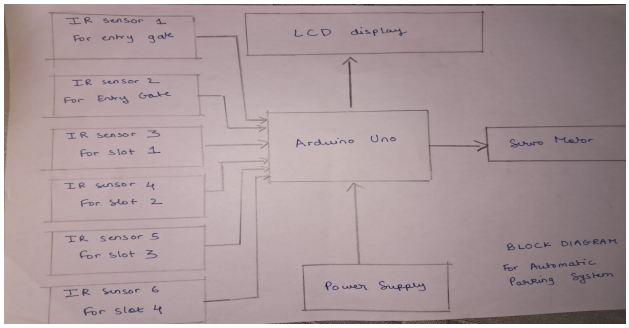

Fig 1. Block diagram

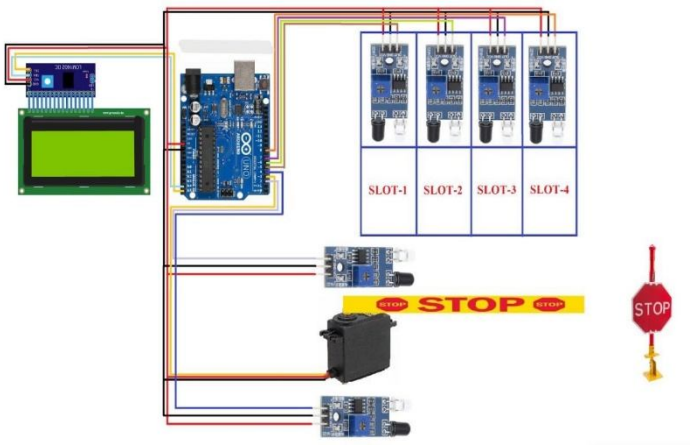

Fig 2. Circuit Diagram

III.RESULTS AND DISCUSSIONS

The proposed smart car parking system was implemented and evaluated in a real-world parking environment. The system successfully detected the presence of vehicles using IR sensors and accurately allocated parking slots based on the parking slot allocation algorithm. The LCD display provided real-time parking information, enabling users to locate available slots easily. The vehicle retrieval process was efficient and seamless, improving overall user satisfaction.

IV.CONCLUSIONS

This research paper presented a smart car parking system that utilizes Arduino, IR sensors, LCD, and servo motors to optimize parking space utilization and enhance the parking experience. The system demonstrated effective parking slot allocation, real-time parking information display, and efficient vehicle retrieval. The experimental results indicate the potential of the proposed system to address the limitations of conventional parking systems and improve the overall parking process

V. ACKNOWLEDGMENT

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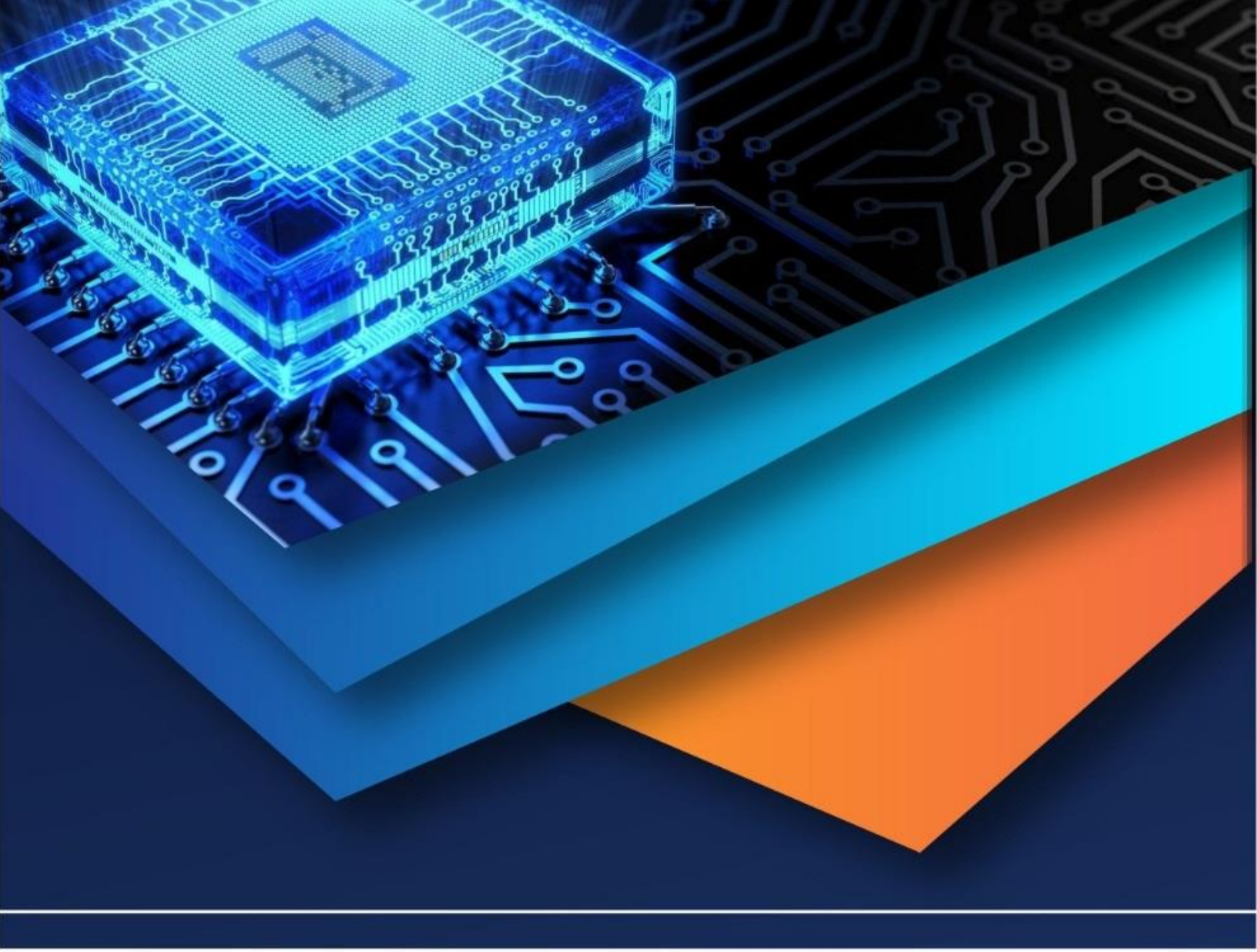

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