THE SMART PARKING SYSTEM

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Abstract: With growing, car parking increases with the number of car users. With the increased use of smartphones and their applications, users prefer mobile phone-based solutions. This paper proposes the Smart Parking System that depends on Arduino parts, Android applications, and based on IoT. This gave the client the ability to check available parking spaces and reserve a parking spot. IR sensors are utilized to know if a car park space is allowed. Its area data are transmitted using the WI-FI module to the server and are recovered by the mobile application which offers many options attractively and with no cost to users and lets the user check reservation details. With IoT technology, the smart parking system can be connected wirelessly to easily track available locations

Keywords: Internet of Things, Cloud Computing, Smart Parking, Smart City, Mobile Application.

I.INTRODUCTION

The number of car client's increases was requested more parking spots, and with the growth of the internet of things causes smart urban areas to have picked up grind popularity. In this way, issues, for example, traffic blockage, constrained vehicle leaving offices, and street security are being tended to by IoT. So, several parking organization systems have been organized to decrease such traffic issues and improve the comfort of car users, it has combined smart mobiles, wireless algorithms, and mobile applications. The idea of the Internet of Things (IoT) started with things with Personal communication devices, which the devices could be tracked, controlled to use remote PCs connected with the internet. Sensors are deployed in smart systems, which in turn collect information from the device for processing and analysis .So, Sensors would be deployed in the parking area and through the mobile application for helping the user to know the freedom of parking places on a real-time basis with more efficiency, and less cost. A smart parking system reduces the time to locate available places and reduces fuel consumption. The paper is organized as follows: First, it presents the concept of the smart parking system and its various functions, then its reviews previous research and studies on the implementation of smart parking. Then it describes the system implementation and operation and gives a conclusion of the smart parking application

II.LITERATURE SURVEY

| Ref.	Title	Methodology
[1]	"A Low-Cost and Sustainable Approach for Smart Parking Systems",Y. M. Dalal, D. R. K. Raja and U. Ashwin Kumar 2023 World Conference on Communication & Computing (WCONF), RAIPUR, India, 2023	•To deliver real-time parking availability data, reduce congestion, and improve the entire parking experience for users, their suggested system design combines sensors, gateways, a cloud-based platform, and a mobile application
[2]	"Design and Implementation of IoT-Based Smart Parking System in Campus Area", Y. Bandung, M. F. N. Aldiansyah, M. R. Dwi Putra and M. I. I. Syiraaj, 2023.	•this system is able to provide recommendations for available parking locations and can provide directions for the nearest road to available parking locations. This system can also detect vehicle parking neatness status and has the ability to process payments automatically
[3]	"LoRa Technology Overview and Smart Parking System Design",A. B. Yazıcı and N. Ö. Ünverdi, 2024	•smart parking system suitable for open areas, where vacant spaces can be observed on the map, has been developed with two LoRa modules, an antenna, a microcontroller, and a mobile application interface

III. WORKING OF THE PROJECT

The smart parking system manages three parking slots using a combination of advanced technologies to ensure efficient parking management. A camera continuously monitors whether a parked vehicle is indeed a car. The camera's image processing capabilities identify and confirm the presence of a car in each slot. The UV sensor adjusts the system's settings based on ambient light conditions to ensure optimal performance at different times of day. The status of each slot, including whether it is occupied by a car, is displayed on an LCD screen, providing real-time information to users. When a vehicle approaches, a servo motor controls the gate, opening it if a slot is available or keeping it closed if all slots are occupied. This integrated system enhances parking efficiency and user convenience by providing accurate slot availability and automated access control.

Block diagram
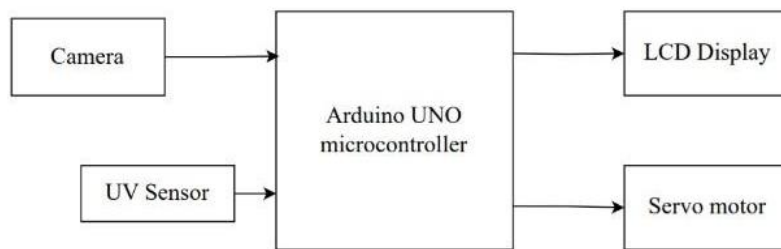
Flowchart
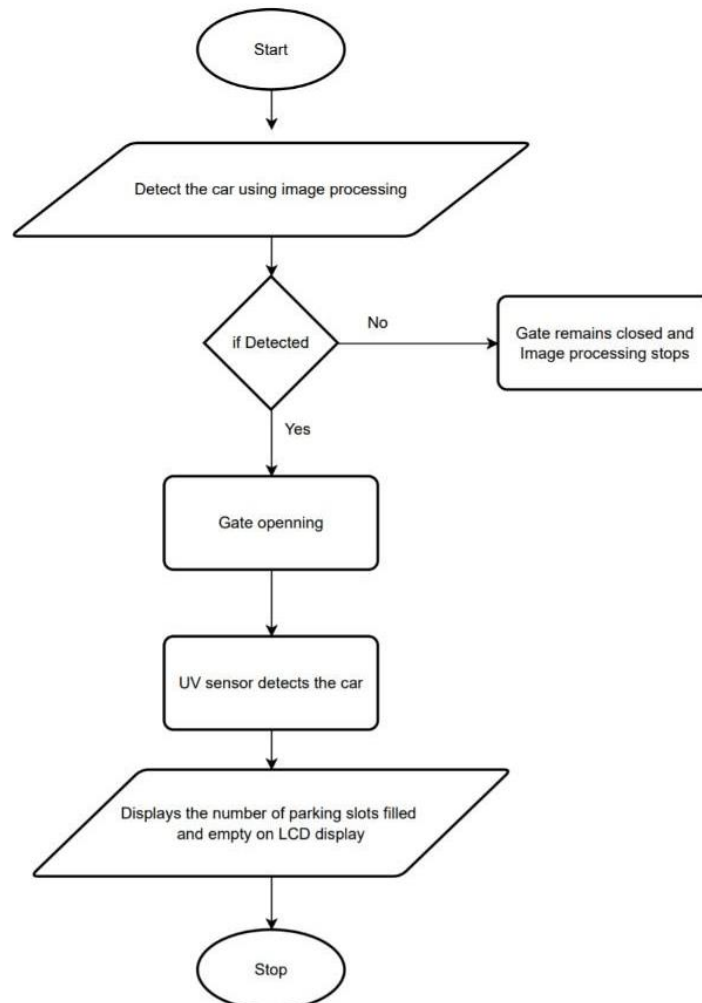
IV.RESULTS

The smart parking system was successfully implemented and tested with three parking slots. The camera system effectively identified the presence of vehicles in each slot, accurately distinguishing between cars and other objects. The integration of the UV sensor ensured that the system adjusted its operations appropriately based on ambient light conditions, enhancing functionality during both day and night. The LCD display provided clear and up-to-date information regarding slot availability, making it easier for users to navigate the parking area. The servo motor operated smoothly, controlling the gate to open or close based on the real-time availability of parking slots. Overall, the system demonstrated significant improvements in parking management, including reduced time spent searching for available spaces and streamlined access control. The successful operation of the camera, UV sensor, LCD display, and servo motor highlights the effectiveness of the smart parking system in enhancing user experience and operational efficiency.
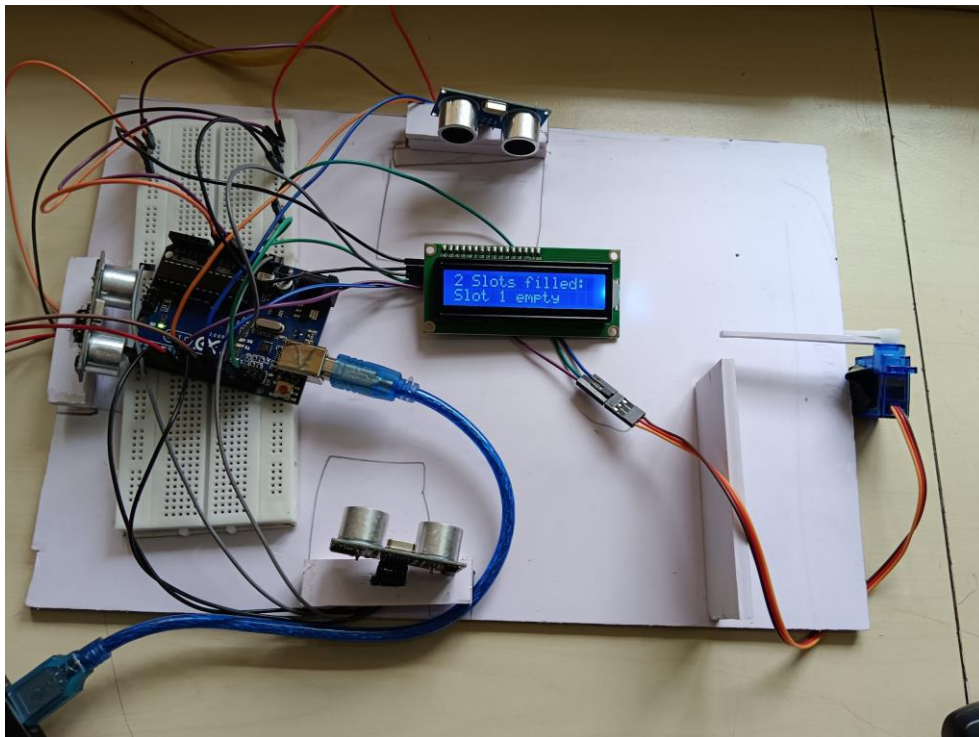
V.CONCLUSION

The smart parking system utilizing CAM, an LCD display, a servo motor for gate control, and RFID tags effectively addresses common parking management challenges. The CAM provides vehicle identification capabilities. The LCD display shows information about parking space availability. The servo motor efficiently controls the gate. The RFID tags facilitates vehicle authentication.

VI.FUTURE SCOPE

To develop a mobile application to allow users to check parking space availability.

Project cost

Components	Price
Cam Module	700
RFID x 3	300
Uno	650

I2C LCD	165
Servo motor	120
Total	1935

Project demonstration plan

1. Simulation.
2. Testing the working of the CAM.
3. Testing the working of the uv sensor
4. Working of 3 parking slots.

REFERENCES

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[2] Y. Bandung, M. F. N. Aldiansyah, M. R. Dwi Putra and M. I. I. Syiraaj, "Design and Implementation of IoT-Based Smart Parking System in Campus Area," 2023 10th International Conference on ICT for Smart Society (ICISS), Bandung, Indonesia, 2023, pp. 1-6, doi: 10.1109/ICISS59129.2023.10292040.

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