IOT Based Smart Parking System

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Abstract—The Internet of Things (IoT) has revolutionized various industries, and one such domain that has greatly benefited is car parking systems. Traditional parking systems often face challenges such as inefficiency, congestion, and lack of real-time information for drivers. The proposed system utilizes IoT technologies to create a network of interconnected devices, including sensors, actuators, and a centralized control system. These sensors is transmitted to the control system, which enables effective management and optimization of parking spaces. Additionally, the system incorporates various features to enhance user experience and convenience. Through mobile applications and online platforms, drivers can access real-time information on parking availability, reserve parking slots, and navigate to the nearest vacant spaces. The benefits of the Smart Car Parking System are manifold. It optimizes the utilization of parking spaces, reduces traffic congestion, minimizes environmental impact, and enhances overall user satisfaction.

Index Terms—Internet of Things (IoT), Parking System, NodeMCU.

I. INTRODUCTION

The Smart Parking System utilizes IOT technology to create an interconnected network of devices, enabling. Traditional parking systems often suffer from inefficiencies, congestion, and a lack of realtime information for drivers. This system leverages sensors, actuators, and a centralized control system to monitor and manage parking spaces in real-time. The deployment of smart sensors in parking lots allows for accurate detection of parking occupancy, providing instant updates on the availability of parking spaces. This results in reduced traffic congestion, improved traffic flow, and a more sustainable and environmentally friendly approach to parking management.

II. METHODOLOGY

Here are some steps involved in the methodology for an IoT-based smart parking system:

Install sensors and devices: Place sensors and microcontrollers in each parking space to collect data on occupancy.

Transmit data: The sensors transmit data to a cloud or local network.

Build apps: Create apps for users, such as drivers and parking administrators, to access the data.

Use the app: Users can use the app to find available parking spaces, check prices and more.

Selecting Sensors: Choose sensors that can accurately detect the presence of vehicles, such as ultrasonic, electromagnetic, or infrared sensors.

III. SCOPE OF PROJECT

Parking availability: Drivers can see available parking spaces in real time on their smartphones.

Parking process: The system can streamline the parking process from entering the vehicle to leaving. Traffic flow: The system can help reduce traffic congestion by directing drivers to available parking spaces.

Parking patterns: The system can provide insights into peak times and parking patterns.

Payments: The system can incorporate real-time and electronic payment methods.

Compliance: The system can help ensure compliance with local regulations.

Parking space optimization: The system can help optimize parking spaces.

Special permits: The system can provide special permits for loading and unloading, cabs, and more.

IV. GAP IDENTIFICATION

Cost: The implementation of IoT-based smart parking systems can be expensive.

Data anomalies: The data collected by sensors and RFID systems may not always conform to the expected pattern, which can lead to a less reliable system.

Security and privacy: The data transmitted and received by the system must be carefully treated to ensure security and privacy.

Scalability: Existing systems for traffic information acquisition can have high costs and low scalability. Computing power: Wireless sensor network (WSN)based systems can have low computing power.

Battery capacity: WSN-based systems can have limited battery capacity.

V. OBJECTIVES

- 1. The main objective of this project is reducing the risk of finding parking slots in any parking area.
- 2. It eliminates the unnecessary traveling of vehicles across the filled parking slots in a city.
- 3. Using the IoT-based parking system you can easily access the parking slot availability over the internet.
- 4. This project helps the drivers of the cars to park their vehicles with minimum wastage of time with accurate information of the availability of the space.
- 5. Enhance the security by simplifying the parking system.

VI. CONCLUSION

The implementation of a smart parking system using IoT (Internet of Things) technology brings numerous benefits and advancements to traditional parking management. By leveraging lot devices and connectivity, the system enhances efficiency, convenience, and security in parking operations. IoTenabled sensors installed in parking lots detect and relay real-time data on parking space availability. This information is then transmitted to a centralized system or mobile application, allowing users to access accurate and up-to-date information about available parking spaces.

REFERENCES

- Shashank Agnihotri, Ankit Kumar, Gopal Singh, Prateek Dixit, Shayan Ahmad, Shresth Chaurasia:IOT Based Smart Parking System, IJRASET2024.
- [2] Sudheer Hanumanthakar: Intelligent and Real-time Parking System, ICREGCSD2024.
- [3] Ananya Saini, Payal Pochampalliwar, Nandini Deshpande, Chetan Manidhara, Tushar Ramteke: SMART PARKING SYSTEM USING IOT, IJARIIE 2023.
- [4] Dr. Vipin Kumar Sharma, Shashank Srivastava, Shikhar Srivastava, Shivam Goel: SMART CAR PARKING SYSTEM USING IOT, IRJMETS 2023.
- [5] Rohini M, Rahul A, Rithik A, Steve John D: IoT based Smart Car Parking System with the Help of Sensors Networks, IEEE 2023.
- [6] Yash Agarwal, Punit Ratnani, Umang Shah, Puru Jain: IoT BASED SMART PARKING SYSTEM, IEEE2021.
- [7] Minal Patil, Vijay Chakole, Krushna Chetepawad: IoT Based Economic Smart Vehicle Parking System, IEEE 2020.
- [8] Hardik Tanti, Pratik Kasodariya, Shikha Patel, Dhaval Rangrej: SMART PARKING SYSTEM BASED ON IOT, IJERT2020.
- [9] Elakya R, Juhi Seth, Pola Ashritha, R Namith: Smart Parking System Using IOT, IJEAT2019.
- [10] Saidur Rahman, Poly Bhoumik: IOT Based Smart Parking System, IJACEE2019.