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Psg Auto Smart Parking System

Haritha Deepthi A[1*],Uma Maheswari S[2*], Kanishka S[3*]

*1*Department of Information Technology, PSG Polytechnic College, Coimbatore, 641004, Tamil Nadu, India*
*2*Department of Information Technology, PSG Polytechnic College, Coimbatore, 641004, Tamil Nadu, India*
*3*Department of Information Technology, PSG Polytechnic College, Coimbatore, 641004,Tamil Nadu, India*

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ABSTARCT
This paper presents the concept of Intelligent Smart Auto Parking System using Internet of Things (IoT). The number of vehicles on the campus ground has been increasing at a rapid speed. It is very difficult and time consuming to find a parking space especially in rush hours. Here a new parking system called Intelligent Smart Parking System is proposed to assist the users to find vacant space in the parking. In this system we use a mobile application to find empty slots in the parking area. This is achieved by using IR sensors. IR sensors are responsible to detect if a particular slot contains vehicle or not. Vehicle identification is done with the help of RFID Tags which is present in each vehicle. This system can be applied in all colleges and universities that face difficulties in finding empty slots that also affects the time.

I. INTRODUCTION

The PSG is a great hub of students, in turn results with huge number of vehicles on the parking campus ground has been increasing at an alarming speed. This has created a high demand for a parking space on the campus ground. Notably, the campus requires spacious parking for the ever-increasing number of automobiles within the compound. A recommended intelligent smart parking system would be a best solution for manual parking hindrances present. In addition, the existing parking yard should be well marked and viewed via a software application and

IOT for best solutions and informative to find the free spots prior through the developed applications The free spots are marked and the databases will be updated about the IN , OUT, and occupancy of the vehicles with the detailed schema. An improvement in the traffic circulation will be appreciated by various stakeholders on the campus. They include students, staffs and visitors at the campus. An improvement in the parking on campus as a smart parking for E, A and at pioneer blocks.

Smart parking systems have revolutionized the way parking is managed and used in modern cities. As technology advances, IoT-based smart parking systems are gaining popularity, providing drivers with real-time information on parking space availability, booking and payment options. Smart parking systems use various IoT devices such as sensors, cameras and wireless networks to monitor and manage parking spaces. Installed on each parking space to detect the presence of vehicles, these sensors provide real-time information on the availability of parking spaces. The data collected from these sensors is then processed and made available to drivers via mobile apps or other means. The benefits of a smart parking system using IoT are many, including reducing traffic congestion, improving parking management, increasing revenue, and improving user experience. Additionally, smart parking systems can help reduce the environmental impact of parking by reducing the time spent looking for a parking space and optimizing the use of available parking spaces. Overall, smart parking systems using IoT are transforming the traditional parking experience, making it more convenient, efficient and sustainable for drivers and parking lot owners. City.

These systems use various IoT devices, such as sensors, cameras, and wireless networks, to monitor and manage parking spaces. Parking sensors are one of the most important components of a smart parking system. These sensors are installed in each parking space to detect the presence of vehicles.

‘1.1PROBLEM STATEMENT

Traditional parking systems have several problems that can be solved by implementing a smart parking system using IoT technology. Some of the key issues with traditional parking systems include:
of parking spaces and reduce the time drivers spend searching for parking spaces, helping to reduce traffic congestion and the environmental impact of parking. Finally, intelligent parking systems can increase the revenue of parking lot owners by optimizing parking

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spaces, resulting in inefficient use of parking spaces. This can cause vacant parking spaces to be taken up, reducing the overall availability of parking spaces.
Traffic jam: Finding a parking spot can be a major cause of traffic jams in urban areas. This problem is exacerbated when drivers are unsure of the availability of parking spaces.

Disadvantages for drivers: Traditional parking systems can inconvenience drivers by requiring them to find a parking spot, walk to a parking meter, and pay for parking.

Loss of Revenue for Parking Lot Owners: Traditional parking systems can result in lost revenue for parking lot owners due to inefficient use of parking spaces, manual monitoring and management, and lack of real-time information on the availability of parking spaces.

Environmental impact: Traditional parking systems can have a negative impact on the environment due to increased emissions from vehicles searching for parking spaces and inefficient use of available parking spaces.

These problems can be solved by implementing a smart parking system using IoT technology. Smart parking systems can reduce inconvenience for drivers by providing real-time information on parking space availability, reserving parking spaces and automating the payment process.

1.2PROBLEM MOTIVATION

Because we are interested in embedded electronics-based projects, there are many benefits to embedded systems despite electronics-based projects. You can use source code delays to control the speed of an electrical component, a DC motor. He is motivated to do this project because it is an IoT-based agricultural project. Covers controllers, DC motor interfaces, ultrasonic transducer interfaces, and linear actuators used to open and close valves. For example, seed delivery.

1.3EXISITING METHODOLOGY

Although a smart parking system using IoT technology has many advantages, there are still some problems that need to be solved. Some of the major issues with smart parking systems include:

High Cost of Implementation: Implementing a smart parking system can be costly due to the cost of installing parking sensors, cameras and wireless networks.

Maintenance costs: Smart parking systems require regular maintenance and updates, which can be expensive.

Technical issues: The Smart Parking System may experience technical issues, such as connectivity issues and sensor errors, which may affect the accuracy of parking availability information.

Privacy issues: Smart parking systems collect and process personal data, such as license plate numbers and location data, which raises privacy issues.

Integration Challenges: Smart parking systems may need to be integrated with existing parking management systems, which can be difficult and incur additional costs.

Limited scalability: Smart parking systems may not be scalable enough to handle large numbers of vehicles, especially in urban areas with high parking demand.

Security concerns: Smart parking systems can be vulnerable to cybersecurity threats, such as hacking and data breaches, which could compromise the security of personal data.

Overall, although intelligent parking systems have the potential to transform parking management and improve the parking experience of drivers, these systems still face certain challenges that need to be addressed to ensure their efficiency.

II. LITERATURE REVIEW:

In [1] of this journal, Amira. A. Elsonbaty (2020) states, Smart parking suggests an IoT-based system that sends data to free and busy parking places via net/mobile applications. The IoT-network includes sensors and microcontrollers, which are found in each parking place. We implemented an enclosed smart parking project (SPMS), that using the Internet of Things and IR sensors, where available parking places can be displayed in a web application, then the user receives a live update about the availability of all parking places and chooses the best one.

In [2] of this journal, S G Raghavendra Prasad. (2016) proposed the system very much similar to many online reservation systems where you are allowed to book prior to your arrival at the destination.

In [3] of this journal, Aditya Basu. (2014) says that, Smart Parking systems typically obtains information about available parking spaces in a particular geographic area and process is real-time to place vehicles at available positions. It involves using low-cost sensors, real-time data collection, and mobile-phone enabled automated payment systems that allow people to reserve parking in advance or very accurately predict where they will likely find a spot. When deployed as a system, smart parking thus reduces car emissions in urban centers by reducing the need for people to needlessly circle city blocks searching for parking.

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In [4] of this journal, Borgonovo et al (2021) suggested that smart parking systems are set to bring positive changes to different urban stakeholders, who, in one way or another, shoulder the burden of haphazardly managed parking spaces. For instance, it is believed that these systems will have a positive impact on traffic accident rates, i.e., crashes resulting from driver attention deficits as they concentrate on searching for parking spaces or rush to occupy existing ones

In [5] of this journal, Anusooya (2016) says that, the main objective is to avoid the cramming in the car parking area by implementing an efficient car parking system along with a user-friendly application for an ease of use. says that, the main objective is to avoid the cramming in the car parking area by implementing an efficient car parking system along with a user- friendly application for an ease of use. the user gets to know the availability /unavailability of parking space prior to his/her entry into the parking place. Implementation involves minimal human interaction and provides a seamless parking experience thereby reducing a lot of time wasted by the user in parking his/her vehicle.

Arduino UNO:

Fig 1.1: Arduino UNO

The Arduino Uno is a microcontroller board based on the ATmega328P microcontroller developed by Arduino.cc. It is one of the most popular boards in the Arduino family and is widely used for prototyping.

The Arduino Uno board has 14 digital input/output pins, 6 analog inputs, a 16 MHz quartz crystal, a USB connection for programming and power supply, an in- ICSP head and a reset button. It is compatible with a wide range of sensors.

IR SENSOR:

Fig1.2: IR Sensor

An IR sensor or infrared sensor is an electronic sensor that detects infrared radiation in its environment. Infrared sensors work by emitting and detecting infrared radiation, which is electromagnetic radiation with wavelengths longer than visible light but shorter than radio waves.

Infrared sensors are commonly used in a variety of applications including remote controls, motion detectors and proximity sensors. IR sensors usually consist of an IR emitter and an IR detector mounted in a single housing.

The IR emitter emits infrared radiation which is reflected by nearby objects and detected by the IR detector. The distance and reflectivity of an object can be determined from the intensity of reflected. The infrared sensor can be used to detect the presence of objects, measure distance and even detect temperature changes. They are widely used in automation and control systems, as well as consumer electronics..

ZIGBEE MODULE:

Fig1.3: Zigbee Module

The Zigbee module is a wireless communication module based on the Zigbee protocol, a low-power wireless mesh networking protocol for Internet of Things (IoT) applications. Zigbee modules allow wireless communication between devices, creating a network of devices that can be controlled and monitored remotely.

Zigbee modules typically consist of a Zigbee transceiver, microcontroller, and antenna, all

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housed in a single module. The Zigbee transceiver is responsible for sending and receiving data wirelessly, while the microcontroller handles data processing and communication. Zigbee modules are widely used in various IoT applications, including home automation, smart lighting, environmental monitoring, and industrial automation. They offer several advantages over other wireless communication technologies, including low power consumption, reliable communication, and interoperability with other Zigbee devices.

LCD DISPLAY:

Fig1.4: LCD Display

An LCD or liquid crystal display is an electronic display that uses liquid crystals to produce images and text. LCDs are used in a wide variety of electronic devices, including calculators, watches, smartphones, laptops.

The LCD display consists of several layers, including a background, a liquid crystal layer and two layers of polarizing filters. When an electric current is applied to the liquid crystals, they align themselves so that light passes through or blocks them, producing the images and text displayed on the screen. The LCD can be monochrome or color and can display a variety of colors and shades. They can be designed as transmissive, reflective or transflective, depending on their intended use and environment.

RFID SCANNER:

An RFID scanner or radio frequency identification scanner is a device used to read and record information from RFID tags or transponders. RFID technology uses radio waves to communicate between a reader and a tag, enabling wireless communication and identification.

The RFID scanner usually consists of an antenna, a radio frequency module and a processing unit. The antenna is used to send and receive radio waves while the radio frequency module is used to interpret the signal received from the antenna. The processing unit is used to process data received from the RF module and interface with other systems.

The user to register themself through the mobile application launched, which indeed stores user's information onto the server. After registering into the parking system the user has the privilege to go into the application and checkout for a free parking space available for parking. The application is updated each time when the vehicle is detected on the parking area with the help of IR sensors. IR sensors are sponsible to detect if a particular slot contains vehicle or not. Vehicle identification is done with the help of RFID tags which are present on each vehicle. RFID readers are present on the parking area which captures the RFID information of each user. Before entering the parking, IR sensors and RFID tags work together to know which vehicle is being parked with time stamps. All of the data generated above is stored and retrieved from the database.

Fig1.5: RFID Scanner

BLOCK DIAGRAM:

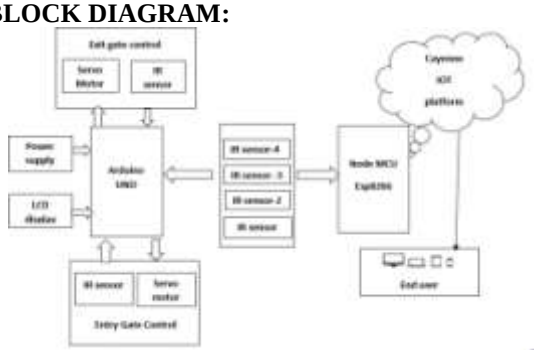

Fig1.6: Block Diagram

This project uses the concept of IOT and suggests
We created an algorithm of functions based on the described requirements for the operation of the information system. Our proposal has the form of flowcharts for better understanding and clarity.

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III. APPLICATION, ADVANTAGES, DISADVANTAGES:

Application:

A smart parking system is a technology-driven solution that uses sensors, communication networks and software applications to manage and optimize parking resources. Here are some potential applications of smart parking systems:

Real-time parking availability: Smart parking systems can provide drivers with real-time information about available parking spaces in a specific area. It can help drivers save time and ease traffic jams by guiding them to available parking spots.

Reduce traffic congestion: By providing drivers with information about parking space availability and directing them to the nearest available space, smart parking systems can help reduce congestion and improve traffic flow in urban areas.

Efficient use of space: Smart parking systems can help parking lot operators and city planners optimize parking space utilization, reduce waste and increase revenue.

Better security: Smart parking systems can provide better security by monitoring the parking lot and identifying suspicious activity. This helps deter theft, vandalism and other criminal activity.

Environmental Benefits: Smart parking systems can help reduce air pollution and carbon emissions by reducing the time drivers spend bypassing parking spaces.

Increase revenue: By optimizing the use of parking spaces and reducing waste, smart parking systems can help parking lot operators and city planners increase revenue.

Improved user experience: Smart parking systems can provide drivers with a seamless parking experience, guiding them to available spaces, facilitating payment, and providing real-time information on parking space availability.

Overall, smart parking systems can leverage technology to optimize parking resources and improve the parking experience, bringing many benefits to drivers, parking lot operators and city planners.

Advantages:

Smart parking systems using IoT technology have several advantages over traditional parking systems, including:

1. **Improved parking efficiency:** Smart parking systems can optimize the use of parking spaces, reduce parking time that drivers spend looking for parking spaces and improve parking efficiency.
2. **Real-time parking space information:** Smart parking systems provide real- time parking space information, allowing drivers to quickly find available parking spaces and reduce traffic congestion.
3. **Carbon Footprint Reduction:** Smart parking systems can reduce the carbon footprint of parking by reducing the time drivers spend looking for a parking space, thereby reducing vehicle emissions.
4. **Improved parking security:** Smart parking systems can improve parking security by using cameras and other sensors to monitor parking spaces and detect unauthorized activity.
5. **Enhanced User Experience:** Smart parking systems provide drivers with a convenient and seamless parking experience, allowing them to easily find a parking spot, pay for parking, and use other parking-related services.
6. **Data-Driven Insights:** Smart parking systems can generate valuable data insights that can be used to optimize parking operations, improve parking design, and inform parking-related policy decisions.

Overall, a smart parking system using IoT technology has many advantages over traditional parking systems to improve parking efficiency, reduce traffic congestion, improve safety, increase revenue and provide drivers with a better user experience.

Disadvantages:

Although smart parking systems using IoT technology have many advantages, they also have some disadvantages, including:

1. **High Implementation Costs:** Smart parking systems can be expensive to implement due to the cost of parking sensors, cameras and wireless networks. Install.
2. **Maintenance costs:** Smart parking systems require regular maintenance and updates, which can be expensive.
3. **Technical issues:** The Smart Parking System may experience technical issues, such as connectivity issues and sensor errors, which may affect the accuracy of parking availability information.
4. **Privacy issues**: Smart parking systems collect and process personal data, such as license plate

numbers and location data, which raises privacy issues.

5. **Integration Challenges:** Smart parking systems may need to be integrated with existing parking management systems, which can be difficult and incur additional costs.
6. **Limited scalability:** Smart parking systems may not be scalable enough to handle large numbers of vehicles, especially in urban areas with high parking demand.
7. **Security concerns**: Smart parking systems can be vulnerable to cybersecurity threats, such as hacking and data breaches, which could compromise the security of personal data.

Overall, while smart parking systems offer many advantages over traditional parking systems, they also face some challenges and constraints that need to be addressed to ensure their effectiveness and sustainability.

IV. CONCLUSION:

Finally, a well-designed parking system is essential to efficiently and safely manage vehicles in parking areas. The use of advanced technologies such as sensors, cameras and mobile apps can significantly improve the driver's parking experience, reduce traffic congestion and improve safety. Implementing smart parking systems can also reduce environmental impact by reducing unnecessary driving and reducing emissions. A successful parking system must take into account the needs of drivers and parking owners, and must provide a user-friendly interface that is easy to manage and monitor. Overall, a reliable parking system is essential to modern urban development, and its implementation should be a top priority everyone involved in the parking industry.

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