A NOVEL BASED SMART PARKING SYSTEM

Abstract

The Advanced Parking System using IoT, GSM, and RFID technologies is designed to provide an automated and hassle-free parking experience to users. The system consists of four IR sensors, a GSM module, an EM18 RFID module, and a Blynk application. The sensors detect the presence of a car in the parking slot and send the data to the Blynk application, which displays the real-time parking slot availability information on a virtual LED. The GSM module sends an SMS to the user confirming the booking and clearing of a parking slot. The EM18 RFID module is used to collect the parking fee from the users. The system provides an efficient solution to the challenges faced by conventional parking systems by automating the parking slot booking and fee collection process, reducing the time and effort required for parking management. The system can be implemented in various parking facilities such as shopping malls, airports, and hospitals to improve the parking experience of users.

Keywords: Smart Car Parking, NODE MCU, IR Sensor, GSM module,RFIDmodule,Blink application and LED.

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I. INTRODUCTION

The Advanced Parking System using IoT, GSM, and RFID technologies is designed to provide an automated and hassle-free parking experience to users. The system consists of four IR sensors, a GSM module, an EM18 RFID module, and a Blynk application. The sensors detect the presence of a car in the parking slot and send the data to the Blynk application, which displays the real time parking slot availability information on a virtual LED. The GSM module sends an SMS to the user confirming the booking and clearing of a parking slot. The EM18 RFID module is used to collect the parking fee from the users. The system provides an efficient solution to the challenges faced by conventional parking systems by automating the parking slot booking and fee collection process, reducing the time and effort required for parking management. The system can be implemented in various parking facilities such as shopping malls, airports, and hospitals. A recent study found that when a driver is preoccupied, it takes him about 8 minutes to park his car. This searching contributes 30–40% to traffic congestion. The main objective of the initiative that has been put into action is to find a solution to the ongoing global issue of parking cars. With the aid of open-source hardware, programmable sensors, and the Blynk application, they created a self-parking system.

II. EXISTING SYSTEM

Force supply switches the output from an ac power line to a dc output. By using a rectifier, this AC voltage is changed to give pulsating DC. By using a channel, this pulsating DC voltage is filtered, producing smooth voltage. This voltage powers the voltage controller, which converts it into a steady supply of direct current (DC) and sends it to the LCD module to display the program's various data. The stopping distance is distinguished using an ultrasonic sensor. The Arduino load up, an obstruction sensor that detects objects in front and behind the vehicle, a supersonic reach locater to determine the leaving distance, an LCD module to display various program data, a motor driver to drive a DC gear engine, and a servo motor to control the vehicle's movement are all included in this self-leaving vehicle project. It also makes use of way finding calculations. The existing system will send the information from the cameras to fog nodes and it takes higher time for processing of these images. The user will not be aware of the shortest available parking slot in the parking space and also the user will not know are there any available parking slots in the parking space before entering. Resources such as fuel and time are wasted in search of the parking slot.The search for the parking slot will also leads to accidents.

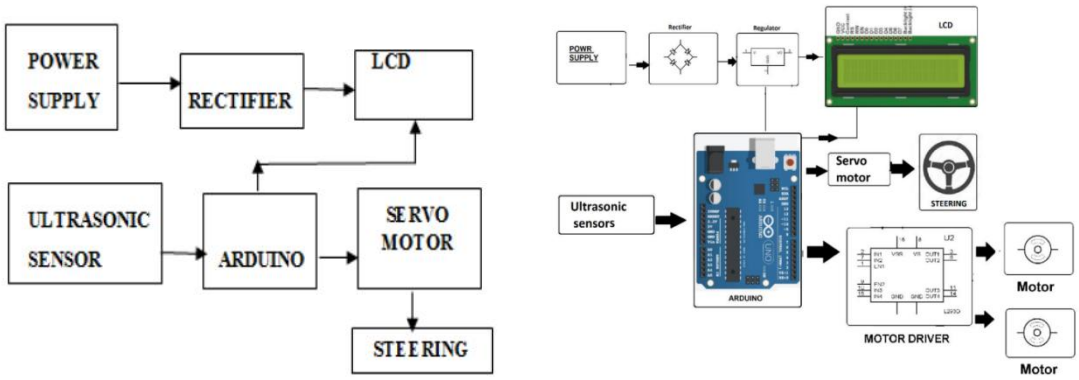

Figure 1: Block diagram of Existing System

III. PROPOSED SYSTEM

The Advanced Parking System is designed to overcome the challenges of conventional parking systems. This system is based on the integration of IoT, GSM, and RFID technologies to provide a hassle-free parking experience to users. The system consists of four IR sensors, a GSM module, an EM18 RFID module, and a Blynk application. The sensors detect the presence of a car in the parking slot and send the data to the Blynk application. The GSM module sends an SMS to the user when a slot is booked or cleared. The EM18 RFID module is used to collect the parking fee from the users. The system provides an efficient solution to the challenges faced by conventional parking systems by automating the parking slot booking and fee collection process, reducing the time and effort required for parking management. The system can be implemented in various parking facilities such as shopping malls, airports, and hospitals.

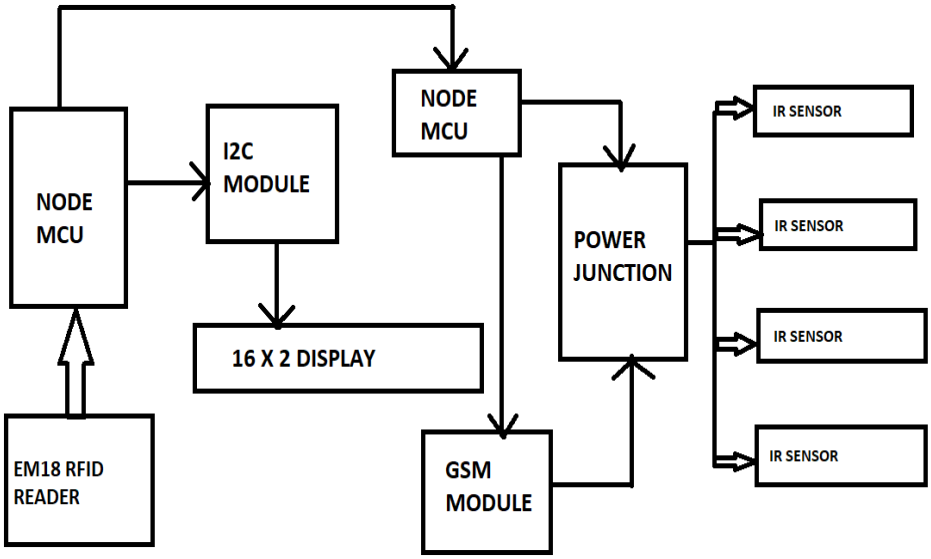

Figure 2: Block diagram of Proposed system

The Advanced Parking System using IoT, GSM, and RFID technologies works on the principle of detecting the presence of a vehicle in a parking slot, automating the parking slot booking and fee collection process, and providing real-time parking slot availability information to the users. Here is the working principle of the system:

1. **IR Sensor Detection:** The system consists of four IR sensors that are fixed in each parking slot. When a vehicle is parked in a slot, the IR sensors detect its presence and send the data to the central controller.

2. **Blynk Application:** The central controller is connected to a Blynk application that displays the real-time parking slot availability information on a virtual LED. When a parking slot is occupied, the LED corresponding to that slot turns off, indicating that it is not available.

3. **GSM Module:** The system also consists of a GSM module that sends an SMS to the user confirming the booking and clearing of a parking slot. When a user books a parking slot,

the GSM module sends an SMS to the user confirming the booking and the slot number. When the user leaves the parking slot, the GSM module sends an SMS to the user confirming the clearing of the slot.

4. **EM18 RFID Module:** The system also includes an EM18 RFID module that is used to collect the parking fee from the users. When the user enters the parking lot, the system reads the RFID tag attached to the vehicle and records the entry time. When the user leaves the parking lot, the system reads the RFID tag again and calculates the parking fee based on the time spent in the parking slot.

5. **User Interface:** The users can access the real-time parking slot availability information through a mobile application or a website. The users can book a parking slot through the mobile application and pay the parking fee using an RFID card or a mobile payment system

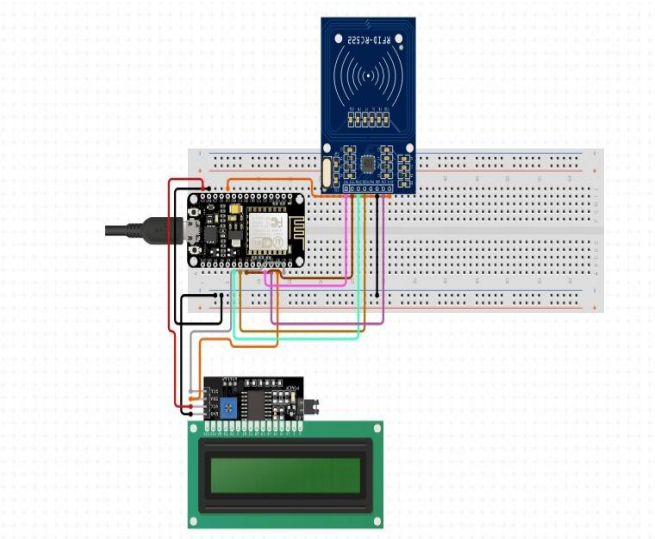

Figure 3: Circuit diagram for RFID Module

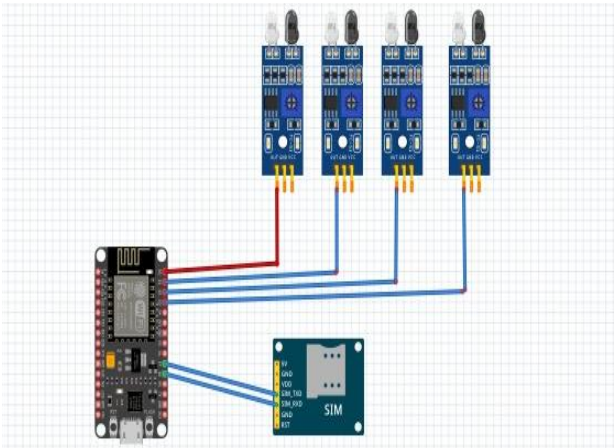

Figure 4: Circuit diagram for GSM & IR sensor

IV. RESULT AND CONCLUSION

The Advanced Parking System using IoT, GSM, and RFID technologies is designed to provide an automated and hassle-free parking experience to users. The system consists of four IR sensors, a GSM module, an EM18 RFID module, and a Blynk application. The sensors detect the presence of a car in the parking slot and send the data to the Blynk application, which displays the real-time parking slot availability information on a virtual LED. The GSM module sends an SMS to the user confirming the booking and clearing of a parking slot. The EM18 RFID module is used to collect the parking fee from the users. The system provides an efficient solution to the challenges faced by conventional parking systems by automating the parking slot booking and fee collection process, reducing the time and effort required for parking management. The system can be implemented in various parking facilities such as shopping malls, airports, and hospitals to improve the parking experience of users.

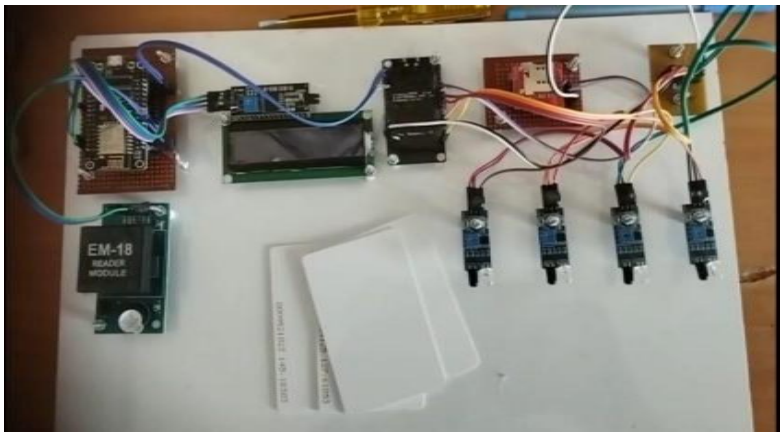

Figure 5: Implementation of Advanced Parking System Module

Figure 6: Result In Blynk Application

V. FUTURE WORK

Although the Advanced Parking System using IoT, GSM, and RFID technologies provides an efficient and reliable solution to the challenges faced by conventional parking systems, there is still scope for improvement and further research. Here are some of the future work areas: 1. Integration with Smart City Infrastructure: The system can be integrated with smart city infrastructure, such as traffic management systems, to provide more comprehensive and efficient parking management solutions. 37 2. Integration with Artificial Intelligence: The system can be integrated with artificial intelligence technologies, such as machine learning and computer vision, to improve the accuracy and efficiency of parking slot detection and fee collection. 3. Integration with Electric Vehicle Charging Stations: The system can be integrated with electric vehicle charging stations to provide a more comprehensive parking and charging management system for electric vehicles. 4. Integration with Blockchain Technology: The system can be integrated with blockchain technology to provide a more secure and transparent parking management system, ensuring the integrity and traceability of parking data. In conclusion, the Advanced Parking System using IoT, GSM, and RFID technologies provides a solid foundation for further research and development in the field of automated parking systems. With continuous improvement and innovation, the system can provide more efficient, secure, and sustainable parking solutions for smart cities and urban areas.

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