AUTOMATIC IOT BASED PARKING SYSTEM USING RFID SCANNER: A REVIEW

Ayush Kumar, Aryan Choudhary, Narendra Singh Pal

Department of Electronics & Communication Engineering, Moradabad Institute of
Technology, Moradabad, India
kayush325@gmail.com

ABSTRACT

Nowadays, parking a vehicle has become a serious concern, as a result of the growing number of automotive every place. In the document, we present an alternate solution based on IoT for users to check for space to reserve a parking spot for the vehicle and keep track of the available space in the parking area, which affords a clever solution. Its goal is to provide a smarter and enhanced parking process that crucially reduces complexity in standard parking systems. The framework can provide the real-time status of each stopping slot by implementing a detector at the parking area. The detector in the parking area detects the real-time state of the parking slot and transmits the data to the main computer system through the MCU. The collected data helps in generating the current status of the slot and provides it to the user for booking.

KEYWORDS

 IoT, RFID, IR sensor, MCU

1. INTRODUCTION

In today's world, the big problem in supermarkets, shopping halls, airports, and many other places is parking. It is because there is less count of adequate space for parking. Nowadays the number of cars in the family is more than the number of family members, and as a result, cars are increasing in the country, which makes the parking situation unhappy to meet the needs of the world. As a result, parking becomes complex which amplifies the time required to demesne the car and boosts fuel usage of a car. In the course of office hours, companies and workplaces are confronting the issue of stopping in urban regions. Now cars are more accessible for destitute families and specifically, cars take up a large room. In the course of the increase in traffic, the parking space is also inadequate in this overcrowded city. Be it in the mall, at the station, or the airport, parking problems are big problems. Utmost of the time individuals expend their time looking for space to park their cars. So, there is a lot of traffic congestion that leads to the tedious task of finding a parking space to park their car. This eventually brought about a boom in pollutants and impacts worldwide warming via way of means of growing it in small proportion.

2. METHODOLOGY

In the system that we have presented, the user follows some steps which are as, firstly checking the slot on the server for a particular parking location and checking the availability of parking space in that parking location. On analysing the slot as vacant the user can book their slot accordingly.

If the user finds the slot as occupied, then they can look forward to a while again check the status if there may be a slot that is vacant after which book their slot. After booking their slot, when the user arrives at the parking location the user will use the RFID tags which are provided to the user, to verify their unique identity so that he/she can park their vehicle.

3. MAJOR FEATURES OF A IOT BASED PARKING SYSTEM.

1. The time consumed in searching parking spaces can be avoided.

2. Decrement of lines as drivers will be directed to parking lots.

3. Reduction of lines as drivers will be directed to parking lots.

4. Proper car selection depending on the accessibility of the parking room.

5. The effects of online automated parking on enhanced revenue with a higher return on investment (ROI) of parking spaces.

4. IOT

Internet of Things (IoT) commenced with objects referred to as "things" and identification communique gadgets. These gadgets may be chased, curbed, or watched with the help of far-flung computer systems related to the network services.

The IoT has various meanings as it is comprised of many small components joined to form the term "IoT". Some defined it as things available in the outside world or nearby surroundings that are webbed with nodes or with any in-built devices linked to the network with the help of cables or cableless connections. The linked devices are called smart things or smart objects. Moreover, these devices also inherit smart instruments, which communicate, interact with other instruments, environments, gadgets, and many other devices. These smart devices and instruments can be operated using different microprocessors and microcontrollers such as ARDUINO, NODE MCU, Etc.

5. LITERATURE SURVEY

A few recent studies show expressing the automated online parking system by implementing IoT. And information about a prior booking parking system and its management.

Chi-Hung Chuang, Luo-Wei Tsai [1], introduced a surveillance system for parking an area administration, and consequences of this system access management reduced human resources, through the identification of car licenses. Our proposed system is based on RFID identification instead of car license recognition.

Mungai Chen [2] proposed a parking adjuration and feedback system based on a WSN system and data passed through the nodes and elutriating of data is done, and the useful data passes to the display drivers. Here, the inhibition is, if the primary sensor which is deployed at the parking slot fails or gets damaged then the entire system will malfunction.

Charlie Fine [3] RFID an era has generated lots of hype withinside the remaining few years. The foremost driving force for its improvement has been the chasing of bodily materials like people, geolocations, and objects with unmarried chips which will affiliate with computers. RFID an era has been recognized as the important thing to the IoT.

Srivastav Nandita [4] The — The information transmitted through the tag might also additionally offer identity or area information, or about the product label, along with cost, chroma, order history, and other details. In the Bar code, the scanner tool directs a mild beam on the bar code. The tool incorporates a small sensory studying element. This sensor detects the mild being pondered from the bar code and converts mild power into electric power. The result is an electrical signal that may be transformed into information to obtain results.

Giuliano Benelli [5], constructed a concept in which customers use their smartphone to permit a digital price tag to go into and go out for parking and as digital pockets to pay off offhandedly.

6. PERSPECTIVE OF THIS SYSTEM

Newly in the current scenario, with the intense boom of vehicles in towns, space for parking vehicles is extreme and may get worse as time passes.

The vision of the project is carried in the following steps: -

i.   A host server for the current status of parking vehicles.

ii.   Then accordingly booking parking slot from home using RFID tags.

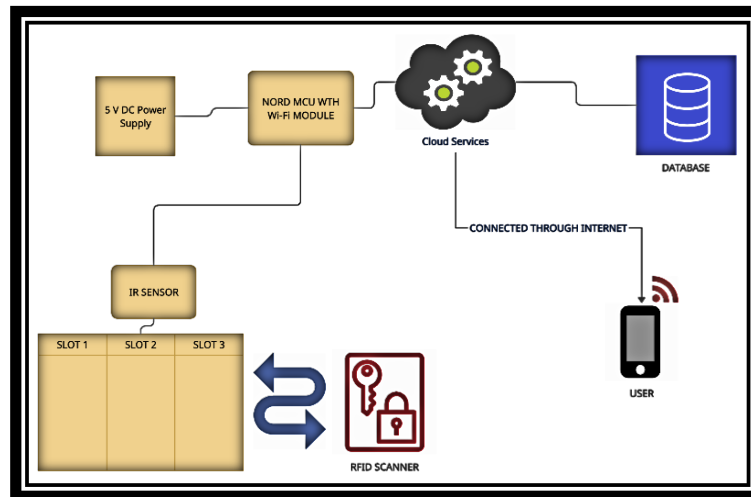iii. Verifications of their booking at the parking station using RFID tags.

Figure 1: Block diagram for the System

7. ENACTMENT OF THE SYSTEM

The enactment of the project is carried out in two distinct stages.

I.   Implementation of Software Stage.

II.   Implementation of Hardware Stage.

7.1 IMPLANTATION OF SOFTWARE STAGE.

In this stage, we have developed a simple Google Firebase server. Where users can search for the vehicle parking slot and simultaneously book their slot.

7.1.1 COMPUTER SERVER

In computing, a server is a bit of computer hardware or software entity (a computer program) that gives the capability for different applications or devices, referred to as "clients". This structure is referred to as the purchaser–server model. The computer servers can offer several functions to operate with, regularly referred to as "services", including sharing facts or sources amongst more than one client, or acting computation for a purchaser. An unmarried server can serve more than one client, and an unmarried purchaser can use more than one server.

7.2 IMPLEMENTATION OF HARDWARE STAGE.

The areas specified for a parking place are enrolled with IoT-based components and sensors which consists of an RFID scanner to identify the tags for a unique user which is connected to the server for cross verification. The IoT device (IR Sensor) updates the status of that slot that is vacant or parked in any car.

The Microcontroller holds back the sensor information and provides it to the main server with the help of API. The API is developed on the web using PHP. The Cloud server receives the data using API and reserves it in the database. When the user examines the parking room, the cloud server manipulates the information to exhibit the real-time result of the parking slot.

8. EQUIPMENT USED

8.1   Power Supply - The power supply of the IoT equipment is provided with 5V DC because the proposed system operates on 5V DC.

8.2   Wi-fi Module - The system uses Node MCU (Micro Controller Unit). The Node MCU is comprised of ESP8266 Wi-Fi as well as a Node microcontroller for performing different operations. It has 3 Megabits of ROM for uploading a sketch in ARDUINO IDE.
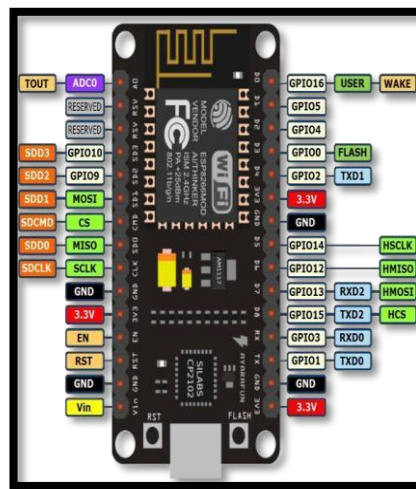

Figure 2 : Pin representation of Node MCU

This microcontroller is a notable, affordable Wi-Fi module designed with the addition of Wi-Fi capability which performs microcontroller tasks via a UART serial connection. The module may be manipulated to behave as an independent Wi-Fi-related component.

Characteristics of ESP8266 are given below:

➢ 802.11 based protocol
➢ Wireless Fidelity (Wi-Fi) D2P

This Module is an autonomous SOC (System on Chip) an incorporated TCP/IP-based protocol bundle that could hand over other MCU connections on your Wi-Fi network. This Wi-Fi module can do both website hosting and utility or offload all wireless networking features from some other utility proceedings. Every Wi-Fi module comes pre-programmed with an AT command set firmware, through which you can connect this up on Arduino IDE and obtain a great deal of Wi-Fi-cap potential as a Wi-Fi protecting guard. This Wi-Fi module is a pennyworth SOC with many users growing tremendously.

This module has an effective sufficient onboard processing and garage functionality that allows it to be incorporated with the actuators and different utility unique things thru its pins with minimum enhancement up the front in addition to minimum loading at some stage in runtime.

8.3   RFID- It will be used for the identification of the unique use for a specified slot. RFID tags will be provided to the user which acts as their identity card. It consists of two parts one is an active element, and the other is a passive element.

8.4   IR Sensor - It stands for Infrared Sensor Module. It consists of segments IR transmitter and IR receiver. Here, the IR transmitter sends out IR radiation at a very low scale intensity, the radiation gets reflected due to the existence of any objects in front of the sensor. The reflected

radiation is received by the second segment which is the IR receiver of the IR sensor module. The sensor comes with a sophisticated and steady response in low light or a blackout situation.

An IR Transmitter is a light-emitting diode (LED) that radiates infrared radiations. Therefore, they are known as IR light-emitting diodes for the fact that an IR light-emitting diode looks like a basic light-emitting diode, but the radiation transmitted through it cannot be seen using naked eyes. Infrared receivers are also referred to as infrared sensors as they spot the beam from an IR transmitter. They come in the model of photodiodes and phototransistors. IR Photodiodes are distinct from standard photodiodes as they are specific to IR radiation. Entrenched from the magnitude of the acceptance of radiation by the IR receiver, the efficiency of it is calculated.

9. CONCLUSION

The increase of the IoT has provided upward thrust to upcoming opportunities in segments of clever towns. Automated areas for providing online parking facilities and vehicles arrangement structures have usually been in the middle of building clever towns. The idea we proposed here, is that we pact with a complication of parking and gift IoT-equipped RFID areas for parking. Devices that we suggest give actual status facts concerning the vacantness of parking rooms in parking places. Users from any place can prior book a parking slot for them by using our server. An attempt to make this paper is to enhance the parking centres from small towns to large cities and hence, desiring to beautify the best of the existence of its people.

With the automated system, the consumer will be able to view the current status of parking rooms in big buildings, airports, colleges, hospitals, and other public parking areas. In consequence, consumers can be able to decide for their vehicles and act accordingly.

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Authors

Ayush Kmar is student of B.Tech 4th year in electronics and communication Engineering department in Moradabad institute of technology Moradabad. He is doing major projects on IOT Platform

Narendra Singh Pal is Assistant professor in MIT Moradabad. He is Ph.D. in Image processing and published many research papers in reputed journals.