Smart Parking System using IoT

Gaikwad S. G.[1], Prof. Kale S.D.[2]

[1]Department of Electronics, ME (II) Digital Systems, SVPM's C.O.E Malegaon (BK) – 413115, Maharashtra, India
[2]Department of Electronics, SVPM's C.O.E Malegaon (BK) – 413115, Maharashtra, India

Abstract: **Now a day's car parking has become a significant issue in urban areas with lack of parking facilities and increased amount of vehicles, due to this driver who is searching for parking space they were roaming around the city in peak hours. We can book the parking slots by using a mobile app. This prototype is developed using a sensor circuit, RFID and IoT. RFID used here to detect the car details, IR sensor is used to find the presence of the car and all details are collected from remotely through IoT. This system helps the user to find parking space availability with the help of the Internet of Things (IoT) technology by providing parking free space information. Drivers can book the slots in advance and the parking information updated in server. This prototype developed for the parking system with less human interaction increases flexibility and security. This system is employable in airports and multiplexes parking, which saves time.**

Keywords: **IOT, Smart, RFID, Mobile App, GSM, NODE MCU, UCD.**

I. INTRODUCTION

Presents day's Parking spaces are large for airport or multiplexes, so it's challenging to maintain the system manually. The big issue with car parking is that improper parking and damages other cars while parking the vehicle. Hence the damaged car parking owners unhappy with parking management and get frustrated. The car parking system communicates with every slot to server. Car parking management system guides the user to park the car correctly and maintain the database. Hence we can find who damaged the vehicle. That causes a waste of money and time. So if we have parking space information, we can plan for booking based on the requirement, for that we developed a prototype of car parking management system using the Internet of things.

As an increase in population, ultimately there is an increase in the number of vehicles. This increased number of a vehicle problem is managed by the present traffic control system efficiently. But this current traffic system based on the predefined hardware which is the program that does not have real-time flexibility which means it cannot be controlled & take decision its own or as per the requirement of traffic conditions.

II. LITERATURE SURVEY

Paper **[1]** proposed Present day's car parking has become a significant issue in urban areas. The causes of traffic waste of time and money. **Methods:** This prototype is developed using a sensor circuit, RFID and IoT. This system helps the user to find parking space availability with the help of the Internet of Things (IoT) technology by providing free space information. The IoT maintains the database of the parked vehicles through a shared server. So drivers can book the slots in advance and the parking information updated in server.

Paper [2] suggests the Internet of Things (IoT) played a vital role in connecting the surrounding environmental things to the network and made it easy to access those un-internet things from any remote location. Generally, people are facing problems with parking vehicles in parking slots in a city. In this research, we design a Smart Parking System (SPS), which allows the user to locate the nearest parking area and provides the availability of parking slots in that respective parking area. And it mainly focuses on decreasing the time in finding the parking lots and also it avoids unnecessary travelling through filled parking lots in a parking area.

Paper [3] is issued in the International Journal of Computer Application in which it suggests to find out the available vacant parking space in the central city area is most in parking space. If the particular parking slot is empty, then that parking slot can be reserved for parking by any car driver using QR code verification before reach to that specific place. For QR code verification webcam is used. This kind of parking system is useful in a mall or for company parking.

In Paper [4] parking slot is allotted as per the size of the vehicle. At the entry of parking system size of the car is considered if the vehicle size is large for example truck or any heavy vehicles then for such vehicles token is given to parking the car at ground floor. If the size of the car is small, then such vehicle is a park on a different level. That means according to vehicle size parking place is different, and also charge varies. In short, this system is building a box type parking system.

On LCD nearest parking place is display and system alert the driver using buzzer if the vehicle is in no parking zone.

III. RELATED WORK

3.1 Problem Definition

There are significant challenges in testing today's transportation systems regarding specific parking systems. Many recent studies have led to the conclusion that new smart parking systems are required in almost every metropolitan city

in the world to lighten many problems, such as petrol consumption and pollution emission, and to improve time-saving and lessen the frustration when looking for a parking space.

3.2 Objectives

For any proposed system to be studied smart about the parking process, it should have as a minimum, the following factors and objectives.

1. Guide users about parking.
2. Enable smart choices to be made using data, including present status applications, and traditional analytic reports.
3. Be able to give the user with all the relevant information about the situation of any changes in the parking area that might appear in real time.

3.3 Existing System:

Free parking space allotment system as per the arrival of the car. No any provision to understand parking is full or vacant.

IV. PROPOSED SYSTEM

This system is developed using a sensor circuit, RFID and IoT. RFID used here to discover the car details; IR sensor is used to find the presence of the car, including space information.

This system also helps the user to find parking space availability with the help of the Internet of Things (IoT) technology.
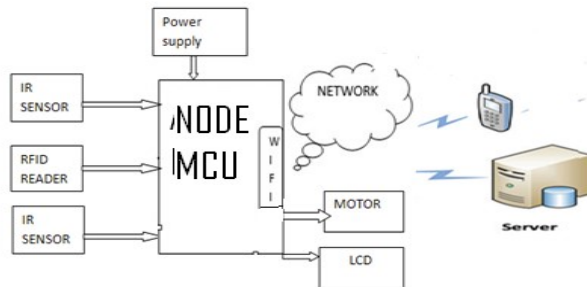

Fig1: Proposed System Block Diagram

The proposed system consists of software as well as hardware components:

1. Hardware:

    a. IR sensor

    b. NODE MCU

    c. RFID reader tag

2. Software:

    BLYNK APP

This system consists of different modules to perform parking management. Those are 'online booking', 'parking entrance system'.The user faces the problem of finding parking places in and around the city for solving that problem.

We can develop an online booking system by using this we can book the parking slots in advance like movie tickets booking online by using a mobile app. The database provides parking availability information if there are any free slots available, and then we can book the new slot.

This parking entry system uses motor, LCD and an RFID reader. IR sensor is used to know the presence of the car for parking; motor is utilized to open the barrier; LCD is used to display. Inside the parking slot IR sensors are present to find parking availability. The RFID reader is used to detect the car details like id, owner name etc. If every user booked online his parking space, then allowed to park car. The LCDs the allotted parking slot and parking status also. This allotment details continuously updated to the database. When the car appears at the parking location, then it deals by parking management module.

Parking Management System this part provides directions to the owners to park their car correctly.. Now RFID reader reads the car's RFID tag, if allotted car RFID is not matched with present detected car RFID, then parking not allowed.

V. OTHER SPECIFICATIONS

5.1 Advantages:

1. Helps user to find parking space availability -With the help of the Internet of Things (IoT) technology by providing parking space information.
2. Database for various investigations- The IoT maintains the database of the parked vehicles through a shared server. So drivers can book the slots in advance and the parking information updated in server.
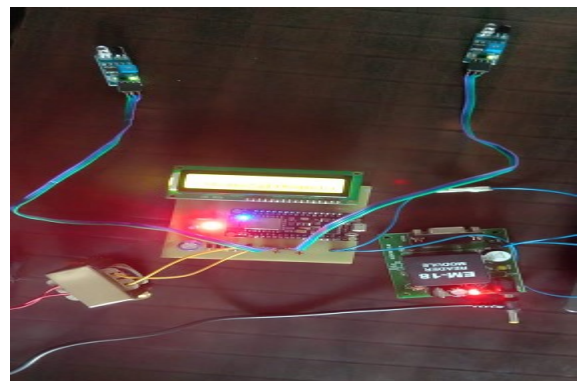3. Provide Security.

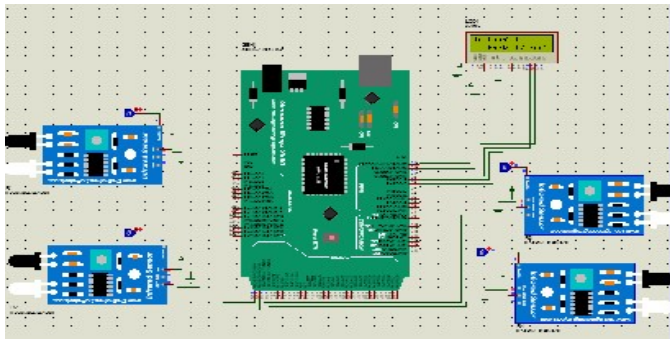*5.2 Results*

Fig- 2: Proposed System Setup
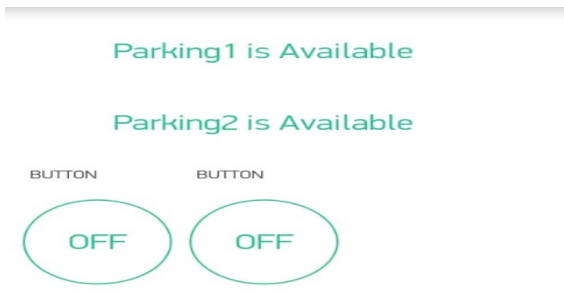
Fig-3 Simulation results.
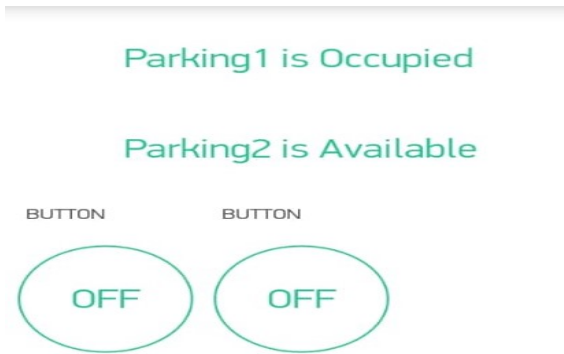

Fig-4: Status of location booking.

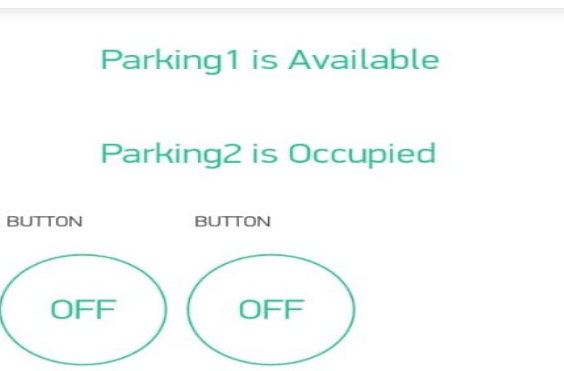Fig-5: Status of booking location 1 and location2

Fig-6: Status of booking location 1 and location2

5.3 Applications:

1. It can be applied inside the Mall for parking.

2. This system can be applied in Airports, Multiplexes and Corporate Offices

VI. CONCLUSION

IoT is the latest trending area on the internet, used to collect the information remotely. Present days everybody uses smart phones and the internet, so online booking provided the solution to predicting the parking space issue, and the user can pay parking fee online.

The RFID technology is used to detect the car identity (number plate) within a fraction of seconds.

We could send messages through the internet if we achieved that reduce the cost of the hardware.

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