



IoT Based Smart Parking System Using Nodemcu and Android Application for Slot Status

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ABSTRACT

As we known India has the largest population in the world. This leads to more vehicle traffic, and thus a big problem of parking vehicles. People in cities suffering a lot for parking their vehicles and being fined by police. To make this problem easy, The proposed Smart Parking system consists of an on-site deployment of an IOT module that is used to monitor and signalize the state of availability of single parking space or slot. The IR Sensor is utilized with NODEMCU and BLYNK APPLICATION to indicate the empty slot. By measuring the distance using IR sensors drivers are able to find the empty slot in parking to park the car and help the driver to find the slot easily and reduce the searching time. As the parking place is found to be empty it is detected using IR sensors which report it further. We achieved this by programming the sensors and NODEMCU

KEYWORDS: IoT, ESP8266, IRsensors, Parkingslots, Carparking, Android application.

1. INTRODUCTION

"A real-time system controls the environment by obtaining data, processing it, and giving out the results sufficiently, immediately to affect the environment at the same time." [16] "The Internet of things (IoT) is the use of Internet in physical devices and objects we interact with on a daily basis. Composed of internet connectivity, electronics, some hardware components, these devices can inter-communicate and interact with other components over the Internet. These different devices can be remotely monitored, analyzed and controlled." [16]

This position paper describes smart car parking system based on IOT. Vehicle parking is anote worthy issue in present day which has clogged urban communities of today. There are basically an excessive

number of vehicles out on the road and comparatively insufficient parking spaces. This has prompted the requirement for proficient smart parking frameworks which will provide ease and consume less time in searching for parking spaces. In this way, we exhibit the utilization of IoT based framework that takes in to consideration productive parking spot use that saves space and time. To exhibit the idea, we use IR sensors for detecting the vehicles which arrives at the parking lot. We presently use ESP8266 microcontroller as the main unit for managing all the hardware functionality of our concept. This microcontroller has an inbuilt Wi-Fi module for web connectivity and other services.

We use cloud-based server space for maintaining an online database and for handling the hardware signals coming to and from the ESP8266 and the user

application. The framework identifies if parking spaces are occupied or not with the help of IR sensors. Likewise, it utilizes IR innovation to detect if a vehicle has arrived at the parking space. The frame work per uses the quantity of parking spaces accessible and refreshes information with the cloud server. This enables clients to check for accessible parking spots online for many place. Consequently, the frame work reduces the time-consuming parking issue for urban areas and get clients a productive IoT based parking system framework.

2. PROBLEMSTATEMENT

The parking management problem can be viewed from several angles. Limited number of parking lots, drivers not knowing where parking lots are, drivers not sure if parking lots have enough space and a tendency to park illegally on the roads.

Due to above such issues, major problems faced by people are consumption of fuel, pollution, wastage of time, mental stress, etc.

3. PROPOSEDSYSTEM

Smart car parking system helps us to reduce chaos of vehicles for parking place. Most of the time, in case of some places, there is no parking space available. So that, people park their vehicles on the road itself. This creates very bad picture and acts as a hurdle in everyone's life. This project is useful for avoiding this situation.

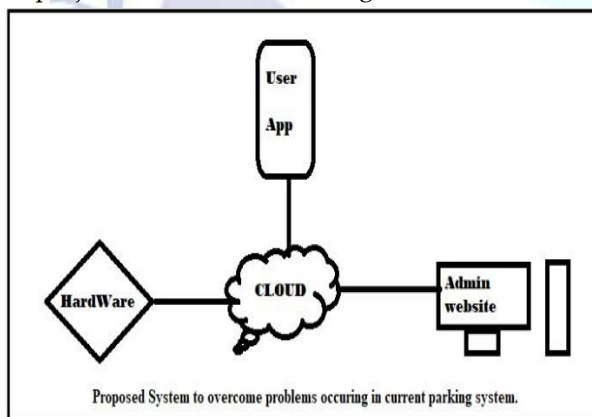


Fig. 1 Proposed System to overcome problems occurring in current parking system

Fig.1 drawn above demonstrates four important part of smart car parking system including hardware, cloud, admin website and a user application. As per the live data present at the cloud we provide its access to the user application. By using this data user get knowledge of number of available parking slots as well as occupied

parking slots. The user can book slot according to his/her choice from available parking slot. As a result, the state of parking resources is changed by user's parking decisions. All this information is updated on admin website. The admin has an authority to accept or decline user's request. This entire database is uploaded on cloud and admin handles it. The hardware is connected to the user application with the help of cloud.

Hardware used in this system i.e. IR sensors detects whether the car is present their or not and then it will pass this information towards MCU8266. MCU will update this information on cloud. With the help of databases collected, admin can keep account of each user.

Due to this proposed system fuel as well as time for searching parking space will be reduced. It will be helpful for user and unorganized parking on the road will be reduced.

4. IMPLEMENTATIONANDWORKING

Before this section, we have discussed about the architecture and technical terminologies that are used in the smart parking. Here we are going to see how actually in real world this Smart Parking is going to work.

For this, we have designed a flow chart elaborating the flow of working of Real Time Smart Car Parking System using IoT

A. Flow Chart

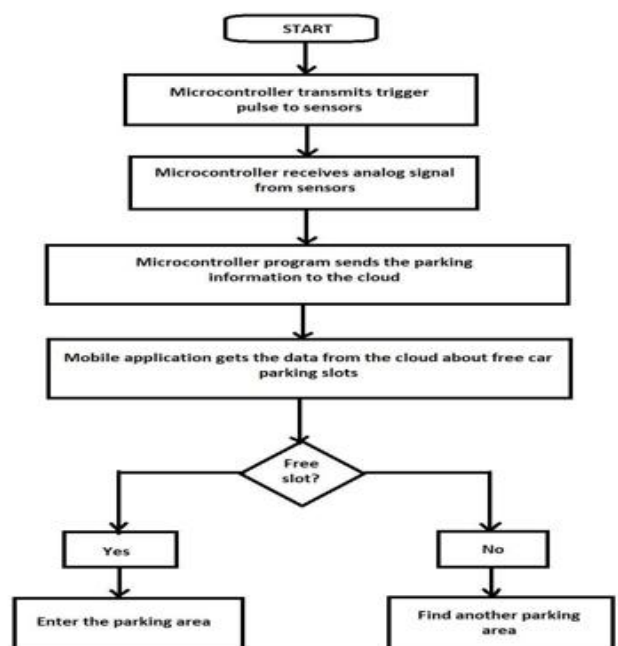


Fig.2 Flow Chart of smart car parking system using IoT

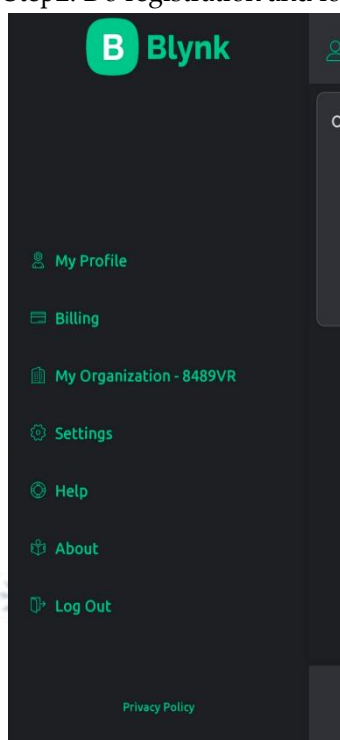
B. Steps Involved

We have formed a real- world model representing the minimized view of the parking lot structure. We applied all the systems their and checked how actual system is going toper form.

Here are steps:

Step 1: Complete the installation of smart parking android application at user side.

Step2: Do registration and login.



Step3: Click on book slot. You will get status of all available and parked slots.

Step4: Click on available slots to request for parking.

Step 5: Now request will be get updated to admin panel. When you reached the parking area admin will accept your request and allow you to enter.

Step 6: IR sensors are continuously detecting that if car is arrived or present or not.

Step7: If cargets detected the nitgets updated on application as well as website via cloud.

Step8: Whenever you will leave the parking lot, the particular parking slot gets free and updated on each platform.

5. RESULT

To get proper understanding of the system it is mandatory to analyze all kinds of results we are receiving from the system. By all such analysis we are possible to reach our desired results. The previously mentioned procedure for booking a space is explained

with the assistance of the following screen captures.

The figure3 describes the registration and login page for the user application

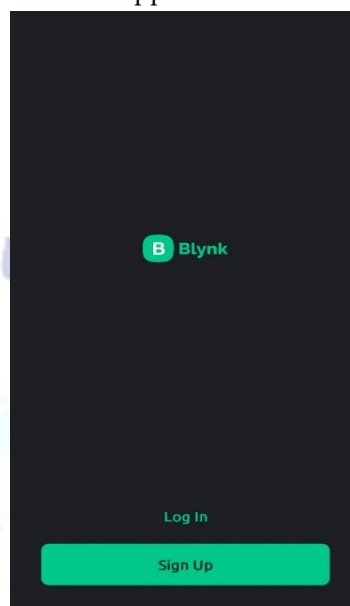


Fig.3 Registration page and login page of user application

In fig 4, here the red parking slots shows us that they are occupied, white parking slots are requested by user but didn't arrive at the location yet while red parking slots are totally available for the booking.

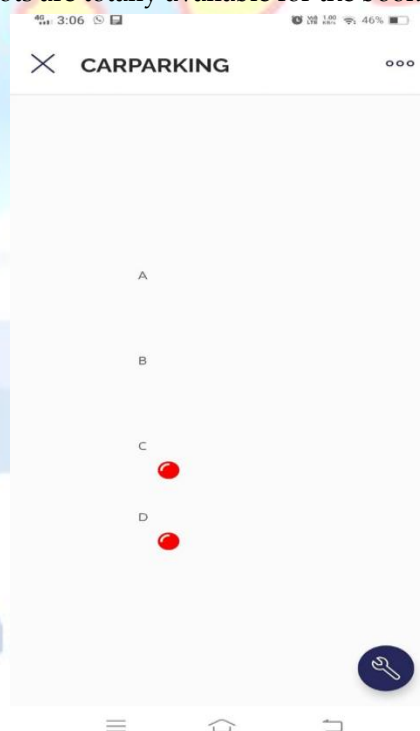


Fig.4Parkingslots

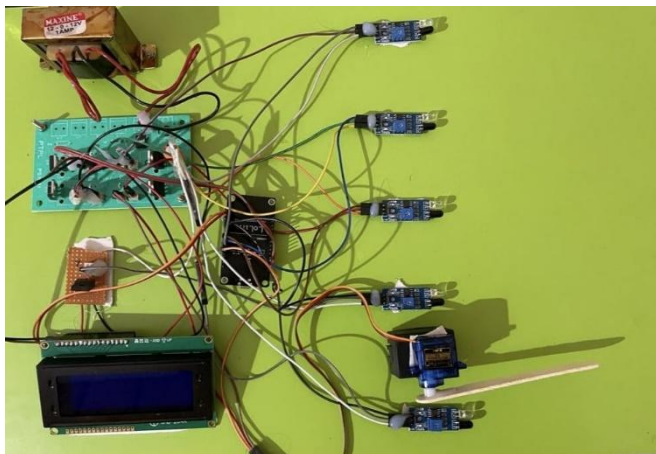


Fig.5 shows live status of parking slot at admin panel

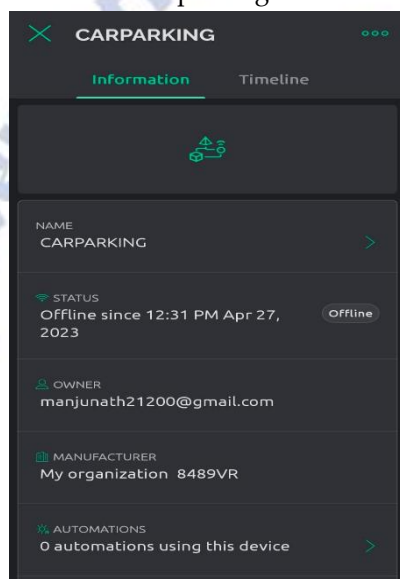


Fig.5 Admin Panel

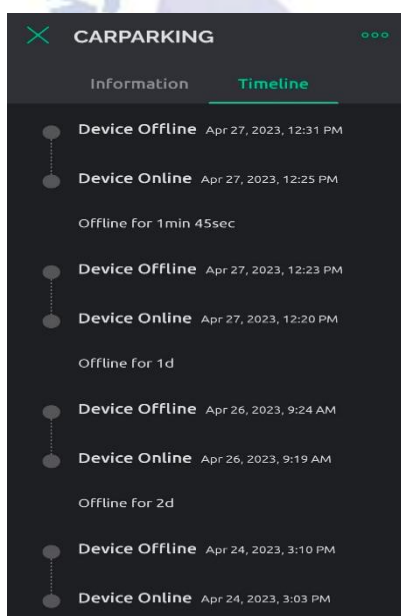


Fig. 6 slot status list at admin panel it also shows entry and exit time according to real time system.

We design a hard ware to achieve this work. In which we design a pcb to fulfil our needs of the hardware where we can put nodemcu 8266 that is iot wi-fi module, ir sensors and leds.

6. CONCLUSION

The idea of Smart Cities has dependably been a revolution for human kind. Since there cent years substantial break throughs have been made in making keen urban areas areality. The development of Internet of Things and Cloud advances have offered ascent to new potential outcomes as far as brilliant urban areas.

We have introduced a constant real time smart parking system utilizing IOT which disposes of the need to scan for parking spots and to productively choose and pre-book the ideal parking space. The user is thus feasible enough to get a parking slot a sperits own choice at any time and from anywhere using just the mobile application. The whole system works in real time as well as lots of problems like wastage of time, fuel consumption, pollution, etc. are minimized drastically.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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