**SMART PARKING SYSTEM WITH DISPLAY OF SLOT AVAILABILITY**

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**Abstract: In the era of Smart City, there is need of Modernized and Synchronized systems as compared to conventional and time-consuming technologies. Smart Parking System is one of the finest solution for problem involving where people find random parking allotment as an inconvenient way of parking system. In this study we found that IOT(Internet Of Things) is the best approach to solve this problem. Using Raspberry Pi, some parking sensors and using some IOT protocols we have proposed an immense model involving and checking of availability of parking slots accordingly. This model also provides flexibility for adding new features in it. This makes more convenient and easy to use the proposed model. Also this paper provides basic infrastructure which will work in flow.**

**Keywords: IoT, ESP, IR, Raspberry Pi, Smart Parking, Booking slots.**

I**. INTRODUCTION**

As we know IOT has lot of applications, it is one of the most modernized and beautiful technique we have seen.

Internet Of Things is combination of hardware and software networking. But we always found Communication and Networking are the most important parameters for any IOT module or application. Sensors play crucial role in deciding physical parameters.

In urban areas, car parking becomes critical issue with increased number of cars. A study showing that 30% of the cars in the traffic jam are looking for parking space and on an average eight minutes is required to find a parking space [1,2]. This results in wastage of energy, money and time. To overcome these drawbacks park IT is a plat­form independent mobile application working for parking management system .In case of dynamic vehicle park­ing first come first serve based GSM/GPRS framework is used without manual interaction [3]. To reduce the parking damages an intelligent valet parking system is designed, it guides cars automatically to park the car within parking slot. AMR sensors are used to get accurate availability of parking spaces. By using neural networks, we can specify the vacant spots extracted from parking spaces and by adjusting light intensity we can predict the slots at night time. With great revolution in IOT brings flexibility to the user, it will provide parking availability and maintenance of database can be possible through a web interface.[1].

The most important features of IoT include artificial intelligence, connectivity, sensors, active engagement, and small device use.

# ii**. SYSTEM FLOW**

In parking system, to register for parking it should be checking availability of free slots. If there is empty slots then user is allow to park otherwise it can’t. Another person cannot park if it’s reserved or allocated. If user wants to book then he/she will have to fill up form that include Name, Email id, Number and other required information. Once he/she finish the registration then they are allowed to park wherever the slots are allocated for them. User can also manage time and date during registration.

Once it’s confirmed then they are allowed to park. And sensor will detect the vehicle and changes its value. For people’s convenience it would be better if it provides booking mechanism.

This parking exit system contains peripherals similar to parking entrance system. During entrance the count variable will increment and it’ll decrement automatically when car will go out. The system works in this flow. Here below also show diagram of proposed parking system model.[2].



Figure 1.1

Above figure shows flow of how whole mechanism will work.

# III.**PERTICULAR CASE WHEN CAR GETS IN PARKING SYSTEM:**



Above figure shows exact flow of III. System

When booking gets confirmed and after a while user gets into the building. Person parks at the particular booked slot . Each slot has IR sensor, when IR sensor senses the presence of the car. The system gets the notification that car is arrived at particular slot. The sensor returns the value to zero and flag is also set to zero. And the final procedure stops.

At the instant when the car enters the parking area, IR sensor at the entry point detects the car, and increments the counter.

# **IV. Exit Algorithm:**

The exit algorithm is kept simple as possible. The user has to first un-parks his car from the particular parking slot for which he/she has booked. When it happens, IR sensor sense the change and turns flag to 1, the value which is also return by IR sensor when there is no obstacle sensor senses. After this, the particular slot gets free and it is shown in slot availability both in app interface and website.



Above figure shows exact flow of final system. In this way all the three modules gets in flow to work.



**THE MAIN ARCHITECTURE**

Our main system architecture is built on Firebase as a central module. When the data gets changed in Firebase from ESP and sensor the reflection should appear in App Interface and Website. We are using JSON format for that. We are using JavaScript and jquery for this purpose.

Embedded C is deployed on ESP side. We should make sure that whole system is working on single Wi-Fi system. We are not using any broker in the system , no MQTT protocol is used.

There is directly Point-to-Point Protocol(PPP) Communication between devices and there is good level of synchronization between them. Main architecture is always important in such IOT Systems.

**V.CONSTRAINTS AND DIFFICULTIES:**

* More advanced sensors than IR like Ultra Sonic and Magnetic sensors.
* Human Intervention/Error.
* No payment system for booking.

CONCLUSION

* In this paper, I have made an attempt to brief you about the Smart Parking System we’ve built. The point is that we were working under some constraints and it was not feasible for us to work with sensors having more precision. The proposed system is very flexible to add new features which will work in flow. We learned and explored new concepts about IOT.

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