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Android Based Optimum Configuration for Car Parking

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Abstract: *Searching for parking space in cities not only consumes time but also becomes inconvenient during peak hours. This leads to traffic congestion and wastage of fuel. The smart parking system is an integrated system to organize cars in public parks. This provides beneficial information about the availability, car parking suggestion and guidance, mapping of the parking IOT and real-time notifications. It offers customers the possibility to reserve their parking slots in advance. IR sensors and Raspberry Pi are used to detect the vehicle movement and number of available parking slots. The IOT based real-time information is provided on the android app and it is user- friendly. QR code is used for the secured access. The app helps the user to find real-time parking space and is accordingly navigated. It is cost-effective, saves time and reduces traffic. Commercial complex or residential complex owners can get a full control over their parking system, thus it provides efficient management solution.*

Keywords - *Android app, DC motor, IR sensor, QR Code , Raspberry Pi.*

I. INTRODUCTION

Nowadays in parking slots there is no standard system to check for parking spaces. However, drivers in the fast-paced world can't judge whether a parking slot is available on demand. The parking slots are dependent on human to human interaction which is inefficient. Previously, various techniques have been proposed to overcome such problems like Short Messaging Services, Zigbee, RFID, etc. Often when users go to malls and commercial complex, they experience that there is a limited space for parking slots, especially on prime hours. Hence, there is a desperate need for a robust parking system that, will enable us to reserve the parking slots. It is a necessary to collect real time information from parking slots of malls, commercial complexes, and multilevel car parking systems. To overcome this disadvantage, smart urban parking detection with reservation option using cloud-based environment is proposed. Problems such as traffic congestion, limited car parking facilities and road safety are being remitted by IoT. This paper is based on the design and implementation of a prototype of Reservation-based Smart Parking System (RSPS) that permits drivers to effectively locate and withhold the vacant parking spaces in mentioned. With the help of algorithm system checks parking status periodically from the sensor set up in parking spaces. The system implemented is cost efficient using WSN (IR Sensor) and develop an android based application. This system's reservation-based parking policy reduces traffic congestion caused by search for parking.

II. LITERATURE SURVEY

According to the International Organization of Motor Vehicle Manufacturers (OICA), the number of cars manufactured in 2014 was about 60 million. With the explosive growth in automobiles, on-street parking will soon disappear, given the constraints on road space. Hence there is a determined need for multilevel car parking and which should be ingenious as well. In urban areas, one-third of cars which have reached their destination and are circling around looking for a parking space thus leading to problems like pollution and traffic congestion. In a recent survey, researchers have found that in a year, car wandering for parking created the equivalent of 38 times expenditure around the world, burning 1.7 lakh liters of fuel and producing 730 tons of CO_2. So, it is essential to control the air pollution using a robust parking system that will be used for the reservation of parking slot as well as parking spot allocation in on slot resource allocation scenario. There were previous works carried out on smart car parking. A few of them help us get ideas for our project. Pallavi Mane proposed the idea which helped to reduce the load on administrator as the manual work reduced excessively. This provides an ease in availability of parking slot and the number of free slots in that space. The user can pre-book a slot before his/her arrival. This efficiently utilized the overall parking capacity[1]. K.Sushma proposed IR sensor is used for the indication of the empty slot with a green LED. Whereas the occupied parking slot is indicated using the red LED.[2].Nastaran Reza Nazar Zadech and Jennifer C. Dela proposed a solution by providing information about the availability of slots in parking space through a smartphone application. Sensors

and raspberry pi were used at the gates of parking zones to detect cars and calculate the number of available parking slots. Client web server was used to accommodate multiple users on an Android platform. The parking system is designed for different types of parking zone (such as open space car parking and multilevel car parking); the cost of deploying the system is inexpensive due to the low demand for Raspberry Pi single board computer as a local server and sensors for each entrance gate[3].

III. SYSTEM OVERVIEW

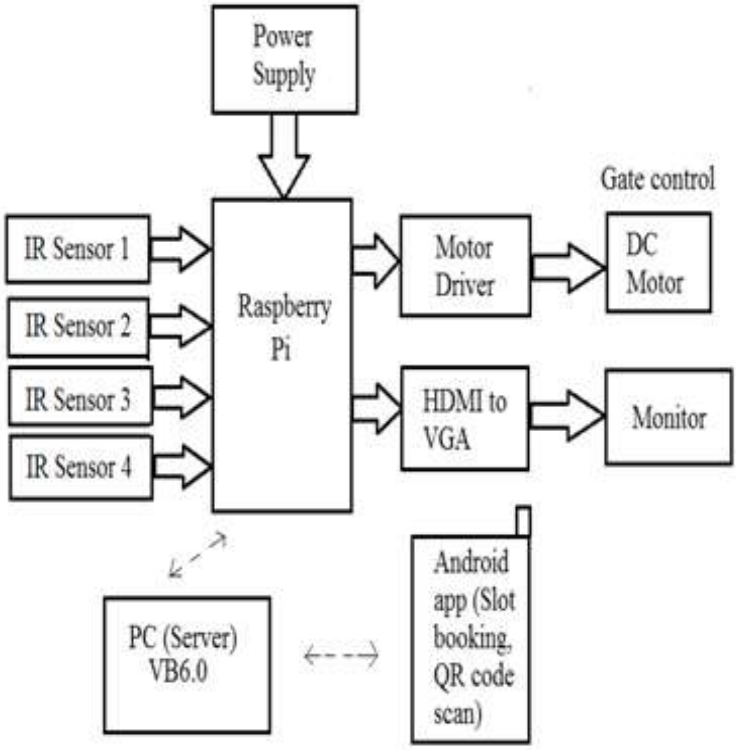

Figure1

This model is designed using raspberry pi, motor driver, DC motor, IR sensor, android application as shown in Figure 1. In this system, one server is present, which will take input from the raspberry pi i.e. which slot and how many slots are vacant in that parking space. Controller senses the status of parking slot with the help of IR sensor and this data will be transmitted to the server through inbuilt Wi-Fi module. This Server database maintains the status of all slots and updates regularly. The server is also connected with the Android app with the help of IP address. Android application is developed such that the user can pre-book the parking slot and even can cancel it if needed. While booking the parking slot user will select the slot from vacant spaces in the parking space and the desired time duration. This data will get updated in the database. After booking a parking slot QR code gets available to the user which he/she will use after reaching the parking area. This QR code, the user has to scan for authentication purpose, this information will reach to server and server will give instruction to the sensor for operating the gate of the parking area with the help of DC motor. If the user is authorized then only the gate will open. When the user gets entry into the parking space he/she will be guided to the reserved slot. IR sensor will indicate controller that car has been parked, and this information will be further transferred to the server. The server will send a notification to the user on their Android app, 15 minutes before time duration gets over.

IV. FLOWCHART

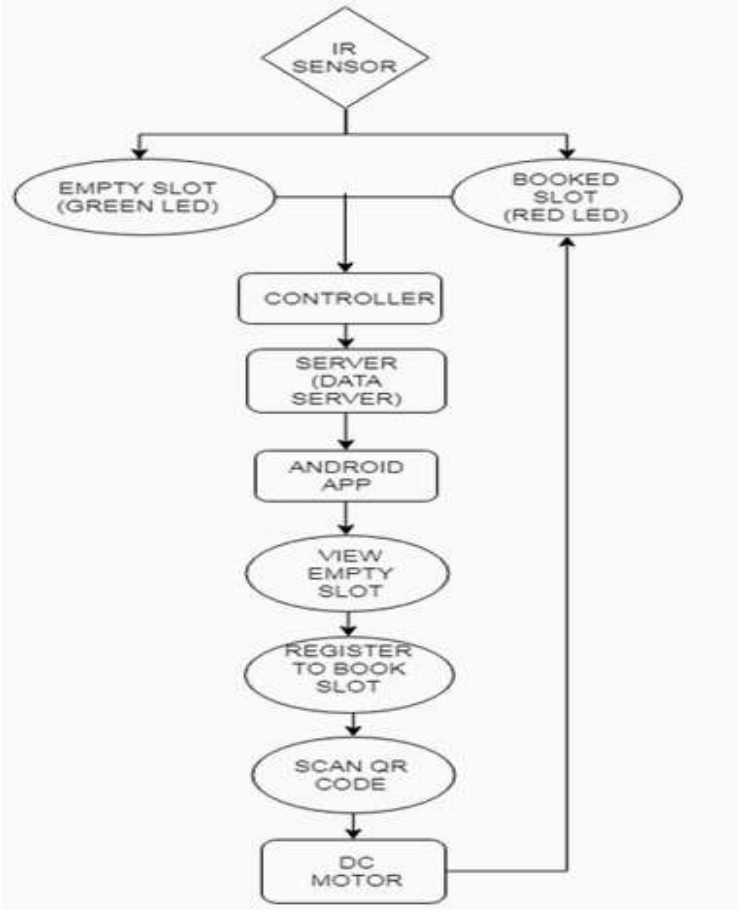

Figure2

V. ANDROID PLATFORM

An Android OS has 70.85% of operating system market share in 2016. To reach as many users at a time, android application has been developed. The parking application needs to access the internet through Wi-Fi or cellular network. Now a days there is multifarious navigation solution based on GPS, the device that can find a parking slot, but finding available parking slot requires additional information and potent updates as parking slot becomes available or occupied. The detection of parked and vacant car parking area information to the user is provided with the help of an Android Application. The Android application uses the GPS of the mobile device and search results for parking. The application gives a possible suggestion for parking, so the driver can go to the parking zones, of his/her destination. The android application receives real-time data from client web server by demand-acknowledge technique, it can also suggest the available parking zone and navigate the user to the particular parking slot.

VI. SYSTEM REVIEW

It is used in the Online booking of parking slots, providing real-time parking information. There will be the reduction in queues, no more long waits. It is Easy to use, management of parking space becomes more efficient and user-friendly application. It is used for security purposes. This system can be implemented for open as well as multi-level parking space. This system can be implemented in all parking areas such as Building, Shopping malls, Hospital, Colleges, IT parks, Commercial complexes.

VII. CONCLUSION AND RESULT

When no slot is available for parking it leads to an increase in traffic congestion, pollution, wastage of time and fuel. It can be reduced if drivers get access to real-time information about where there are available slots. The server program systematizes sending the information, keeps on updating the database and the real-time data from parking system to android app as well. An Android application for a smart phone will help the drivers to park easily. On getting the desired slot user can pre-book the slot, on reaching the parking area, with the help of DC motor the stop bar will open, once the QR code is scanned. The user will get a notification 15

minutes prior he/she reaches the parking area. The user is provided with options such as extended time or cancelled on the android app. On reaching the intended parking area the user is navigated from the gate to the slot. This data is simultaneously updated on the server.

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