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IOT based Smart Parking System

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Abstract: In recent times the concept of smart city has gained great popularity. Huge efforts are being made in the field of IOT so as to maximize the productivity and reliability of urban areas. Problems such as, traffic congestion, limited car parking areas and road safety are being noticed by IOT. In this paper, we present an IOT based cloud integrated smart rotary parking system. The proposed Smart Parking system consists of RFID to monitor and signalize the state of availability of each single parking space. A webpage is provided that allows an end user to check the availability of parking space in the given location. Such a system can provide increased driver comfort and reduce efforts in parking space operation by allowing drivers to easily decide on where to park.

Keywords: IOT, Webpage, RFID, Server, App.

I. INTRODUCTION

IOT is a global network of things i.e. physical and virtual devices having independent identity to each one of them which can be connected via a vast network to share data and process it into meaningful information. In IOT refers to devices like Bluetooth connected headsets, thermostats, utility meters temperature readers, sensors, actuators which can sense some parameters.

The parking system faces many problems in the parking environment. In order, to solve those problems, the smart parking system has been developed. The vehicle parking location service has been proposed on the using of RFID devices. In this service, the drivers have to receive an RFID tag on the entrance of parking lot. The vehicle location is provided to the driver through RFID tag parking space. In addition to security using RFID, the availability of the parking slot will be updated on the webpage. This webpage will be accessible on the server or mobile phones. Hence, the efforts for searching the parking slot are reduced and parking is used conveniently.

A webpage is a document commonly written hypertext mark-up language (HTML) that is accessible through the internet or other network using an internet browser. A webpage accessed by entering a URL address and may contain text, graphics and hyperlinks to other webpages and files.

Parking system implemented nowadays is automated multilevel car parking system. Disadvantage of this type of parking is consumption of large area which is successfully eliminated by rotary car parking system. As compared to existing parking systems, the main advantage is maximum space utilization. The rotary car parking system is totally automated with the user being given a unique ID corresponding to the trolley being allocated to the user. This system is easy to install and maintain. This idea is also solution to current parking issues.

II. LITERATURE SURVEY.

A. IOT based smart parking system.

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The smart parking system that is proposed here is implemented using a mobile application that is connected to the internet. The user comes to know about the real time availability of parking spaces. IOT has its technological constraints such as storage, processing and energy by leveraging the unlimited capabilities and resources of Cloud. Cloud deal with real world entities in a more distributed and dynamic fashion by the use of IOT.

In this project, IR, PIR and Ultrasonic sensors are used. These sensors sense the parking area and detect whether the parking slot is vacant or not. The Ultrasonic sensor checks the presence of car. As the processing unit here is Rasp-berry Pi. All the sensors are connected to the Raspberry-Pi wirelessly. Data collected from various sensors is sent through ESP8266 to the Raspberry-Pi. The raspberry pi then transmits this data to the IBM through MQTT protocol to MQTT server over a channel. MQTT is an application layer protocol. MQTT has low power footprint which makes it suitable for IOT application development and it also has low bandwidth. The IBM MQTT server is connected to cloud. Cloud is to store all the records related to parking areas and end users can access to the system. It keeps a track and maintains information such as time at which the car was parked, time duration for parking a car, amount paid by the user and mode of payment.

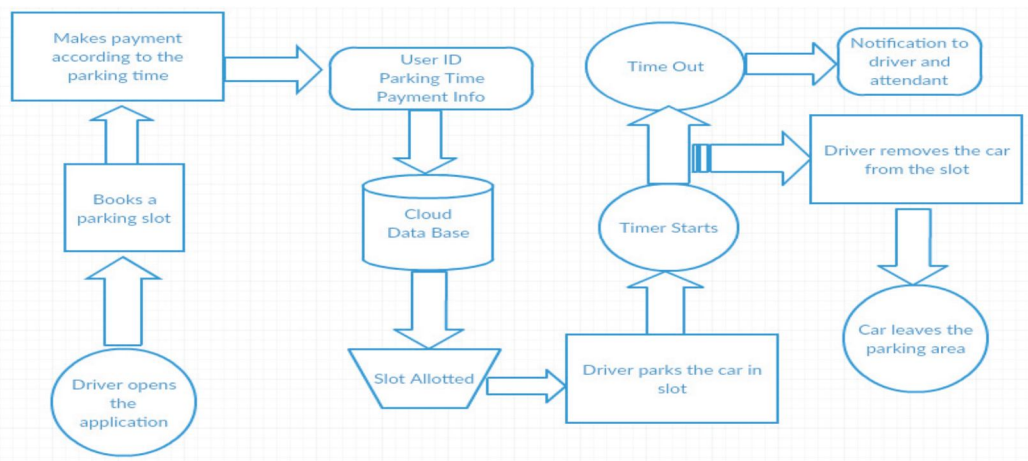


Figure 1: Flow chart

In this paper, the mobile app is provided to book the parking slot. Due to this app the real time information of availability of parking slot is been provided to the end user. The efforts are taken to provide solution to the parking issues by improving parking facilities and enhance quality of life.

B. Smart Parking System for Vehicles.

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In various regions WSNs are used. WSN is Wireless Sensor Network. WSN consist of autonomous sensors which are connected within a network by radio communication.

In this demonstration, a WSN is used to build an efficient and smart parking system. This application uses light sensors to automatically determine the use of parking spaces in a parking area and calculate parking time. This system can provide comfort to driver and reduce costs in parking space by allowing drivers to easily decide on where to park. For the implementation, IRIS WSN notes with attached MTS420/400light sensor boards and a base station connected to a PC are used.

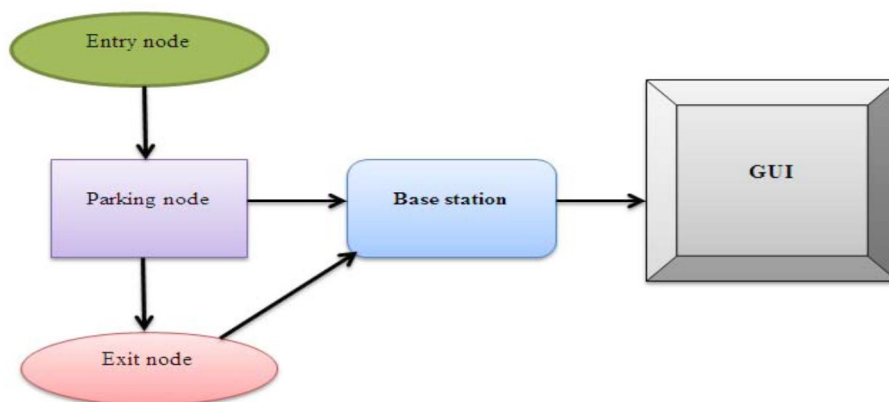


Figure 2: Flow Chart

When the vehicle reaches the parking area the light to the sensor is blocked due to which an ID is generated. This ID is termed as ID of vehicle at the given spot. When the vehicle is removed from the parking slot the light is again high to the sensor due to which the parking slot is vacant is detected. This data is stored to the server. Using this data the time calculation is done of how much time the slot was used. Using this time fees is calculated. At the end node this fees is collected.

Using this system the user can get the information about the availability of parking slot at the server node.

C. A Wireless Smart Parking System

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In this paper, it can present a wireless system for locating parking spots via a smartphone.

This smart system automates the process of locating an available parking spot and paying for said parking spot. The system consists of a wireless integrated sensor system smartphone application, and it can be used in a mall or office park with multiple areas to park. Wireless sensor networks can be used to interconnect many smart devices and are accessible for monitoring applications.

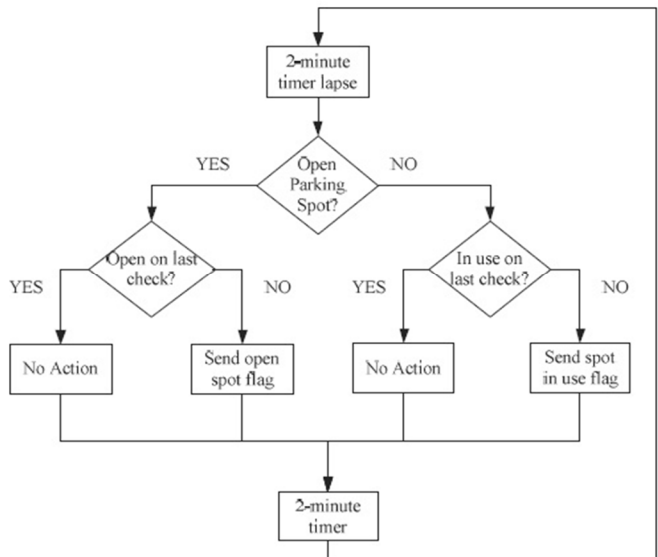
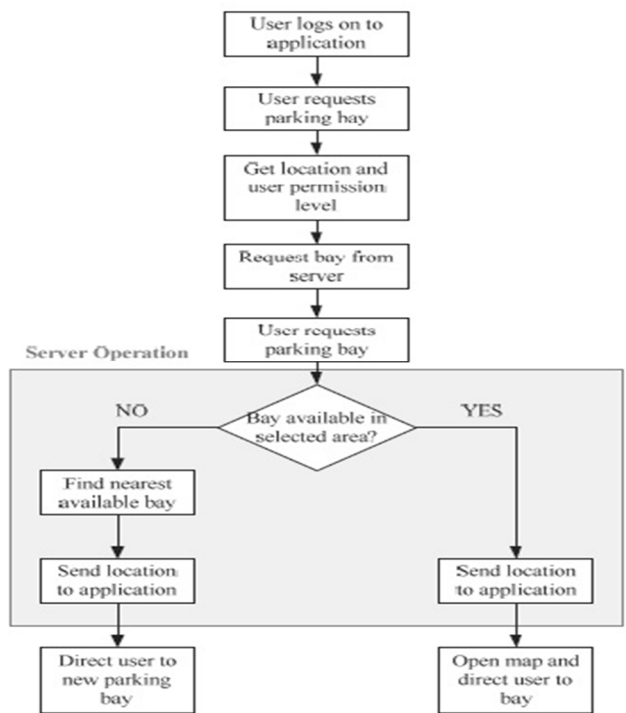


Figure 3: Parking Spot flowchart



The practical design can be applicable for large traffic parking areas in commercial applications. The amount of time taken to find a parking spot in busy areas can be reduced with the correct security features of the system.

III. CONCLUSION

The system benefits of smart will avoid time wasting. Enables cities to develop fully integrated multimodal intelligent transportation system with great security and efficiency. Real time vacancy count can result to save time. It saves u the time and efforts that we put into this task and also the fuel wastage can be reduced. Smart parking system will be revolutionary change in the city life, which is so filled with automobiles.

IV. ACKNOWLEDGEMENT

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