Internet of Things Based Smart vehicle Parking Access System

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*Abstract***:** *With the rapid increase in the current population, the market also raised with malls, exhibitions etc. Due to the increase in the population, the usage of two wheelers and four wheelers vehicles are everywhere. As the traffic is congested , mostly in the roads and malls, due to the unavailability of parking slots. In this paper, the proposed design is to reduce the traffic congestion and reducing the gas consumption in the process of searching the parking slots. The system is designed with the incorporation of ultrasonic sensors at the traffic slot. With the help of Raspberry Pi Microprocessor, immediately the values are uploaded via network into the available display board and helps the user to view the parking slots requirement. The total system is using the technology of Internet of Things (IoT). By this system, the huge traffic can be cleared, and gas or oil consumption can be decreased.*

Keywords: Traffic congestion, Internet of Things, Raspberry Pi Microprocessor.

I. INTRODUCTION

As population is increasing rapidly, the use of two wheelers and three wheelers are also increased. To park a vehicle, the abrupt disappointed situation arises when the vehicle parking is not available, and it will consume more time and oil from the vehicle. So, searching for the parking area at rush places is very difficult. According to the reports [1], with the advancement in the technology 2,22,000 gallons of oil can be saved by 2030 and 3,00,000 gallons of gas till 2050 IoT Based Cloud based smart parking system. Hence parking system has area of scope for improvement. Internet of Things [6] is connecting the things to the network and observing the status report by sending and retrieving data either to cloud/database. These data are further be used in the analyses in the applications. As by inter connecting the devices, the reliability will be effective, and the data can be robust. By deploying the system using IoT, the nodes could be accessed easily with each other and the adding/removing of sensors can be made superfast. The network is perfectly taken to reduce the energy

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consumption in the device is very important. The major components of the IoT is shown in the Fig.1.
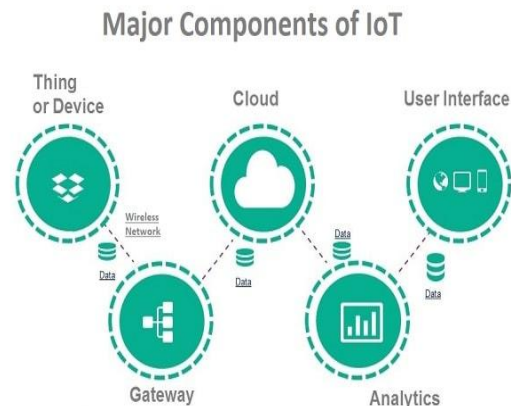

Fig.1. Major components of IoT

With this proposed design, the maximum usage of oil and gas consumed at the parking areas and traffic congestion can be reduced and lot of time is saved.

II. LITERARTURE REVIEW

The related work proposed in this design are mentioned in the below

A. IoT Based Cloud based smart parking system

This paper provides the algorithm in a unique way with the development of cloud computing based smart parking system [2] and also it is used with IoT. This system helps to find automatically the parking space. This purpose is to reduce the man power to help the users for parking space..

B. Final StageSmart Routing:A Novel Aplication of Collaborative Path Finding To Smart Parking System

In this paper, smart parking system provides the parking space guidance and information (PGI) systems [3], This information is provided in the location of the par space available based on the GPS usage.

C. A New "smart parking" based on optimal resource and allocation

In the proposed design of the paper, the system uses Mixed Integer Linear program (MILP) problem to get time driven sequence [4]. It shows the availability of parking space and new users request. This mechanism helps for better response for further reservation with the best possibility algorithm

D. Research and Implement of the intelligent parking reservation management system based on ZigBee

With the increasing in the traffic congestion, the parking systems are incorporated with the ZigBee technology and further the data is uploaded in the database. The system of parking lot has both mobile client and server. The client sends the request to the server for the parking slot availability through web-based system [5]. The slot availability/unavailability info is sent from server to client. In this way the system transfers the information effectively.

III. METHODOLOGY

The Methodology of the system of IoT Based smart vehicle parking access system is given in the below Fig.2.
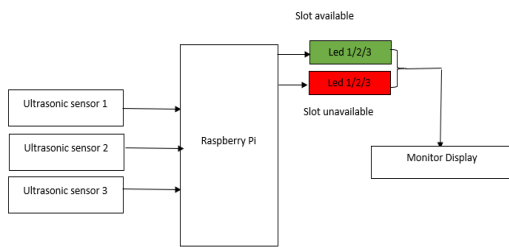

Fig. 2. Methodology of proposed design

IV. PROPOSED DESIGN

In the proposed design, the ultrasonic sensors are used in the slots and the slot check is done with the help of Microprocessor Raspberry Pi. If the slot is available, then the led blink in green. If the slot is not available, then the led blink in red and the data is transferred to the network for displaying in the screen. By this traffic congestion is reduced and the oil/gas consumption reduces. With the IoT technology, the lot of time is saved to the users.

V. SYSTEM SPECIFICATIONS

A. Raspberry Pi

The raspberry pi board is a credit card sized single board computer which is developed by the Raspberry pi foundation. In this board, the Broadcom BCM2837 is the processor used with the 1.4Ghz. The raspberry pi consists of 40 GPIO pins which is used for analog/digital pins. The Idea of using this system is to provide the accuracy of getting the information from the sensor node to the server point. In this raspberry pi, the ultrasonic sensors used allow the find distance of the parking slots. The overview of the Pi board is shown in the Fig.3.

Fig.3. Raspberry pi overview

B. Ultrasonic Sensors

The ultrasonic sensor is used to find the distance of the object with the trigger and echo. The trigger acts as an output and the echo acts as an input. The sound pulse waves are generated in the system. The transmitter used in the system generates the clock pulse by the speed of velocity of sound 0.0343 cm/ms. In this system, the ultrasonic sensors are used to find the distance of the cars available at the parking slots and send the information to the raspberry pi. The ultrasonic sensor used in the system is shown in the Fig.4.

Fig.4. Ultrasonic sensor

The software used to process the source code is with the Python IDLE. The python IDLE is an integrated development environment for python, which is added in the raspberry pi home as the programming language environment. These packages are installed by the Raspbian operating system by Linux. The programming in the python IDLE is completely written in the python programming language.
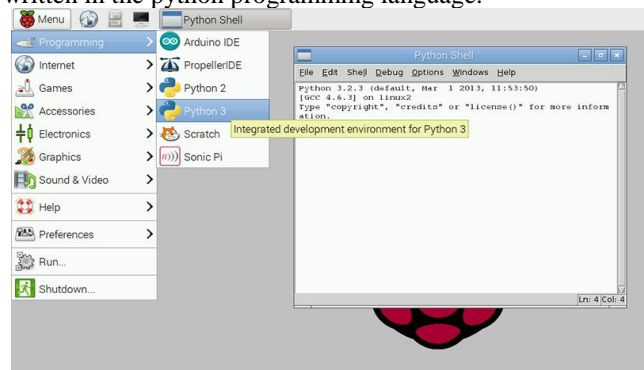

Fig.5. Programming environment of Python IDLE

VI. RESULTS

A.Experimental Setup :

Fig 6: Experimental setup of the Smart Vehicle Parking Access System

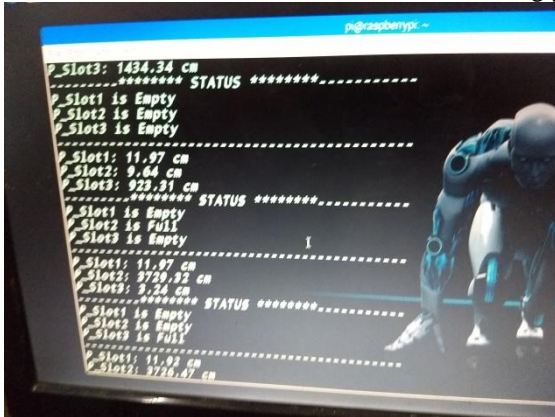All the values of the sensors are collected accordingly.

Fig 7: Screenshot viewing the messages and values displayed on the monitor

The above image is the screenshot of the result exhibiting the values and the message displayed on the monitor.

VII. CONCLUSION

The proposed methodology designed for smart parking system is very simple and effective to reduce the traffic congestion, oil consumption and pollution. The structure is well designed to know the parking slots and their availabilities through the Wi-Fi network. So, this system eliminates the time for searching for the slots in the city.

VIII. FUTURE SCOPE

The future scope of this proposed design is to adopt this parking system on the bases of smart satellite navigation device. This real time enhancement with the notification alert system will bring the new probability of improvement in the traffic system and the parking slot management system.

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AUTHORS PROFILE

G.Sucharitanjani personal profile which contains their education details, their publications, research work, membership, achievements, with photo that will be maximum 200-400 words.

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