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A Survey Paper on Parking Guidance System

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Abstract: The current scenario in any state of our country is that the number of vehicles exceeds the number of parking spaces available. This is because a family owns more cars than they require and public transport especially in our country (INDIA) is not up to mark that's why people use private vehicles more than public transport. The problem arrives during parking, due to minimum number of parking spaces owners finds it difficult to find one (parking slot) at desired location. So, to park the vehicle at a perfect spot, owners keep searching the respective slot by just moving their vehicle on the street thereby wasting time, fuel, and money indeed and therefore resulting in road traffic. To solve this common problem, we came up with a solution where the vehicle owners/drivers can directly search for the available parking spaces at the intended destination.
Keywords: NodeMCU, MQTT, Rest API, Ultrasonic Sensor.

I. INTRODUCTION

In today's world due to high amount of vehicle ownership finding a vacant and safe parking spot at desired location such as shopping malls, movie theatres, airport, university has become a major problem for people. It is more difficult to find parking spot during holiday and festival time. The chances of accidents are higher as the drivers keep looking for parking spot by randomly moving their vehicles on road.[3]. Parking problem is mainly arriving because the number of vehicles is more than the number of parking spots available. Also, these spots are not well managed. A study by Times of India in 2019 says that in Delhi there are only 94,000 parking spaces available and about 31.6 lakh vehicle among 75 lakhs registered and active vehicles. Another study also says that on a daily basis it is estimated that 30% vehicles on road spends 7-8mins to find parking space thereby wasting fuel and time. It creates unnecessary traffic on roads that may leads to accidents and traffic jams.

The parking spot finding method by most of the owners is manual and at the time of festivals or holidays drivers rarely find any parking spot at shopping malls and other places. This process of finding parking spot is very time consuming and, in some cases, drivers are not able to find any parking spot due to high vehicle density. The use of Internet of Things (IOT) will reduce the difficulties in the above problem and it will improve the parking management system.[3]

With the help of Internet of Things (IOT) the devices could be tracked, controlled and monitored with the network of computers connected through internet.[1] Internet of Things gives ability to transfer the data and information over network without human interaction. In today's world the number of vehicles is increasing rapidly and the fuel resources are limited. Due to the parking problem the fuel consumption is unnecessarily increased. Hence, Smart parking system is the need to the fast-growing problem of parking and fuel crisis.[4]

II. LITERATURE SURVEY

A. Abhirup Khanna and Rishi Anand, "IOT Based Smart Parking System"

The system consists of IoT and cloud architecture which will help users in parking process. The user has to use the mobile application for checking the availability of parking slot. The user has to mention the amount of time the parking will be used for and then reserve it.[1]

B. J. Cynthia, C Bharathi Priya, P. A. Gopinath, "IOT Based Smart Parking Management System"

The system is developed to manage parking area with inclusion of IoT. The user is provided with the mobile application and RFID tags. User can make a search for available parking space and can reserve the slot accordingly. When the user enters the parking area, the user identity is verified by the RFID tag available with the user.[2]

C. Manickam Ramasamy, Sunil Govinda Solanki, Elango Natarajan, Tham Mun Keat, "IOT Based Smart Parking System for Large Parking Lot"

A pure IoT based system that can be deployed at parking area. With the help of Ultrasonic sensors and ESP-8266 the parking slot is monitored. Arrival of vehicle in the parking slot is detected by the ultrasonic sensors and then updated to the cloud server. The user can view the status of the parking slot and reserve it using mobile application.[3]

D. ElakyaR, Juhi Seth, Pola Ashritha, R Namith, "Smart Parking System Using IOT"

This is an IoT based system that comprises of Arduino, GSM Module, IR Sensor and RFID system. The flow of this system are as follows: The user has a RFID tag that consists information of respective user. When the user reaches the parking area, the information will be fetched and the slot availability will be informed to user by sending the text message.[4]

E. Madhur Dixit, Srimathi C, Robin Doss, Seng Loke and M. A. Saleemdurai," Smart Parking with Computer Vision and IOT Technology"

The system is using IoT and CCTV for monitoring Parking area. The system also uses Ultrasonic sensors to detect presence of vehicle and double checks it with CCTV which increases the cost. The user can check whether a parking slot is available in parking area and head towards the parking area. On arrival user can check which slot is free.[5]

III.LIMITATIONS OF EXISTING   SYSTEMS

A. In paper [1], The system doesn't allow time flexibility, because maximum time person isn't aware of time that will be required for which the vehicle will be parked for. Hence, we will only be keeping track of the time that user actually parks the vehicle and then will be charged accordingly.

B. In paper [2], RFID tags are mandatory for a vehicle owner to get into the parking area. There is no system developed for the person who don't have one. For this we will be providing a booking system on the entrance itself. This will help those users who are unable to book slots using our mobile application.

C. In paper [3], There is no system that can manage multiple users searching for the parking slot. There is high probability that same slot will be assigned to multiple users. To tackle this, we will be blocking the slot for some time and based on user behavior the slot will be unblocked.

D. In paper [4], The system requires the user to arrive at the parking area after which the user can check the availability of the parking slot. This drawback is eliminated in our system by providing a mobile interface to user, using which the user can check whether the parking is available at particular location or not.

E. In paper [5], There is no reservation system which makes the system vulnerable as, user can check the availability of parking slot but cannot reserve. When the user arrives at parking location, the user may find that parking is full. Hence, we are integrating reservation system which guarantees the availability of parking spot on arrival. Moreover, there is no mechanism that will check that intended person has parked the car in the parking lot. This will be tackled by an algorithm that will keep a check on it.

IV.PROPOSED SYSTEM

As per the survey, current systems either makes use of RFID sensors or Ultrasonic sensors to make things work. Most of the systems makes the sensors talk with servers using middleware as Wi-Fi router. But considering the range of a Wi-Fi router and its capacity to make connections with limited number of devices many systems become impractical when considered for large number of parking slots. So, to tackle these issues, we are proposing a system which will be divided into different levels which are: Hardware Level, Software Level (Backend), Software Level (Client). At hardware level the ultrasonic sensors will be connected to the NodeMCU's which will in turn be connected with the single NodeMCU that will act as a bridge node between multiple NodeMCU and single router.

This will eliminate connecting multiple devices to a router which will decrease the number of routers required to be installed during deployment. The NodeMCU that acts as a bridge will be connected to the server using the MQTT protocol and will be sharing the messages using the same. When a message will arrive on a server, the database will be updated accordingly. As we now have data of every slot available in the parking area, we can help users check the number of parking slots available in the area of user's choice. If user wants, he/she can use the mobile application to search the parking area in the desired destination and then reserve the parking slot if available.

The communication between user device and server will be done using Rest API's. User on reserving the slot will also be guided to the parking location. After parking the vehicle at the parking slot, the timestamp will be recorded which will be used to calculate user's total parking time, using which total charges will be implied which can be paid using the mobile application.
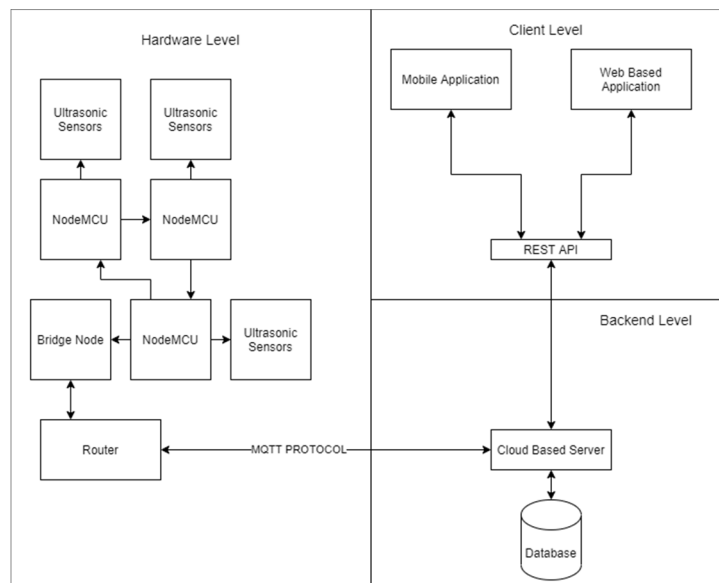
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Fig 1. Parking Guidance System Architecture

V. CONCLUSIONS

This application overcomes the disadvantages of traditional parking systems and gives multiple features such as time flexibility, multiple user management, real time parking slot status, and parking slot reservation. The mobile application gives user-friendly interface. It provides hassle-free, low-cost, efficient and easy to monitor solution for vehicle parking. This system will also save time, fuel and money. With the option of online payment methods, we are providing an environmentally friendly and cashless system.

VI. ACKNOWLEDGMENT

REFERENCES

[1] IOT based Smart Parking System Abhirup Khanna, Rishi Anand, Maharashtra Institute of Technology (MIT), Pune, 2016 International Conference on Internet of Things and Applications (IOTA), India 22 Jan – 24 Jan, 2016.
[2] IOT Based Smart Parking Management System J. Cynthia, C. Bharathi Priya, P. A. Gopinath, International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Volume-7 Issue-4S, November 2018.
[3] IOT based Smart Parking System for Large Parking Lot Manickam Ramasamy, Sunil Govinda Solanki, Elango Natarajan, Tham Mun Keat 2018 IEEE 4th International Symposium in Robotics and Manufacturing Automation (ROMA).
[4] Smart Parking System using IOT ElakyaR, Juhi Seth, Pola Ashritha, R Namith International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249-8958, Volume-9 Issue-1, October-2019.
[5] Smart Parking with Computer Vision and IOT Technology Madhur Dixit, Srimathi C, Robin Doss, Seng Loke and M. A. Saleemdurai.

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