

IOT BASED ADVANCE PARKING SYSTEM FOR VEHICLES

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Abstract

Recently parking has become a serious issue and even worsens, because of the increasing number of automobiles everywhere. It offers an intelligent approach in this paper to suggest an IoT-based guide for the user to track and book the vehicle parking space and to control and monitor free parking space. It aims to incorporate a smarter and better guidance process for parking, which decreases the complexity of the conventional parking system substantially. By deploying a sensor node on the slot, the device can monitor the state of any parking slot. The sensor then detects the parking slot status and sends the status to the central node server controller. The Node MCU gathers data from all sensor nodes and uploads it to a server where users can use the internet and any browser to verify their parking status from anywhere. Users can also book a parking slot in by creating their profile on the server.

Keywords: *IoT, Parking, RFID tag, Space, Vehicles.*

I. INTRODUCTION

People usually choose vehicles such as cars or cabs to go shopping in shopping centers, markets, hotels or theatres for their convenience in a region that has a high population density or metropolitan areas. Searching for a parking space to park their vehicles in a densely populated area in search of a nearby parking space that absorbs both time and fuel. There is also a technological requirement that will allow the registered user access to the parking slot. Users can book slots for parking by making online payment through application by using their credit or debit card. With the rapidly increasing urban population and improvements in living standards, the number of vehicles has increased dramatically[1]. The rapid increase in urban car ownership not only increases the burden of urban traffic but also exacerbates the problem of insufficient parking spaces. The increased driving distance in the parking process increases energy consumption and exacerbates parking difficulties, which increases the number of minor accidents, such as scuffing and collisions. Nowadays parking is the main issue in malls, event halls, and so on. That is because of the lack of proper space for parking. The vehicles in a family are now more than the headcount of the family members for a few days, and because of this, the vehicles in the country are also increased, leading to the parking scenario which unfortunately falls short of the current requirements in the country. It is difficult to park because of this and it also increases the time required to park the car, with an increase in the vehicle's fuel consumption[2].

The basic definition of an Internet of Things(IoT) can be defined as anything which could be connected to internet results into “Internet of Things” The things in Internet of Things are sensors, actuators, RFID tags. Using remote computers linked through the Internet, stuff can be tracked, managed or monitored. IoT expands the use of the Internet, offering connectivity, and therefore the inter-network of devices and physical objects, or "Things" IoT, typically consists of a finer network of devices and physical objects, a variety of objects may collect data at distant locations and interact with units in the processes and services that handle, receive, organize and evaluate data[3]. It provides a vision where items (wearable, watch, alarm clock, home devices, surrounding objects) become intelligent and function alive through sense computing and interaction with embedded small devices that communicate through communication with remote objects or people. Any number of nodes could be added or removed from the IoT system on a real-time basis due to high scalability in the cloud and IoT is well known to minimize the storage of human effort to some degree.

The ideal of creating a Smart City is now becoming possible with the emergence of the Internet of Things. The Internet-of- Things technology (IoT) has created a revolution in many ways in life as well as in smart-parking system (SPS) technology. As parking becomes a very essential need of our day to day life. Therefore, before moving to our destination, this scheme looks forward to planning and acquiring a smart parking system to reduce the hassle of driving around searching for a parking spot during peak hours. It is often difficult for drivers to find an accessible parking space in today's cities, and it continues to get more difficult with a growing number of users of private cars[4]. This situation can be seen as an incentive for smart cities to take measures to increase the productivity of their parking services, thus reducing search time, traffic congestion and road accidents. Recent advances in creating low-cost; low- power embedded systems are helping developers to build new applications for the Internet of Things. The need for vehicles has also increased as the amount of population increased in metropolitan cities. Eventually, it causes parking problems that lead to traffic congestion, driver dissatisfaction, and air pollution. When we visit the numerous public places such as shopping malls, multiplex cinema halls & hotels during the festival period or weekends, it creates a lot of the problem of parking. Latest research has shown that a driver takes almost 8 minutes to park his car because he spends more time looking for a parking spot. This search results in traffic congestion of between 30 and 40 percent. Here we are going to see how to reduce the parking problem and to do secured parking using the smart parking system.

Recently, with the increase of automobiles in metropolitan cities, parking of automobiles is becoming a serious issue and in many cities parking systems are very bad. It consumes a lot of time in searching parking slots to park vehicles. The main view of this paper is to provide and design:-

- A mobile application for parking vehicles.
- From home users can book parking slots.
- By using Google map users can search nearby parking space Easy payment systems.
- Owners of parking can add their own place for parking.
- For owners and customers it is easy to automate parking[5].

Users can search their parking area; According to parking space availability users can decide their vehicles are 2-wheeler; 4-wheeler or they use public transport to reach their desired destination. This paper proposed a mobile web application. Where users can register themselves and login to a particular mobile application or website to see the status of the slot for parking. If there is a slot for parking, the user can book that slot with the help of a mobile application. This mobile parking application provides many facilities to users like they can change their information regarding profile such as name, contact information, profile picture and many more, users can change their mobile application password. Any automobile parking owner can also include their parking area location and generate their profile. Availability of parking area and allowance of vehicle for parking, the owner of parking can add charge of parking on daily basis or according to hour basis. the parking owner has to add the location of the parking area, name of parking and the building name[6].

In various fields of smart applications, IOT technology is growing, but we have not yet found the limitations of this technology. Any current smart applications, such as smart grids, smart lighting, smart energy, smart city, smart health, etc. This is divided generally into three groups, such as sensing, processing, and communication. Whereas sensing involves sensing the speed of vehicles and people or any objects, temperature sensing, pressure sensing, etc. and these can be processed using such processors, such as network processors, MCU/MPU hybrid processors, etc. And by using some technologies called GPS, Wi-Fi, BT/BTLE, RFID etc, the devices are connected. More than half of the people in the world live in cities. The towns have therefore achieved maximum occupancy[7]. As people use automobiles for commuting, there is a significant number of vehicles for convenience for individuals. Most of the time, individuals spend their time looking for parking lots to park their cars. Congestion thus occurs in the traffic, leading to a hectic job of finding a parking place to park their car. The bulk of traffic happens mainly due to car congestion in urban areas, so people spend time abnormally searching the parking area to park their cars. The device is a Raspberry pi-based parking sensor containing a pi-camera to detect empty parking spaces and to send this information to the server. Users have access to this stored data; this increases the user's ability to check parking spaces' status/availability before setting up their journey. The task here is to make maximum use of the available resources to reduce the search time and traffic congestion in the area. To build Internet of Things applications, some embedded systems such as arduino, raspberry pi, Tsgate, Tsmote etc. are used.

Advantage of Implementing an Advance Parking system.

1. There is no need to waste time on searching for parking.
2. Reduction in Fuel and time spent by users for parking search.
3. Number of queues is less as drivers will be guided to parking slots.
4. Users can select the proper vehicle according to the space availability in the parking area.
5. Advance parking results in more revenues collection and provides profit for parking facilities.
6. This system provides transparency between Parking owners and parking agents[3].

II. CONCLUSION & DISCUSSION

The system minimizes the parking waiting time in a large- sized parking facility. It also helps in maximizing the venue generation for the parking facility owners. It would also help reduce the need for man-power in the parking facility which would greatly reduce the cost and errors in the process. Also this method would minimize the usage of paper ensuring a green system. This work can be further extended to booking of parking lots over a period of time from advance. The mobile application can be extended up on other operating systems such as iOS, Windows, etc. In the server, services can even be extended to the safety measures such as fire, theft, etc.

III. REFERENCES

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