

A survey on IOT Based Smart Parking System

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Abstract: The recent time has been a great leap for the concept of IOT due to the ideas of smart cities. Due to the evolution of IOT the smart city concept seems achievable at a very early stage. Continuous steps have been taken to modernize the current city infrastructure using Internet of Things concept. Various problems addressed under the smart city concept also includes the congestion due to traffic, unmanaged car parking areas.

In the present survey paper, a proposed IoT based integrated cloud smart parking system has the capabilities to solve the current parking solution. This Smart Parking system includes deployment of an module that will use IOT to monitor and signal the condition of availability of each parking space in the parking area. In addition mobile application is developed that allows user to access the status of available parking in the parking area. The proposed system also provides additional options like payment and parking area search nearby. Moreover the present system is not implemented in a country like India to be used fully.

Keywords: IOT, Android, Cloud, RFID, Arduino

I. INTRODUCTION

The rapid increase in the vehicles count on the road has lead to existence of traffic problems. The main reason behind this situation is the current transportation infrastructure and facilities available for parking vehicles. Another important factor is the inability to manage the increasing no of vehicles on the road day by day. Unorganized parking on the road sides has increased day by day and this also contributes to the traffic congestion in the cities. Moreover unawareness of parking lots to the drivers is the main reason for roadside parking. To remedy those troubles, the clever parking gadget has been evolved. wireless sensor networks is a fine alternative for low value and clean-to-set up solutions for intelligent traffic guidance systems and parking zone applications.

This project provides the use of server or cloud based totally clever parking services in clever towns as an essential application of the internet of factors (iot). This machine can be on hand via a cell application or through the net interface provided and can be considered to monitor or discover the empty slots in that place. In this century, smart parking serves as a good instance for a commonplace citizen to recognize how the internet-of-things (iot) might be efficaciously and efficaciously used in our each day dwelling environments to offer distinct services in less time. Any citizen might also use phone or a computer having net connectivity to access the smart parking software across the global to discover a free parking area in the metropolis and query about parking locations that remains available. With the implementation of the smart parking system, user can without problems find and book a vacant parking space at any parking place.

The prime purpose of the developed application is to suppress the on road traffic and fuel consumption and make travelling eco-friendly and social. This entire process is made easier by the means of an application which people can use from their smart phones. In addition to the ease of access to the smart parking system the customer would also be charged at nominal rates. The following survey was conducted based on the (1) availability of free parking space, (2) traffic caused due to illegal parking, (3) reduce the inconvenience of the customer in order to find the nearest parking space. Basically this survey report purely deals with the parking situation present in India where the no of cars on road [1] is comparable to the population of Australia[2]. Hence this paper proposes a smart parking system which can be a great solution in India.

According to the various papers [3][4][5][6] published on smart parking few of them have been discussed below.

A. The Concept of IOT

In today's world, IOT is something which is evolving rapidly in every other fields from agriculture to science. Billion of physical devices can now share and collect data globally through concept of IOT. The vision of IOT is that it gives us the freedom of controlling objects remotely in the infrastructure of an existing network. Iot can assist groups and organization to reduce the price concerned through progressed method efficiency, asset utilization and productiveness. With progressed tracking of gadgets/objects the usage of sensors and connectivity, businesses can benefit from real-time insights and analytics. Businesses in manufacturing, agriculture, retails sectors can make the benefits by using IOT.

B. The Concept of ANDROID

Android is a collection of Software's that are grouped together in a stack which include OS, middleware and important applications. Android applications are written using programming languages like Kotlin, java and C++ languages. The apps make use of core libraries. The code is first compiled to Dalvik executables to run exclusively on Dalvik virtual machine. Every android application has its own safety sandbox, blanketed by way of the following android safety capabilities:

- Android Operating System: It is a multiple user handling Linux system in which each acts as a different user.
- The system assigns each application a particular user ID. Permission for read, write and execute for all files in app is set by the system.
- Each process has its own virtual machine.

D. The Concept of RFID

Nowadays every field has connection of these words mobile and remote. So we need a better cheap efficient method to collect and send information.

Radio frequency identification system is a ever growing technology that is helping computers and machines to identify objects, collect any important data like location, temperature etc with the help of radio waves in a RFID tag that can be sent Wirelessly.

There are 3 types of RFID tags available in the market:

1. Passive: It is the smallest, affordable tags. It depends on the power generated by reader as it lacks internal power source.
2. Semi-passive: These tags have power(internal) which allows them to respond faster to request. It has a greater range than passive tags because no antenna is used in gathering power.
3. Active: It contains an internal power source which is used to power the microchip and to generate signal on antenna. Beacons are signals which are not queried before sending.

RFID tags are classified as below based on frequency distributions :

1. Low frequency (30 – 500 kHz)
2. High frequency (10 - 15MHz)
3. Ultra high frequency (UHF, 850 - 950MHz, 2.4 - 2.5GHz, 5.8GHz)

Main area of usage of RFID is: scientific gadgets, aerospace and car components, tracking and updating product pleasant in meals industries –a majority of these programs want ongoing information about the matters saved for their lifetime.

This facts also wishes to be made available to a couple of parties, from trading companions to customers to the government. The wish is that exploiting the net will allow industries in giving a standard to the data so it turns as a dynamically beneficial to these events, consequently offering a extensive and lengthy-lived go back on investment.

B. AWS(Amazon Web Services)cloud

Amazon Web Services provides variety of services to the individual, organization, community and governments, on a paid subscription basis starting from computation to storage on a cloud platform.

Some of the services of AWS are:

- **Compute:** This service is provided by Amazon Elastic Compute Cloud (EC2) which basically consists of servers called instances. These instances perform memory-intensive and accelerated-computing jobs.
- **Storage:** This service is provided by Amazon Simple Storage Service (S3) which acts as device for archival, data backup, and analytics. An organization or company can store cash with s3 via its infrequent get admission to garage tier.
- **Databases, data management:** This service is provided by Amazon Relational Database Service which consists of databases such as oracle, SQL Server, MySQL and Amazon Aurora.
- **Security, governance:** For security of information stored in the cloud AWS cloud provides AWS identity and Access Management (IAM).Using Amazon Cloud Directory Admin can create new user directory for storage or connect existing Microsoft active directory to cloud resources . Amazon Inspector analyzes an AWS environment for any threats affecting security.

II. ADVANTAGES IN EXISTING SYSTEM

In this paper [3] the author has pointed out few anomalies in the existing system and has provided the solution to them accordingly. As usual the user is given with a system to use and pick a appropriate space for parking . The reput of every parking slot is up to date on real time basis. In the next [4] paper the proposed system mainly focuses on the IPA (Intelligent Parking Assistant) that allows driver to spot and find a appropriate parking space on the streets of Italy, thereby reducing search time and traffic on road. The third [5] paper discusses the same things as told above, but the only thing done differently by the author is to provide a smart parking allocation center (SPAC).This centre is dedicated towards surveillance of the vehicles in the parking area. Last paper [6] referred in this survey uses the WSN, NFC, UHF, RFID technologies to provide the SPS (smart parking system). SPS uses the WSN extensively and RFIDs to detect whether or not any vehicle has occupied a parking spot.

III. DISADVANTAGES IN EXISTING SYSTEM

In terms of the new proposed new system the author has suggested various reforms, to handle the existing traffic system thereby solving the problem to a greater extent. One of the disadvantage in this [1] system is the installation of new Local unit in each and every car. This thereby increases the cost and complexity because each Local unit consist of control unit , Screen and RFID tags. Looking forward for the flaws in the system[2] the author has put forward the concept of installing the RFID at each slot hence giving a very secure concept of detecting the parked vehicles or not. But in that process the author is not sure of the parking policies and therefore it's not clear from his points, how the policies be worked if there is a conflict in two users. Hence it doesn't makes a efficient system for parking.

Next great disadvantage in the proposed system[3] in the introduction of the SPAC which requires extra cost and manpower to monitor the operations. It also doesn't makes a good system[4] if the RFID's are placed opposite to the car in vertical manner rather than placing them underneath the vehicle on the parking spot.

IV. BACKGROUND RELATED WORK

The system proposed by our team “IOT based Smart Parking System” is blend of all existing system with additional features that can handle the real world demands. Countering on various drawbacks related to the parking we present a quiet efficient system which can be implemented with ease. Our system presents various features:

- The system will provide a efficient pre- booking mechanism from the app and from the web application, allowing the user to access our services in a interactive manner.
- User can find the various parking space available nearby his destination during his trip.
- The cost of parking will be charged in advance and will be based on the no of hours parked vehicles.
- The data of the customer will be stored in the AWS cloud services enabling the information to be secured.

- Generation of a report related to parked cars frequency will give the users an idea about the available spaces at particular time of the day or week.
- No conflict will be encountered when two or more users try to book the parking slot at the same time. On the first come first serve basis the seats will be allocated.
- Extensive use of RFID's and Arduino technology to monitor the system makes this proposed system a successful solution.

V. CONCLUSION

The smart parking machine based totally on iot has been carried out using numerous sensors circuitry, cloud servers, and technologies. Designed as an efficient gadget used in parking that will deprecate the congestion on the site caused due to traffic. Using resources like Arduino IDE, Arduino UNO, Android studio IDE, cloud storage and various programming language, we provide a very interactive system for the users. This concept of smart parking is a dynamic concept in the coming future where the concept of smart cities will take pace. In country like India introduction of this system will provide a very unique solution related to the traffic congestion. Consequently we finish that the contributions done into this paper are supposed to enhance the facilities of parking in metropolis and thereby aiming to beautify the quality of lifestyles of the human beings.

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