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A Study on Smart Parking System using IoT for Indian Malls

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***Abstract*:-** *In a current position a parking is an important issue and that will be increasing day by day. In India we are still using the manual vehicle parking system and that is why we are facing problems like wastage of time and fuel finding free space around the parking ground when we need to park our car which requires a good amount of lighting. Another issue is chaos that happens while parking because there is no particular system anyone can park anywhere that sometime causes damage to the vehicles while moving out or in the parking lot. Security is also an issue there.*

To solve these problems we are introducing new car parking system. When a driver place their car in any malls they found on screen for free slots are available or not in a parking. The user will have to provide his mobile phone number and car's registration number and the operator will give command to open the gate, a car parking tray will come & will park the car in the garage. The user will receive a SMS which will contain a code. After the car is parked a time counter will count the amount of money to be deducted till the car is parked out. While parking out the driver will have to provide the code to the operator at the exit gate. When user paid a money they will receive a SMS on their registered mobile number. After paying the amount the car parking tray will park out the car using the same process it was parked out.

Keywords- *real time applications, IOT, hardware & software implementations.*

1. INTRODUCTION

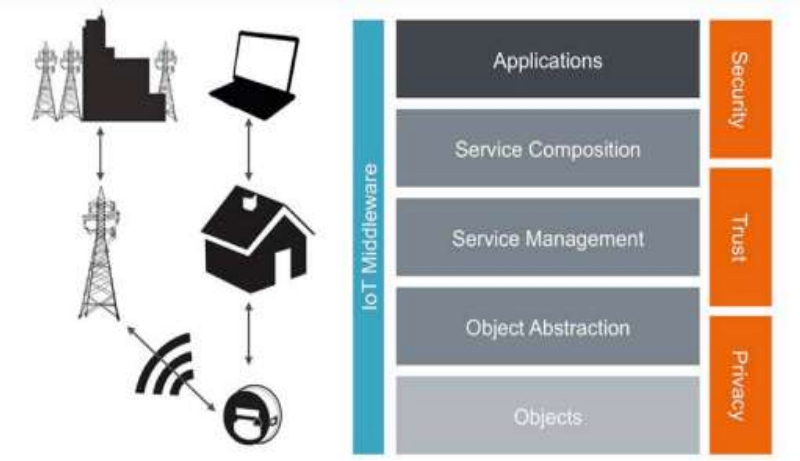
Internet of Things (IoT) term represents a basic concept for the ability of network controlling devices to sense and collect data from around the world, and then share that data across the Internet where it can be processed and utilized for different interesting purposes. The IoT is comprised of smart machines interacting and communicating with other machines, objects, environments and infrastructures. Now a day's every persons are connected with each other using lots of communication way. Where most popular communication way is internet so in another word we can say internet which connect peoples.

An smart parking system is basically based on Indian malls for facing a problem . This app uses ultrasonic sensor to detect the presence of a vehicle (whether the parking slots is occupied or not). Based on the parking slot occupancy, the status (occupied/unoccupied) is displayed on the web application dashboard. In real time, the environment have sensors and devices embedded into parking spaces, transmitting data on the occupancy status; and the vehicle drivers can search for parking availability using their mobile phones or any infotainment system that is attached to the vehicle. Hence the driver would know where there is an available spot to park his vehicle in less time, reducing the energy consumption and air pollution.

The second part in this application is doing analysis on parking trends in a parking lot. The analysis gives information about which parking space is most occupied and least occupied and at what times of the day. This information is helpful in choosing one parking space when there are multiple available, keeping in mind the history of that space. For example, when there are more than one vacant slots the driver will want to choose the one that has less occupancy rate because the high occupancy rated slot might be wanted by many other drivers and you don't want to waste your time reaching that slot.

II. Literature Review-

- *Do an IoT-related web search, and you'll quickly notice the overuse of the term "smart." So, what does it really mean when something is smart, and what makes an object smart? For example, how would a refrigerator or a toaster oven that hasn't been considered smart become a smart appliance? Today, we are seeing the electrification of the world around us. Almost any manufactured good now includes an embedded processor (typically a microcontroller, or MCU), along with user interfaces, that can add programmability and deterministic "command and control" functionality. The electrification of the world and the pervasiveness of embedded processing are the keys to making objects "smart."*



- *The Internet of Things (IoT) refers to the use of intelligently connected devices and systems to leverage data gathered by embedded sensors and actuators in machines and other physical objects. IoT is expected to spread rapidly over the coming years and this convergence will unleash a new dimension of services that improve the quality of life of consumers and productivity of enterprises, unlocking an opportunity that the GSMA refers to as the 'Connected Life'. For consumers, the IoT has the potential to deliver solutions that dramatically improve energy efficiency, security, health, education and many other aspects of daily life. For enterprises, IoT can underpin solutions that improve decision-making and productivity in manufacturing, retail, agriculture and other sectors.*
- *Locating a parking spot during peak hours in most populated areas like shopping malls, universities, exhibitions or convention centers is difficult for the drivers. The difficulty rises from not knowing where the available spots may be at that required time. Smart parking is a solution to metropolitan cities to reduce congestion, cut vehicle emission totals and save persons' time by helping them in finding a spot to park. Smart Parking is a parking system, usually a new one that is equipped with special structured devices (things) to detect the available parking slots at any parking area. This is an application based on Internet of Things (IoT) that in Real-Time environment have sensors and devices embedded into parking spaces, transmitting data on the occupancy status; and the vehicle drivers can search for parking availability using their mobile phones or any infotainment system that is attached to the vehicle.*
- *Now a day's vehicle parking is an important issue and day by day its necessity is increasing. In India we are still using the manual parking system and that is why we are facing problems like wastage of time and fuel finding free space around the parking ground when we need to park our car which requires a good amount of lighting. Another issue is chaos that happens while parking because there is no particular system anyone can park anywhere that sometime causes damage to the vehicles while moving out or in the parking lot. Security is also an issue there. When we facing a problem so we solve a problem with a using Arduino UNO for making a parking system. The system works as follows: The driver will place the vehicle in front of the garage door and there will be a monitor available where the number of available parking slots will be displayed. The user will have to provide his mobile phone number and car's registration number and the operator will give command to open the gate, a car parking in a particular slots or divided area.*
- *To solve these problems we are introducing new car parking system. The system works as follows: The driver will place the vehicle in front of the garage door and there will be a monitor available where the number of available parking slots will be displayed. The user will have to provide his mobile phone number and car's registration number and the operator will give command to open the gate, a car parking tray will come & will park the car in the garage.*

III. Motivation-

A Smart Parking System like this helps drivers make smart decisions which will reduce congestion and make the most of available spaces. Finding a parking space has become a daily concern these days, and that is where the motivation for this project came up from. With the evolution of technology, we have Smartphone, sensors that detect the presence of any object and my idea is having a system where parking spaces are equipped with these ultrasonic sensors that tells about the occupancy status of the parking

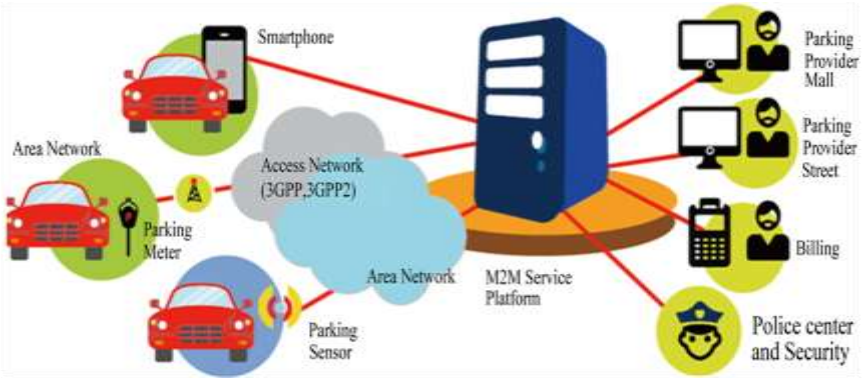
spaces and a central management system that posts this occupancy status to a web application to guide the drivers in finding a vacant slot.

IV. Requirement Analysis of Smart parking

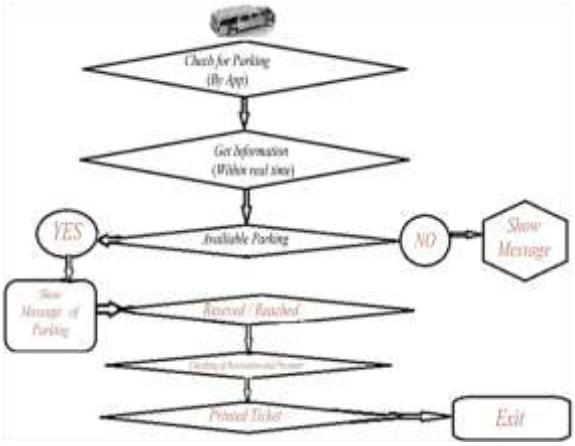
- *Optimize parking space usage.*
- *Help traffic in the city flow more freely.*
- *Guides residents and visitors to available parking.*
- *Accurately predict and sense spot/vehicle occupancy in real-time.*
- *Enables intelligent decisions using data, including real-time status applications and historical analytics reports.*
- *Smart parking plays a major role in creating better urban environment by reducing the emission of CO_2 and other pollutants.*

V. Procedure of smart parking system

The Smart Parking System is designed by making use of some IOT supportable hardware's such as raspberry pi, auridino boards etc. here we focusing on less power consumption and more performance device so raspberry pi is the suitable microcontroller for our implementation. And NOOBS installer is loaded into the storage device of microcontroller. This installer which consists of various hardware supportable operating systems such as mac os, tiny os, openelec, raspbian os etc. where these operating systems which basically consumes less power.



VI. Flow Chart of Smart Parking System -



VII. Challenges for Smart Parking System

This system is totally based on the internet with a wide range of network usage. It also depends on the automatic analyzing system involving the cameras, sensors and display unit. This system is also engaged with the online route providing system such as Google Maps, etc. so it must be using higher speed network. In smart parking system there are some features are as given:

- *The major challenge in implementing the Smart parking systems is of system integration due to wide variety of hardware and software platforms involved and hence possess a great threat or concern to the system scalability.*
- *The technology platform supporting those systems which comprises of a myriad of hardware sensors, dynamic messaging systems and traffic control devices, wireless, computer clients, servers, hardware drivers and application interfaces.*
- *Enabling all these devices from thousands of different vendors to communicate and tying them together into one platform is the greatest challenge in reducing the cost and complexity of smart parking. The varieties of infrastructure hardware and software systems that need to be integrated are enormous and add to it.*

VIII. Result

The project "A STUDY ON SMART PARKING SYSTEM USING IOT FOR INDIAN MALLS" is basically organized for only India based project. This project will help you to rearranged and reorganized to parking a vehicle in malls. This project is achieving WI-FI technology. In this project the users will be manage all the problems using WI-FI network to the particular parking area through which is given access to the web page and can know about the status of the parking slot.

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