# PARK IN -A SMART PARKING SYSTEM

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*Abstract:* Finding a parking place is a process very stressful for a person who would like to reach a specific place. Here, we present a Smart Parking Application that helps users to reach a parking slot, in a shopping complex or any other location that provides parking facility. Also we introduce a policy of converting plots of individuals who are willing to give their plots for revenue. Individuals can register in the application about their plot and no of vehicles which can be parked with a layout of the plot. We also introduce a pre-booking facility by which users can book their parking slot according to their wish. Users can book the slots before reaching the destination and a reporting time is also asked for reservation of the slot. Cancellation of the slot is done if the user is late by ten minutes and a cancellation charge is imposed.

A real-time monitoring is also done for analysing the availability of the remaining slots so users can check the slots using the layout of the parking area in the application. Vehicle details is identified by a camera using image processing for reading the licence plate of the vehicle.During Registering in the application a QR-code is generated which is unique for each user. Check-in and Check-out to the parking area is done using the QR-code. Payment is done using a wallet or using Cash. A minimum balance of Rupees 30 is to be maintained for cancellation charges.

*Index Terms* - **Image Processing,QR code.**

## I. INTRODUCTION

Rapid economic and increase caused the Indian metropolises nowadays to start out at a mobility crisis. Presently,parking spaces are very rare in urban places, leading to issues like traffic congestion , disproportionate demand and supply , and environmental hazards etc. Moreover, Due to poor parking management and policy, India is scuffling with problem causing situations like overcrowded footpaths, illegal parking, and theft due to lack of proper surveillance. Lack of parking spaces is one in every of the most problem faced these days. Number of vehicles is over the prevailing parking spaces, thereby congesting roads. Due to which, incidents of violence over occupancy, deformed cars thanks to a neighborhood crunch, and overcharging for parking are extremely common. The average income of Indians is growing and thus the amount of privately owned vehicles is rising. this implies more vehicles on the road and more vehicles conclude to more traffic.The situation is specified on any given working day approximately 40% of the roads in urban India are concerned for just parking the cars.On-street parking issues often cause delays, especially on roads with heavy traffic.Another problem that arises due to a scarcity of parking spaces in Indian cities is cruising i.e.long queues are going to be caused by vehicles searching for a car parking zone which end in congestion, and pollution. Typically when free on-street parking isn't available, drivers like better to cruise instead of paying for parking.

The mission of our project is to cut back the strain to search out a parking place in an exceedingly crowded area and park the vehicles with none fine by the police in an exceedingly safe place. car parking zone is booked using the appliance in your Smartphone within second. It also reduces the traffic jams occurring when looking for parking and also thanks to improper parking in roads.

## II.RELATED WORK

[1]An intelligent parking guidance device which uses ZigBee network and geomagnetic sensors. Vehicle position and traffic information are collected by geomagnetic sensors around parking lots and updated to center server via ZigBee network. On the other hand, out-door lcd screens controlled by center server can display information of obtainable parking places. The experimental results prove that the space detection accuracy of geomagnetic sensors was within 0.4m, and therefore the lowest package loss rate of the wireless network within the range of 150m is 0%. This system can provide better parking service in intelligent cities.

[2]Nowadays concept of smart cities have gained great popularity. Thanks to the evolution of Internet of things the thought of smart city now seems to be achievable. Consistent efforts are being made within the field of IoT so as to maximise the productivity and reliability of urban infrastructure. Problems like , traffic jam , limited car parking facilities and road safety are being addressed by IoT . This paper is an IoT based cloud integrated smart parking system. This system consists of an on-site deployment of an IoT module that's used to monitor and the state of availability of every single parking lot . A mobile application is additionally as long as allows an user to see the supply of parking lot and book a parking slot accordingly. Towards the top , the paper discusses the working of the system in sort of a use case that proves the correctness of the proposed model.

[3]Traffic condition in foreign countries are homogeneous whereas India's traffic condition is heterogeneous which makes real-time management at parking zone difficult. Traffic congestion at parking zone has become often, that folks cannot even find the place to park their vehicle especially in large companies where first come first serve method is used for parking vehicle.The proposed system helps the company to enter only registered employees and to manage limited parking place. Image processing algorithms, like OCR (Optical Character Recognition) are used to check valid employee. After image processing algorithm, number extracted from number plate and sent to server, for employee verification. In the similar fashion, server will also receive exact traffic density count at parking lot and other statistics from the micro-controller. Android App are often employed by the user to extract the small print from server at any time on demand find the right location for parking. This technology will help the firms with large number of employees to park their vehicle without wasting time. This system also alert authorities when less than 10% space is available and have reserved parking for women, physically handicapped person, and pregnant women.

[4]Internet of Things (IOT) plays a crutial role in connecting the encompassing environmental things to the network and made easy to access those un-internet things from any remote location. And generally people face problems on parking vehicles in parking slots during a city. In this study we design a Smart Parking System (SPS) which enables the user to find the nearest parking area and gives availability of parking slots in that respective parking area. And it mainly specialize in reducing the time find the parking zone s and also it avoids the unnecessary travelling through filled parking lots during a parking lot . Thus it reduces the fuel consumption which successively reduces carbon footprints in an environment.

[5] In this paper, a solid system is used to identify a free slot in a parking area and keep the record of ehicles which are parked. It is useful for the drivers who is searching for a free slot before they reach their destination and to calculate the parking charges while leaving the parking area. This system, uses sensors identify the free slots, a vehicle is identified using image processing, and the parking charge for each vehicle is detected on the basis of the time that the vehicle is within the parking lot .

[6]In today's technological world the concept of smart city has became an area of interest. Concern to parking became a major problem in urban areas. The parking lot problem are often become a replacement opportunity brought by the recent trends to satisfy the world's connected continuum. In this paper, i'm presenting the IoT based Smart Car Parking System. This paper makes easy for the user to seek out automatically a free space at the low cost and without consuming time and fuel. The whole system is based on Wi-fi network.An android application is also provided to the user to check the availability of free space for parking and book the slots.

## III. METHODOLOGY

Project is divided into five modules which are:

- Type Management

- Customer Management

- Parking Slot Management

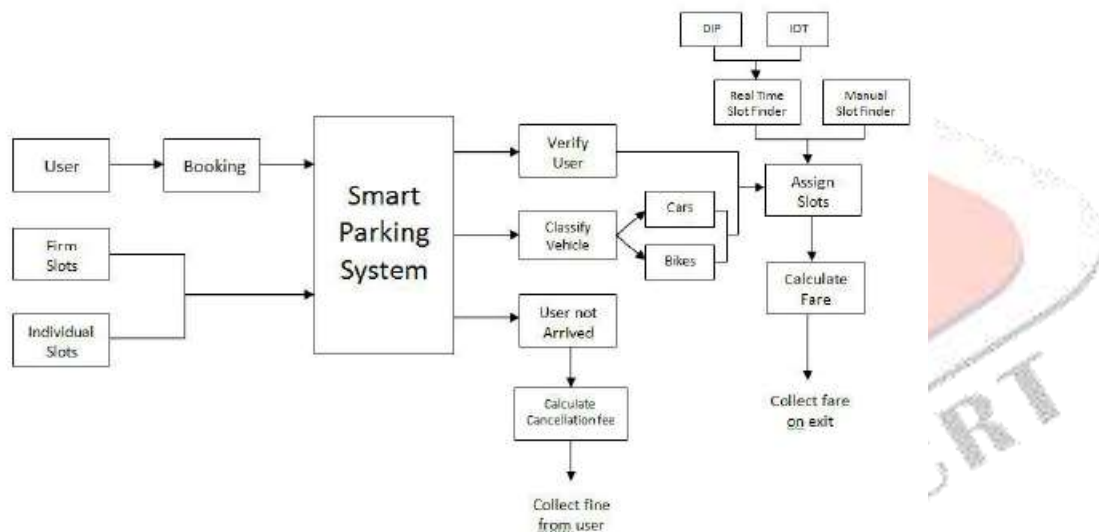- Vehicle Management

- Time and Fare Management



Figure 1. Architecture of Proposed System

Project is divided into five modules which are:

- Type Management

- Customer Management

- Parking Slot Management

- Vehicle Management

- Time and Fare Management

### 3.1 Customer Management

This module is used for creation of a user account or registering a user in the application. At the time of registration the user must provide necessary field of information to register and continue the services of the application. When all the information required are obtained the account is verified using an OTP send to the registered mobile number. After the verification is completed a QR code is generated to each user which is unique to everyone. This QR code is unique for each user and is used to check in to an area and check out process is also done using QR code.

If the user is already registered user , just login to the application and book the slots. Each time after using the application details of the customer are updated and a track is kept on the basis of usage of the application. This module is connected with the Parking slot management module in order for the customers to view the number of free slots and spaces.

### 3.2 Type Management

Our application contains a database which consist of various parking areas in different cities. The available parking areas are viewed with the help of Google Map Platform and can search and select the places where parking facility is available. Routes to the corresponding places is also set for the user to reach the destination without delay. Places such as shopping malls , theaters , hospitals , railway stations which provide parking facility can be mainly registered in the application by respective authorities of these organization. For registering in the application as a parking provider they must provide the necessary details such as Organization name , location , parking fare,total number of available parking spaces and layout of the parking area. These organizations must have parking slots in order to register in the application.

Another category of parking areas available are plots or spaces which their respective owners are ready to give for parking for revenue. Owners of the plot can register in the application by submitting the necessary information for registration. For a private plot to register in the application the owner must provide the ID proof and the documents of the plot to be registered to verify the ownership. The documents are to be submitted online. Another requisite for registration is same as in the registration for parking slots owned by a firm or organization. The owner of the plot should give the exact count on the number of cars that can be parked and a layout must be provided for the same. There fore in this module there are mainly two categories. ie ; Plots owned by individual and areas owned by organization which provide parking facility.

### 3.3 Parking Slot Management

In this module the parking slots in all registered areas are managed. The slot data store consist of information about all the registered parking areas. The main highlight of this application is that it also monitors real-time parking availability status. People who does not use this application will also approach the parking area .Therefore the real-time monitoring must also be done to help users trying to book the slots can identify which slot is free and can book the slots. Next step in this module is the verification of the customers. Customers are verified and allowed to book the slots by checking whether they have registered in the application as a User.If they are registered then they are able to book the slot. If not registered, the application will not login the user .

### 3.4 Vehicle Management

In vehicle management module types of vehicles that can be parked in a parking area is classified. The number of cars slots available and number of bike slots available for the user to park. These car and bike slots can be viewed in the application and can be used to book slots.The vehicle data is stored using a Image Processing which helps to read the license plate of the vehicle. These information can be viewed by the customer and all the details about previous parking using the application can be monitored.

**3.5 Time and Fees Management**

In Time Management the time of booking and reporting time is stored. The checking time is noted and stored for the calculation of the final parking charge.The final parking fare is calculated at the time of check out.

In Fare management the parking fare for each parking areas and the increment in amount after each hour is saved. The fare is calculated by a initial charge and fare is updated according to the time taken by user to check out. A Cancellation charge is also imposed on the user if the user fails to report to the parking area within the mentioned reporting time. Cancellation is done after ten minutes of reporting time. Final fare is calculated according to the check in and check out time.

## IV.RESULTS AND DISCUSSION

In this system, the issue of parking and presented it using IoT and real time image processing based. This system provides real time information regarding availability of parking slots in a parking area. Users from any area can book a parking space using the mobile application. The efforts taken in this system are with intention to improve the parking facilities in the cities and aim to provide the ease to people. People with free unused areas can also register into the application and let users park there. By doing this it will turn into a mode of income for the user. The proposed work-in-progress described in this system reveals the research agenda that aims at lifting the parking space management from a purely physical business to a business that transforms parking in to a computational service. The system outlines the agenda of this on-going wok to enable value added services around parking to both end- user and the parking service provider. Advantages are it is User friendly, Saves time for chasing the empty space, Saves fuel and traffic congestion is under control.

## V.REFERENCES

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