

**Smart Parking System using Android**

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**Abstract**

Parking has become an expensive resource in almost any major cities in the world, and its limited availability is the concurrent cause of urban traffic congestion and air pollution. Now a day the number of personal vehicles usage is increasing on a large scale. People prefer personal vehicles than public transportation. It is very difficult and frustrating as well to find parking space in most metropolitan areas, especially during the rush hours. It is often costly in almost every major city in the world to find proper and secure parking space. Due to this there is a need to provide sufficient parking places providing plenty of slots to help the user park his vehicle safely. The aim of this report is to propose a design of Android based smart Parking System that regulates the number of vehicles to be parked on designated parking area. This is done by automating the Parking and un-parking of the vehicle with the help of an Android Application. The proposed project is a smart parking booking system that provides customers an easy way of reserving a parking space online. It overcomes the problem of finding a parking space in commercial areas that unnecessary consumes time. Hence this project offers a web based reservation system where users can view various parking areas and select the space to view whether space is available or not. User should register them before booking the slot by providing their name, contact number, email address and password. A verification mail will be sent to user in their provided email address. After verification user will be able to view available slots and can book one from them. If the booking space is available then he can book it for specific time slot. Before booking the user have to provide the vehicle details either by scanning the number plate or by manually adding the vehicle number. Admin will add the user details and hence can confirm the booking after the user pays the specified amount. The booked space will be marked red and will not be available for anyone else for the specified time. After making payment users will get a notification on his/her phone with unique parking number or can also download the generated invoice in pdf format

**Keywords:** — *Smart Parking, Android, Vehicle, Pre-book, Application.*

## **I. INTRODUCTION**

Nowadays parking has become an expensive resource in the almost any majorities in the world, and its limited availability is the concurrent cause of urban traffic congestion and air pollution. Particularly in the cities and the big towns, there is a problem where the supply-demand ratio makes parking a problem for parking space providers, the motorists or both. To overcome this problem there is definitely a need for designed parking in commercial environment. To design such parking slot we need to take into the account of reservation of parking slot with optimal parking space which depends on cost and time. Additionally, the user can pre-book a slot in the area he desires if it is available. This will help reduce the load on the administrator as his physical work reduces drastically and user can search the parking slot through Android Application. The idea behind our android application is to help the user for online parking booking. The user needs to have an Android enabled device to reap the benefits of this application. After installing the app, user needs to mandatorily register with the application. In this application user can view various parking areas also he can select it to view whether parking slot is available or not. If the slot is available then the user can book it for some specific time period. During reservation process the client needs to provide with details that includes booking person's name, vehicle number, expected entry and exit time. Payment services are made available using UPI in the future, so the user is required to own a credit card or debit card. After making payment users will get a notification on his/her phone with unique parking number or can also check the bookings in his/her profile.

## **II. EXPLORATORY DATA ANALYSIS (EDA)**

The analysis of the proposed system based on data gathering techniques to identify how the application advises users on the optimal path and minimum cost, the definition of the functional and non-functional requirement, and the required skills to build the application is considered in this section. The proposed system consists of two actors:

- i. The user is the driver of the car who is booking a parking space.
- ii. The admin controls the proposed system components.
- iii. Additionally, the system allows the admin to view statistics about car drivers, in addition to displaying current available parking spaces.

## **III. LITERATURE SURVEY**

1. In 2011, Parking system proposed by Hongwei Wang and Wenbo Hein. This system provided light sensors that are easily interfered by light sources. These high directional beams are used to strengthen the light and reduce the interference. These are responsible for monitoring the real-time condition of parking of parking lots and deliver the sensed information to the parking system.
2. In 2015, Innovative smart parking proposed by Jin Teong Ang and others. This system provided the Near Field Communication (NFC) function of smart phones as a parking ticket.

Communication will occur when the smart phone is placed near the NFC reader.

3. In 2015 the system uses Bluetooth to find the empty space in the parking area and give the information about empty parking space within the range of Bluetooth. The mobile's Bluetooth used for identification, registration and the rack and pinion mechanism for linear motion. The unique registration number is detected with the help of Bluetooth chip. The disadvantage is with designing the whole system with rack and pinion mechanism.
4. In 2018, Android-Based Parking System proposed by Renuka and others. This system used RFID application. RFID application is used to debit the amount of parking charges through RFID tag. The parking information is further displayed in the Variable Message Sign (VMS) board at major roads or intersections.

#### **IV. PROBLEM STATEMENT AND OBJECTIVE**

##### **1. Problem Statement**

Particularly in the cities and the big towns, there is a problem where the supply-demand ratio makes parking a problem for parking space providers, the motorists or both. The common method of ending a parking space is manual where the driver usually gets a space on the street through luck and experience. The situation is such that on any given working day approximately 40% of the roads in urban India is taken up for just parking the cars. The problem has been further exacerbated by the fact that nowadays even people from the low-income group are able to own cars. To overcome this problem there is definitely a need for designed parking in commercial environment. The idea behind our android application is to help the user for online parking booking. Additionally, the user can pre-book a slot in the area he desires if it is available. This will help reduce the load on the administrator as his physical work reduces drastically and user can search the parking slot through Android Application.

##### **2. Objectives**

The main objectives are:

- The main purpose of the project is to provide a system that helps a user find parking spaces on the go and utilize them with a hassle free experience.
- Mobile application acts as the one-spot-solution for the entire process right from finding the parking spot, booking the slot and payment (via payment gateway to UPI).
- Admin access to add and reduce parking slots
- Camera and location feature to be used at scanning number plates and locating parking spots.

- It saves user time in search of parking space available in such a long parking area.

## **V. PROPOSED SYSTEM**

- Starting the application

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The user needs to install the application on his android based device. After installation, the icon of the app will feature on the home screen of the user's device. Welcome screen will be flashed to the user on opening the application. The proposed system is the combination of smart parking and the Slot allocation with the Android application.

- Registration

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Initially, the user has to register his details with the application for the first time. This is a onetime registration. The user has to enter details like username, gender, phone number and email-id. All this data will be stored on server.

- Selection of location for parking

:

The client is provided with multiple parking locations. Client has to select one of the locations provided where he desires to park the vehicle.

- Select vehicle type :

After selecting the location, options for the vehicle type is provided i.e. 2-wheeler, 3-wheeler or 4-wheeler. User can enter the vehicle's number either by scanning the number plate or manually by typing the number plate details.

- Availability status of the slots :

Based on the type of vehicle selected availability of the empty slots will be displayed along with the total slots reserved for that vehicle type. Color coding is used to indicate empty v/s reserved slots.

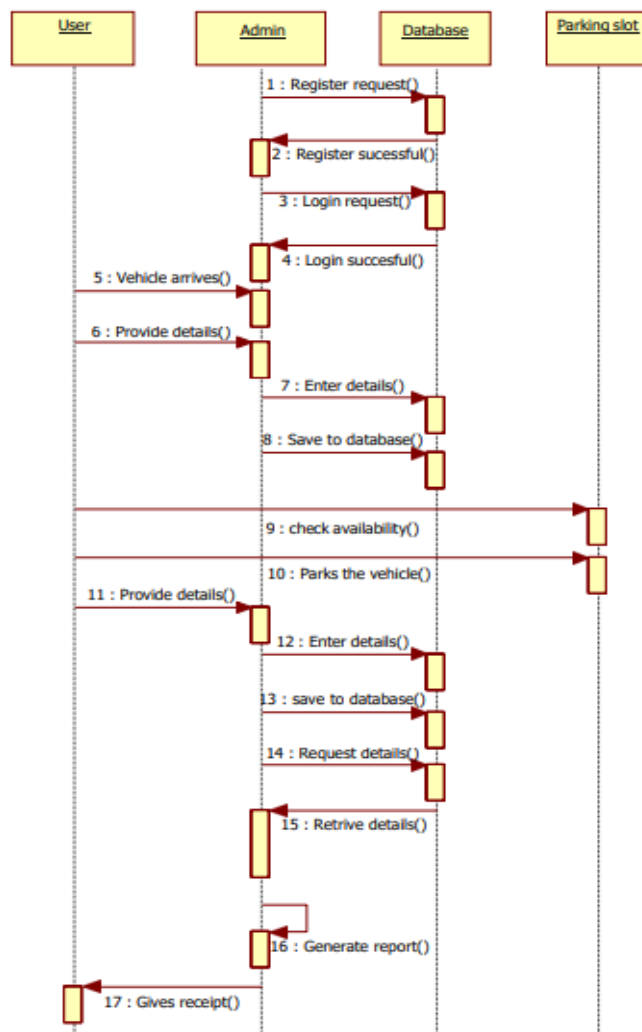
- User details for registration :

In case the slot is available, the client can proceed further with the reservation process or else he can go back to change the location/vehicle type or else can terminate the entire process.

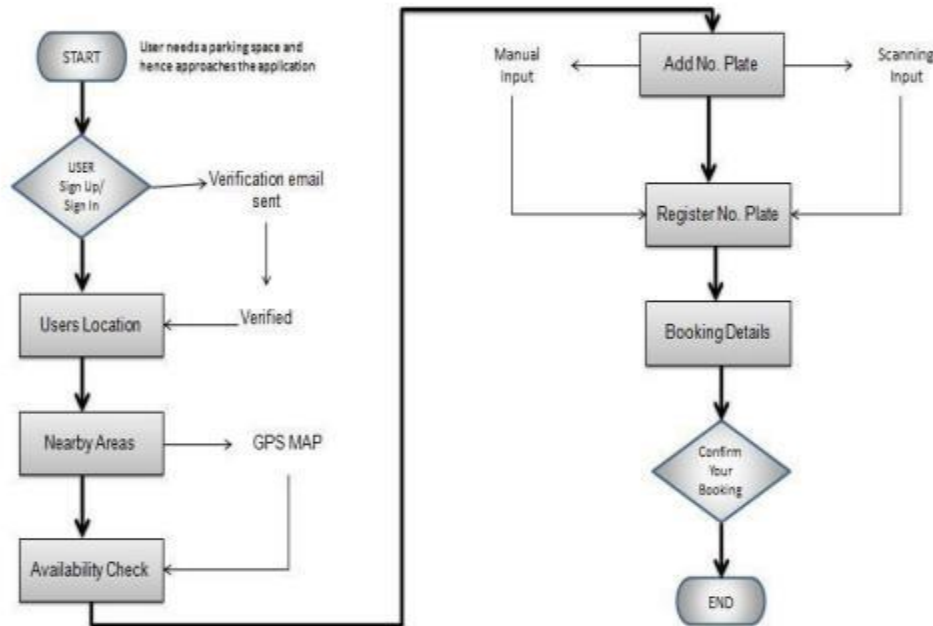
- Confirmation :

On successful reservation, a confirmation page with user details is shown and user can also download the invoice provided.

## VI. SEQUENCE DIAGRAM



## VII. FLOW CHART REPRESENTATION



## VIII. CONCLUSION

The proposed system reduces drive frustration and traffic by providing the shortest route and available slot. As smart parking system increases the service levels in operation, there is a lot of scope for innovations and implementations through data standardization and management, mobile phone integration, hardware and software integration. Basically, smart parking system saves time, money, space and help to simplify the often tedious task of parking. Compared to other developed countries, the problem of parking is disheartening in India as there is no well devised plan in place. There is a wide gap and total mismatch between the production of vehicles and the parking slots. The parking problem is quite acute in places of entertainment such as theatres and shopping malls. A well thought parking plan saves the time of visitors in booking a parking slot in advance and the administration to allocate the vacant slot in a methodical and organized manner.

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