



## Android Application For Smart Parking System

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**Abstract**— Now-a-days, vehicle parking has become a major problem in urban areas with the shortage of parking spaces. it is very difficult and frustrating to find a parking space in most metropolitan areas, especially during the rush hours to solve this problem. The paper entitled smart parking system using android application, the major motivation of this paper is to reduce the traffic congestion in roads, multistoried buildings and malls due to unavailability of parking spaces. The proposed application provides an easy way for reservation of parking slot. In this application user can view various parking areas and also view whether space is available or not. If the booking space is available then he can book it for specific time slot. The paper displays the nearest empty slot if present with respect to user location. Our project aims to make efficient use of parking spaces. Also, this system provides an additional feature for user. To alleviate the parking problems, smart parking systems must be implemented. In this paper, the background on parking problems is introduced and relevant algorithms, systems, and techniques behind the smart parking are reviewed and discussed. This system gives a further feature of cancelling the bookings. User can cancel their booked area anytime. Users may even make price online primarily based totally at the time taken for the reserved area the quantity might be calculated and the person can make charge.

**Keywords**—Android Application, Firebase, Cloud Storage, GPS, Real-Time System, Parking Space Detection

### 1. INTRODUCTION

The number of personal vehicles usage is increasing day by day. Due to this searching for a vacant parking area during peak hours is not only time-consuming but also results in wastage of fuel. The drivers keep searching for a proper parking lot that leads to increased traffic. Increasing volume of vehicular exhaust creates a negative impact on the environment. Hence reservation-based smart parking has become the need of the day. At this time, most existing parking lots do not have a system in place. Most of them are managed by hand and are a bit ineffective. Every user's demand should be I. Should be more efficient ii. Users friendly iii. They should provide more security. The idea behind our Android Application- "valid spot" is to help the user for online parking booking.

### 2. LITERATURE SURVEY

Now-a-days technology has been moving fast in all stream, with that people are moving forward with the time. To save little bit of time of people of car parking as well help them to park the car in legal space not on road and not becoming the frustrated for finding the space for car, this application the "The Smart parking Application" has been introduced. "Parking system controlled by Android application" is a miniature model of a car parking system that can regulate and manage the number of cars that can be parked in given space at any given time based on the availability of parking slot. For this topic, various papers are available with technology they have used from all this research of technology and information here are some paper which are associated with this topic. expensive. Another challenge is to identify the machine learning algorithms or capabilities that might help to process the collected data. Moreover, it is crucial to make all parties provide an excellent functionality with each other in the real time and avoid occurring of errors as much as possible.

In this paper, smart parking systems obtain information about available parking spaces, process it and then place the car in that position. A prototype of the parking assistance system based on the proposed architecture has been built. A well-developed control system is necessary to combine the whole process.

### 3. METHODOLOGY

#### Modules

Real time vehicle parking system using android application mainly consists of three modules.

They are

- User Module
- Administrator Module
- Booking Module

#### User Module

This module of the application deals with the user interface/user experience. This module provides the user with the flexibility of registering, logging in, booking and making the payment. If the user is new to the application, then, the user must register in the application by providing the user's details. After the registration, the user logs in using the user-id and password. Once the user logs

in, then the user browses the parking slot then books that parking slot followed by the making the online payment.

### Administrator Module

This is the operative module of the application. It works in the backend for managing the database and performs various operations on it. The administrator stores all the user's data in the database as soon as he gets registered with the application. Administrator maintains the details of all parking slots (both empty and reserved), their price for booking, user details in database and the modification on these data is only can be done by the administrator. The administrator also provides the payment method to the user.

### Booking Module

This is the main module of the application and it deals with the booking of the parking slot. When the user is ready for booking then the booking module comes in the scenario to provide user the necessary information for booking. The available slot, cost to book the slot and the necessary processing in regards to these, are done by this booking module.

### Client Side

#### 1.Start the application:

The person desires to put in the application on his Android primarily based totally device. After installation, the icon of the app will function at the Home Screen of the person's device. App welcome display might be flashed to the person on beginning the software.

#### 2.Registration:

Initially, the person has to sign in his information with the application for the primary time. This is a one-time registration. The person has to go into information like person name, gender, phone number and email- id. All these records can be saved on server. Booking for slots mandatory must be carried out a day before to arrival. On server aspect the parking owner additionally needs to sign in the number of parking slots available and for what sort of cars and the amount that needs to be paid.

#### 3.Login:

Once the user registers, he can use his email id and phone number to login in future. This authenticates the user.

#### 4.Selection of location for parking:

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

#### 5.Select vehicle type:

After selecting the location, options for the vehicle type are provided i.e., 2-wheeler or 4-wheeler alongside the rate chart for parking charges is prompted.

#### 6.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. Grey indicates empty slots and Red indicates that currently there are no empty slots for reservation.

### 7.Confirmation to user:

On a success of reservation, a confirmation pop-up is show on screen booking is successful. Thank you for using smart parking system.

### 8.Payment:

When the user sees the car taking the car, he has to go to the dashboard and cancel the booking and pay. Without that he cannot take the car from there. user can make this payment by any mode UPI,NET BANKING,CREDIT CARDIT,DEBIT CARD ETC. Once the payment is successful, the user can take the car.

### Server Side:

#### Login:

The administrator can login to the application through giving e-mail and password. If the administrator receives successfully login, then the administrator is stated to be authorized. After getting login to the application the administrator can perform many responsibilities such as:

- Adding Parking Locations
- View Parking Locations
- View All Users
- View All Bookings
- Users Feedback

#### Add and view Parking Locations:

The administrator can add distinct locations in which parking slots are available. The person can pick out any area that is nearest to his destination. The administrator also can delete the places if he wishes. The administrator can view distinct places in which parking slots are available and also can take a look at the status of various parking slots. View All Users and Respective.

#### Booked Slots:

The administrator can view all of the users who're the use of the application and also can test the reserving information consisting of the time and date at which the person requires a slot, number of hours a person is the use of the allotted slot, at which area he requires a slot etc., The administrator can view all of the reserved slots of all registered users. The administrator takes this as a reference for similarly allocation.

**Workflow Diagram—**

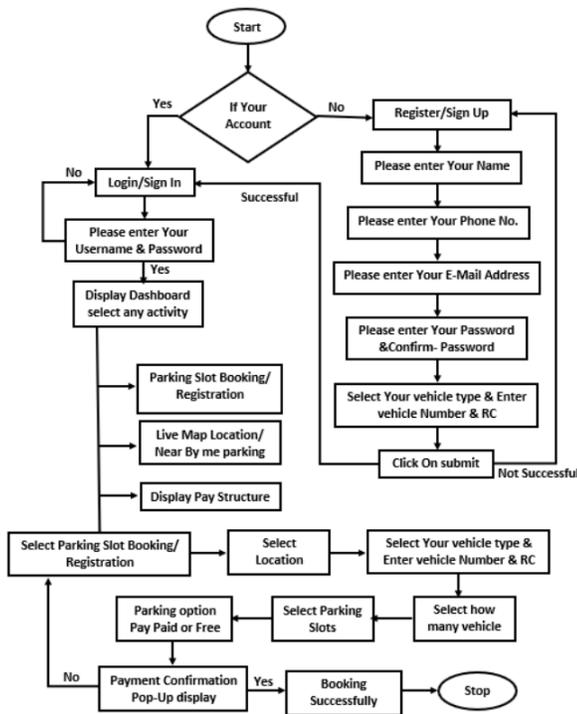


Fig. 1 Workflow Diagram

The smart parking system based on slot reservation is implemented, utilizing the Android application. The app having the features of slot allocation, by using the slot allocation method, user can reserve their own lowest-cost parking slot. It is an effective way in resolving the parking issues, which helps for traffic congestions and also provide the automated payment billing process. This work gets extended as a fully automated system using multilayer parking method.

The workflow shown in fig. 1

**4. SYSTEM ARCHITECTURE**

The system architecture shows the six components of the smart parking model: park owner, user, internet, application server, server database, park owner database, and more. Parking owners have a dashboard with their own database of parking and non-parked spaces. Users use the mobile phone API to register with the app over the internet. The application server tracks the GPS location and matches it to the nearest parking slot. The main server database contains data for all parking owner and GPS location within the area.

**Hardware requirement:** - Processor: Dual Core Display: 4 inches or more RAM: 1GB

**Software requirement:** - Operating System: Android SDK 4.x Database: Firebase GPS Enabled: Yes

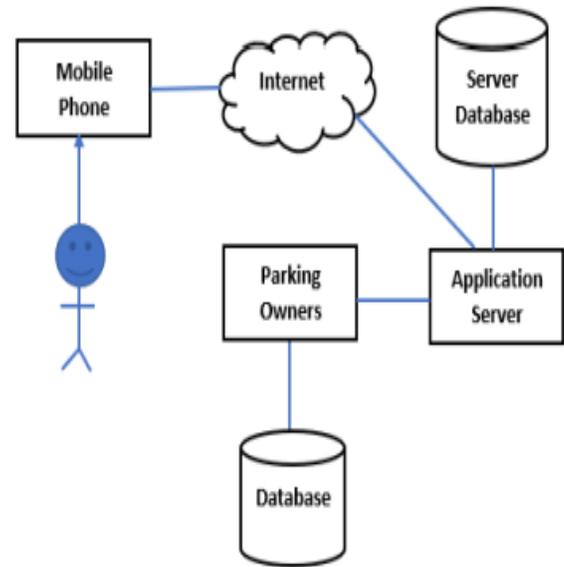


Fig.2 System Architecture

**5. IMPLIMENTATION**

In this section , the detailed designed and implementation of the system are presented.

A. Software Login and Register interface: This part of the system gives the to convenient way to register and login himself.



Smart Parking System

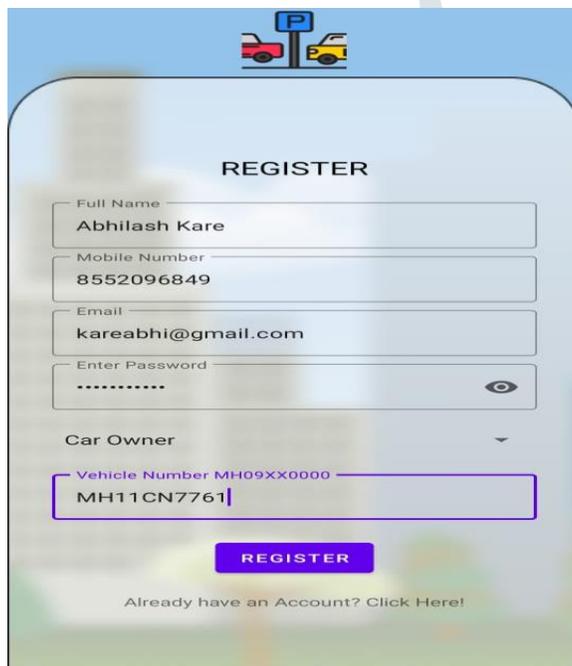
Fig. 3 Home Page

B. Software Login interface: In this login interface we can see omkar can login. If the username are correct then it will login and show the pop up of login successfully. It takes username and password for login.



Fig. 4 Login Page

C. Software Registration Interface: In this interface we can see that omkar can register themselves by using the name, address, email, phone number, user name, password. The email and password is the important credential to login the user again. After the registration successfully completed the registration process



Registration Page

Fig. 5

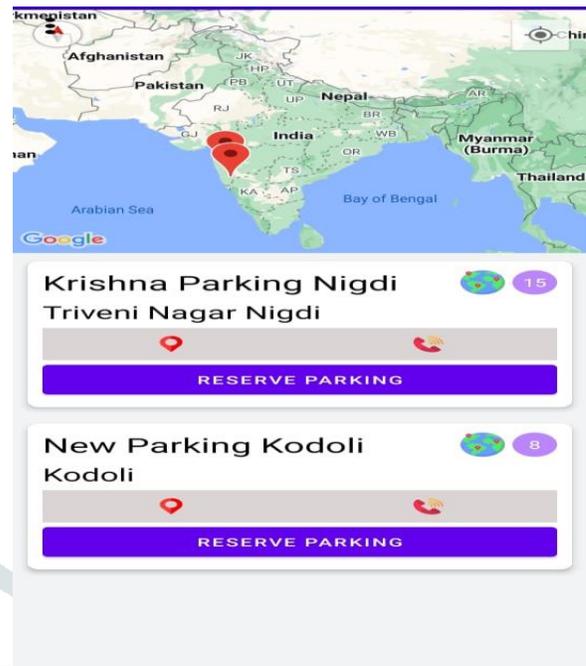


Fig. 6 Near By Parking Location

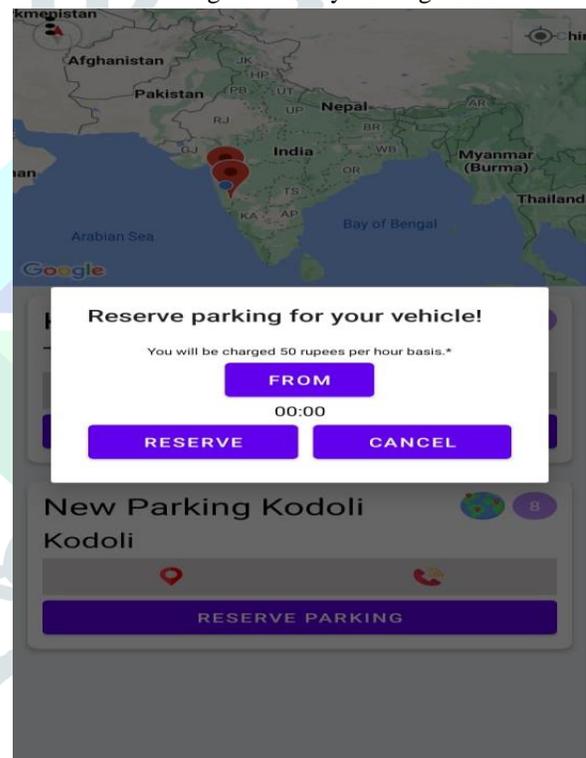


Fig. 7 Booking Slot and Confirmation

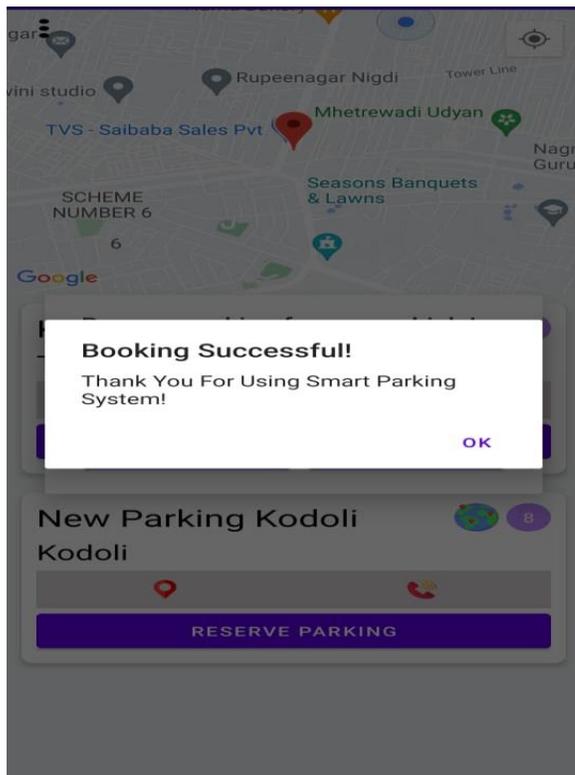
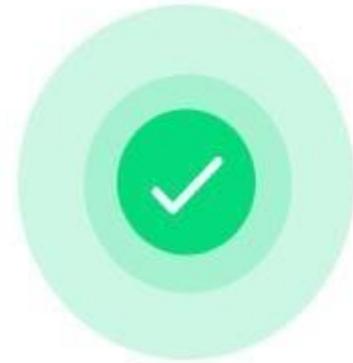


Fig. 8 Booking Successfully



## Payment Successful

Fig.10 Payment Successful

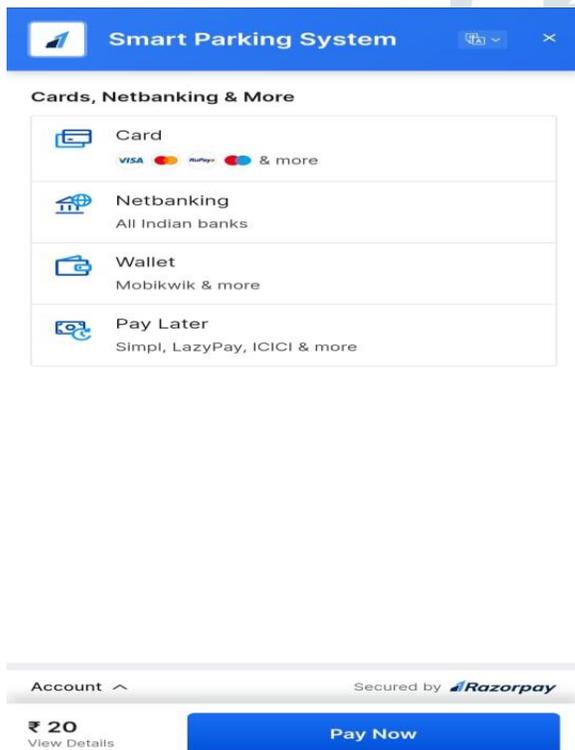


Fig. 9 Payment Gateway

## 6. CONCLUSION:

1. From this we can conclude that with the growing use of vehicles and smartphones being a very accessible device most of the places it becomes greatly convenient to solve the problem of managing a parking place with the help of a mobile application. Android has the largest user base and hence helps us get access to much more customers than any other platform. An Android app will be of great help to manage any parking place on the go.
2. Android apps being comparatively cheaper and more accessible, it becomes easier for the user to have access to the app. This app will provide the user with most of the basic requirements such as logging in details of the vehicles and rent generation. Further, it also helps the user by indicating him statistics about his operations, which will be of great help in monitoring the working of the parking place and take some data backed decisions.

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