

# ParkUp

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**Abstract** - ParkUp, a parking management system, is a cloud-based application, which will help users to find the available parking areas in any geographical location and also check the availability of parking spots in the respective parking area. If there are available parking spots, then the users can pre-book them for their required number of hours. The users can also compare the per hour cost of different available options and select the best suited for them. While booking the parking spot, the user will need to provide certain information like their vehicle number, check-in time, check-out time, etc. On successful booking of the parking spot, the user will get a unique QR code that will contain all the information that they filled and will serve as a ticket for them. The users can pay the parking amount to the service provider after arriving at the location or via the in-built payment system provided in the application. The users can also add their vehicle information once and later select them while booking a parking spot. For security purposes, there is a JWT based authentication system and every user needs to sign in or sign-up for the application to use it. ParkUp will provide a separate application for the service providers where they can register their parking areas with the system. Once the parking area is registered into the system, it will be automatically added to the map interface for users to find. Thus, ParkUp is focused on maintaining an efficient parking system where users, as well as service providers, will get benefitted.

**Key Words:** Online Parking, Digital Payment, Firebase, Flutter, Cloud Storage, QR Code

## 1. INTRODUCTION

With each passing day, Urbanization and Modernization are moving one step ahead. Along with this, the population is also on the rise. These factors have contributed a lot in increasing the number of people using vehicles. As a matter of fact, The per capita vehicles to urban population was nine vehicles per 1000 in 1960-65 and the same has increased to 402 vehicles per 1000 population in 2011-15, this has resulted in a 44 percent increase in total vehicles due to urbanization. With such a large number of vehicle users, most of the people residing in metropolitan areas face the difficulty of finding a parking spot. Here, the problem is not the lack of adequate parking areas but a system that could help people to find the parking areas around them. Indiscipline parking may result in damage to the vehicle and also create difficulties for others. Thus, there is an utmost need for an efficient parking system that can bridge this gap. If the people can find the available parking areas in any geographical location, then they will not have to roam around finding one which will directly reduce their time and fuel-wastage and also indirectly decrease the traffic and pollution.

## 2. SCOPE

With a vision of reaching each person, ParkUp is built using Flutter which can serve on both Android and iOS devices. The system tracks the current location of the users and shows them the parking areas available in that location that are registered with the system. The system also provides a search bar where users can enter their desired location and find the parking areas prior to arrival. Another salient feature of the system are local comparison, online booking, and in-built payment system.

## 3. OBJECTIVE

The objective behind our system "Park Up" is to :

- Reduce the difficulties an individual faces while finding a parking spot in day-to-day life.
- Allow an individual to find and view various parking areas around him/her or at a particular location.
- Allow an individual to select or view a parking area and check whether a spot is available or not.
- Allow an individual to book a parking spot if the spot is available.
- Allow an individual to make an online payment and cancel the booking.

Besides, traffic congestion can be solved up to a great extent in the metropolitanical cities as well as cities.

#### 4. LITERATURE REVIEW

**i. Title :** Review Paper on Smart Parking System

**Inventor:** Anusha, Anushri, Arshitha M S, Geetanjali Bishtannavar, Ms. Megha D Hegde

**Description:**

- This research paper presents an IOT based smart parking system which provides an optimal solution for the parking problem in metropolitan cities.
- The user can reserve the car parking slot. Once he enters the slot the time period will get started. Later the user leaves the slot he needs to pay the amount for the period of time his car is placed in the slot area.

**ii. Title :** Centralized parking payment and monitoring system using geo location enabled devices

**Inventor:** Adityakumar Akshaikumar Aggarwal, Sunil Goel

**Description:**

- This patent describes a system of centralized parking payment and monitoring, which uses geo-location enabled devices and wireless mobile computers.
- Instead of looking at a particular parking spot, it aims at parking on a particular section of a street or an unmanned parking lot - which we refer to as a 'Parking Area'.
- This system does not need any new devices to be installed or parking spots to be marked and entered in the parking application. It uses geo-location enabled devices to identify the location of the parking place.

**iii. Title :** Intelligent Parking System

**Inventor:** Abdul Ahad, Zishan Raza Khan, Syed Aqeel Ahmad

**Description:**

- Smart parking management systems are capable of providing extreme levels of convenience to the drivers. In this paper, a proposed web App system, named "Park Easy " is based on the usage of smartphones, sensors monitoring techniques with a camera which is used as a sensor to take photos to show the occupancy of car parks. By implementing this system, the utilization of parking spaces will increase.
- It allocates available parking space to a given driver to park their vehicle, renew the availability of the parking space when the car leaves and compute the charges due. Smart parking App, "Park Easy", will also enable most important techniques to provide all the possible shortage routes for parking from any area of the city mainly, it helps to predict accurately and sense spot/vehicle occupancy in real-time.

**iv. Title :** Smart Car Parking with Reservation system using QR Generator

**Inventor:** Aswathy James, Prince Abhraham

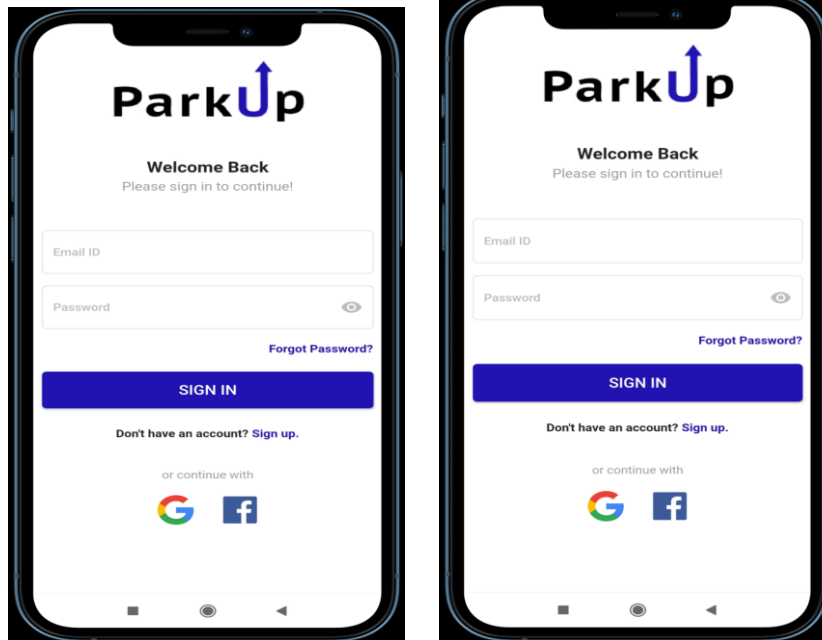
**Description:**

- In this paper, an attempt has been done to automate the car as well as the car parking system with a Smart Parking System (SPS) which is based on the integration of an Android app and QR Code reader.
- The introduction of a novel algorithm that increases the efficiency of the current smart-parking system and develops an android app to collect information about the occupancy state of parking spaces, and to inform the drivers to the nearest vacant parking spot. The entering into or leaving the parking slot is controlled by an Android-based application. The algorithm helps improve the probability of successful parking and minimizes the user waiting time.

### 5. DESIGN AND METHODS

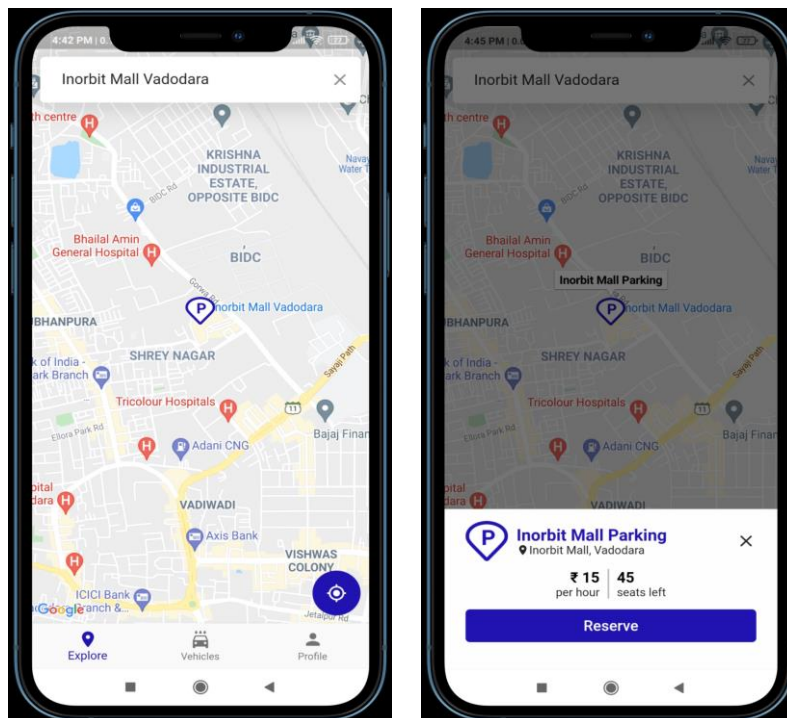
i. App Interface :

a. Sign Up and Sign In Screen



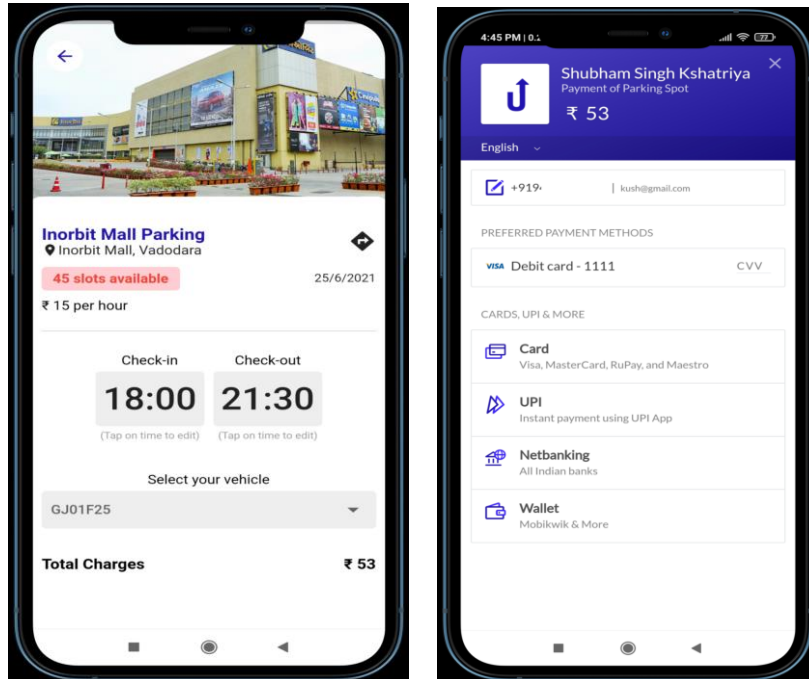
- In this screen user has to login using his/her username and password. If user is not registered, he/she has to register first by providing basic details.

b. Landing Screen and Parking Spots



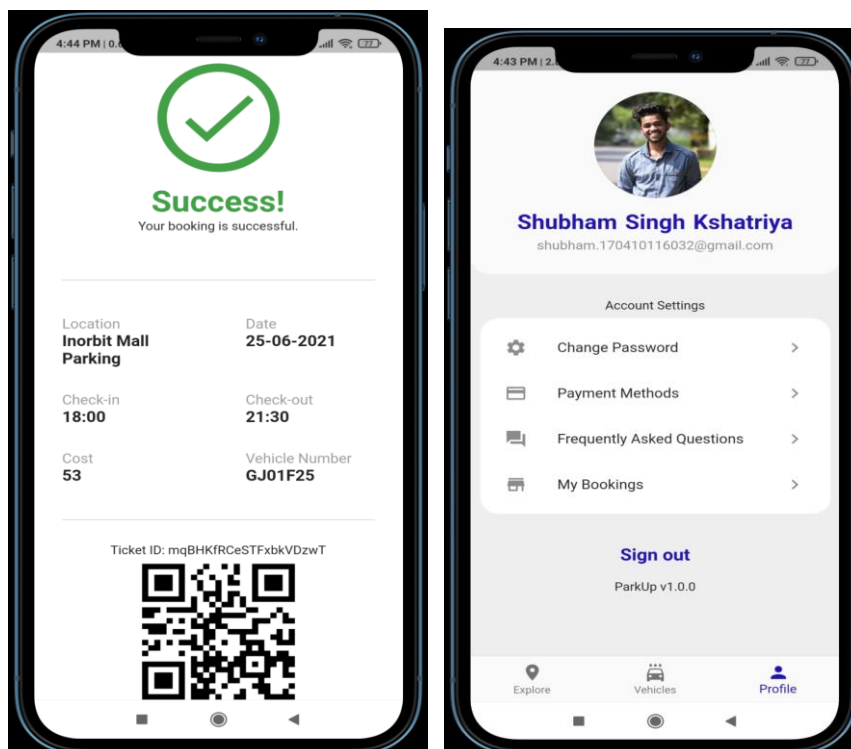
- In this screen, a map will be displayed with the live location of the user, where they can find the parking spots nearby or even search a parking space in a particular area.

c. Parking Booking and Payment



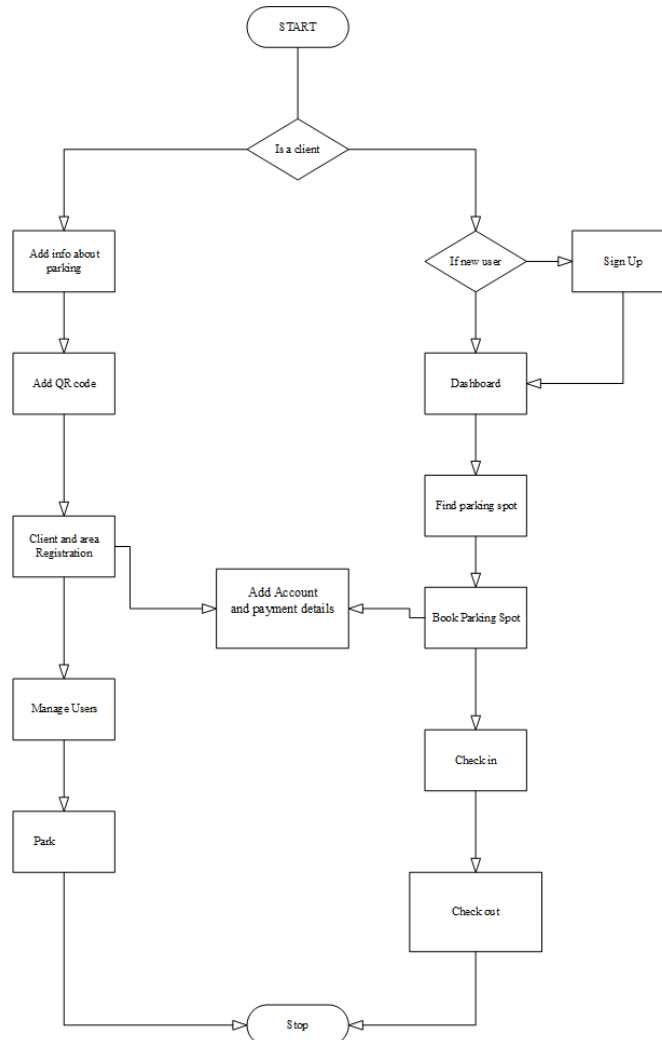
- In this screen, the user needs to specify the time slot and other details for generating the parking ticket. They can also opt for an online payment option available in the app itself.

d. Ticket generation and Profile Settings



- After the slot selection and payment options, the ticket is generated with a unique ticket ID and a QR code for the same. The app also provides with the facilities of adding payment methods, change password, previous bookings and FAQs.

ii. Flowchart :



## 8. CONCLUSION

ParkUp is a parking management system which will help users to find the available parking areas in any geographical location and also check the availability of parking spots in the respective parking area. Using this system, the users can avoid the troubles of finding a parking spot in a jam-packed area and can save their precious time. Also, the FAQ section will help the users to understand how the system works.

## 9. FUTURE WORK

Currently the system can be accessed only through a mobile application. In the future, we aim to develop a web application as well. Thus, the services will be accessible more easily and to more people. We will work on the horizontal scalability of the system so that it can withstand tremendous traffic and provide ceaseless services without any latency. We are also considering adding a Text-to-Speech feature which will help users to search location using their voice instead of typing. Also, we are focusing on integration several features like wallets and adding coupon codes in payments etc.

## 10. ACKNOWLEDGEMENT

First and foremost, we would like to thank our internal guide Mrs. Sneha Gaywala who guided us in doing this project. Her guidance and constant supervision contributed tremendously to the successful completion of the project. Besides, we express our gratitude to Dr. Bijal Talati, Head of the Department of Information Technology and all the faculties who helped us by giving us advice and providing the equipment which we needed. Finally, we would like to thank everyone who helped and motivated us to work on this project.

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