NearByMe - Shared Parking System

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Abstract - *Vehicle parking space is a major problem in cities and highly populated areas of India. Most of the cities in the country are suffering from a lack of parking areas, especially at peak times. The rapid increase of car ownership had created an imbalance between the required demand and supply of parking space. Our work mainly focuses on solving the problem related to parking spaces by using the concept of localized parking spaces. The system is a smart parking application that enables users to find and book the localized slots for parking their vehicles. The private parking space at home could be rented out, when not in use, along with other parking spaces. Everyone with a piece of land could be a spot provider, and they need to register in the App. A space owner's land, when become free, can be issued to vehicle owners by this system. Vehicle owners who are looking for parking space around an area can use these free spaces by paying the money. The space owner can list out the time slots when their parking spaces are available, in advance. The system allows vehicle users to find the slots with a GUI interface in the application and can pre-book their slots. Thus the unused private parking space can be given rental by the owner for a specific period. This system ensures an enhanced availability of parking spaces, helps to reduce conjunction, helps the spot provider to earn some money and to localize the parking spots to find out the nearby parking space where the contemporary pay and park systems are not available.*

Key words: Smart parking, Payment portal, GUI interface.

1.INTRODUCTION

The ongoing urbanization process makes parking a major problem for citizens because of the limited parking space available in cities. One solution is to build a multi-level car park infrastructure so that more cars can be parked in an area. This is a better-voted solution, but the major drawback is massive infrastructure investment and ongoing maintenance[1]. It is also possible to reduce the parking crisis by encouraging the public to use public transport, such as buses, rail, metro. However, public transport may not be large in developing countries and may not have a deep penetration near the outskirts. Therefore, if we can create smart parking spaces with better usability, people can save their time and money by saving gasoline waste and time to find a parking lot along with reduced emissions. This would also reduce road congestion[2]. Every locality has access to privately owned unused land. If some of these lands can create smart parking pools, the intensity of vehicle congestion on the roads looking for a vacant parking lot can be reduced[3].

The landowners can simply rent out their property so people can use these slots and reduce congestion. An affordable parking ecosystem will be built using this approach. The landowner shall get returns from his land with no capital investment, with the assurance that he owns the property. This solution could be extended to accommodate existing parking systems for migration to the proposed system.

2. EXISTING SYSTEMS

Some similar applications or web pages that are useful for NearbyMe are listed below:

2.1 Parkgene

Parkgene, developed by PARKGURU Group, offers a Blockchain as an accommodation predicated platform using cryptocurrency (tokens and wallets) to transact the parking lot between the owners and the terminus users [4]. In this approach, the landowner should shoulder the whole burden of establishing the parking space. The owner can rent out space through the park gene platform and generate revenue out of it.

2.2 Parkaide

Parkaide provides a smartphone predicated application for parking space booking with no ticketing[5]. The mobile app has the option to cull the car park of your accommodation. After culling which car park and predicated on the duration of the stay, one can make payment through a token method and you can avail the parking lot for the allocated time.

2.3 Parkaidapp

Parkaidapp is an augmented reality-based platform that shows the parking slot and other details of street parking using the crowdsourcing concept[6]. Here users can choose how long they need parking for and they can see streets where parking is allowed.

3. PROPOSED SYSTEM

Our proposed system comprises a website for admin and landowner's access and a mobile application for the customer's access. Admin will monitor the entire system and have management privilege overall features. Admin can log in and add new landowners and parking slots by collecting the details about the landowner and the parking spots. The admin has the authority to add or remove landowner's and the parking slots, and can also update them. The landowner can log in with the login credentials provided by the admin and can update his profile and can see the bookings made by the customers.
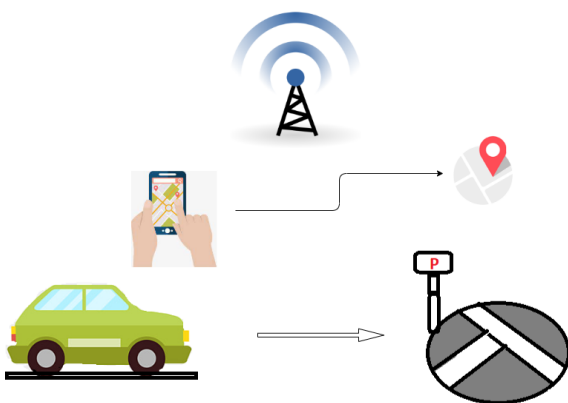

Fig 1:NearByMe- Shared Parking System

The Customer can log in through the mobile application by giving details about him and his vehicle. Then he can search for the parking slots by placing a pointer at the location he needs to go. He can then select a parking slot at his required location and can pre-book the same by paying some money in advance. Then that parking slot will be reserved for him at the time specified by the customer. The customer also has the option to call the landowner before booking a parking slot. Also, the customer can also see his entire booking history and can give reviews of the parking slots he had visited. The profile module of the customer helps him to update his profile and add new vehicles to his account.

The key features offered in this NearByMe-Shared Parking System are:

- The customer can pre-book their parking slots.

- The customer can localize the parking spaces to find out the nearby parking slots.

- The customer can give reviews about the parking slot based on his experience.

- The customer can find out the directions to the parking slot with the help of google maps.

- The customer can pay the bill through online transactions.

- The landowner will get some money by renting out their private parking space.

4. SYSTEM MODULES

The entire project is divided into the following modules namely, Admin, Landowner, Customer, Registration and Login, Adding Parking Area and Slots, Find parking and Booking module, Rating and review.

Our webpage 'Nearbyme' comprises a database for Admin and landowners. Admin can add new landowner's details and landowners can add details about the parking slots they are having with them. The data entered through the registration page are sent to the database via forms. Admin will provide a username and password for each landowner. Landowners can use that credentials to log in to their page and can provide the details of the parking slots they are having, including information such as exact location, available period and status. They can update and delete the information according to their changes in interests. Landowners can update information like which type of vehicle can be parked in their land and what is the amount they are expecting.

4.1 Admin

Only the admin may add new landowners to the system. Thus admins can make sure only trustworthy landowners are added. This will help to provide more security to the customers. Admins will provide all the basic details of the landowners and if needed they can add customers as well. They can view all the booking details as well. Figure 2 shows the login page of the admin. They can log in by giving the pre-defined user credentials given to them.
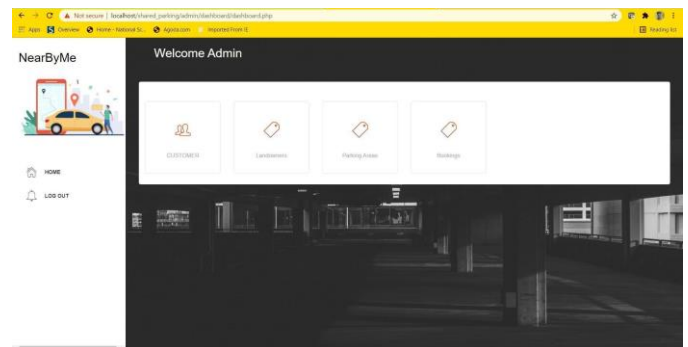

Fig 2: Admin Home Page

The Admin home page from where admin can go to the different sections like adding customer details, adding landowner details and viewing booked slots. And the logout option is also there.

The customer page has the option to add new customer details also if they want to. Admins will provide the basic details of the customers and they can provide username and passwords to customers which they can use later for logging in to the app for booking the parking slots. There are options to update and delete already entered information.

The Landowner page has the option to add new landowners details as well. Only the admin can add new landowners to the system for making them trustworthy. Admin will provide the basic details of the landowners and

they can provide username and password to landowners which they can use later for logging in to their web page for providing details about the parking slots. There are options to update and delete already entered information.

The booking details page will help the admin keep track of all the bookings through the system with details like vehicle number, time duration and amount.

4.2 Landowner

Landowners can log in to the system with the username, and password provided by the admin. Landowners can provide the parking area details and time slot and amount details for which the parking slot is available. They can also view the bookings in their area. Figure 3 shows the login page of the landowner. They can log in by giving the user credentials given to them by the admin.
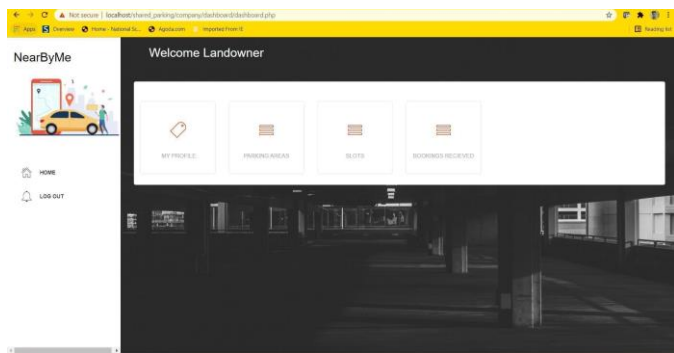

Fig 3: Landowner Home Page

The landowner can go to the different sections like viewing their profile, adding parking area details and parking slot details and viewing booked slots. And the logout option is also there. On the landowner's profile page, there are options to update and delete their profile

4.3 Adding Parking Area and Slots

On the parking area page, the landowner can add a new parking area if they have any. From a map integrated into the page, users can get the latitude and longitude details to specify the exact location of their parking slots. There are options to update and delete the already entered parking area details.

In parking slot, details include time duration and amount of the parking areas available. Landowners can add new spaces as well. They can update and delete already added slots.

The Booked Slot Page shows the already booked slots of a landowner's parking slot. They can update and delete the bookings related.

4.4 Customer

Users can either create a new account or sign-in to their existing account (as shown in figure 4 and 5) using 'NearByMe' Application.
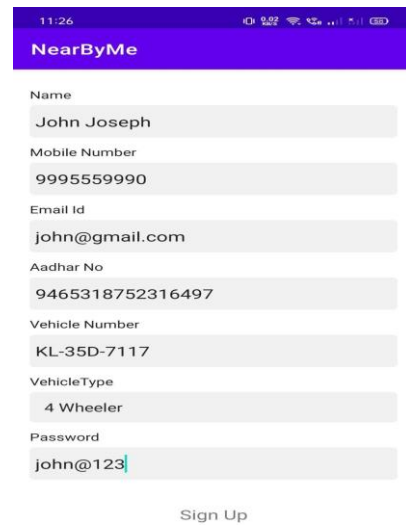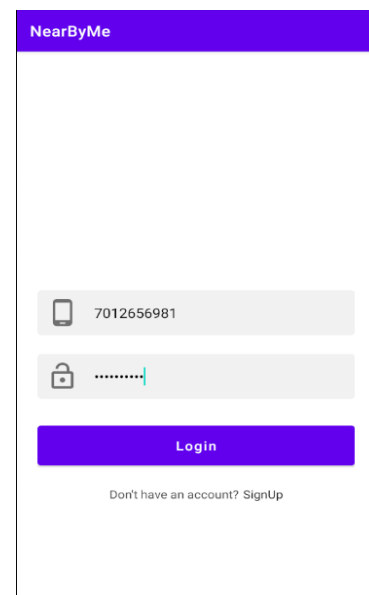

Fig 4: User Signup

Fig 5: User Login

4.5 Find parking

Once they log in they should specify the vehicle type as 2-wheeler or 4-wheeler. After mentioning the vehicle type, Users can view all the parking slots on the map and then they may choose the desired space from the map which is stated in a red marker as shown in Figure 6.

Fig 6: Choosing the Parking Slot

4.6 Payment

Users could then complete the payment to the landowners, which varies according to the duration and vehicle type. After, which the payment will be processed with the partner bank (Figure 7). The user gets a confirmation message when the payment is successful and the parking slot is confirmed.
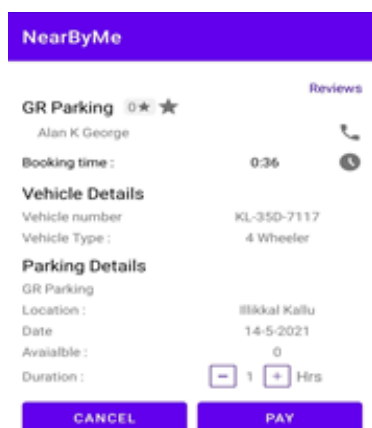

Fig 7: Payment Page

4.7 Booking

On making the payment the customer can see all the booking he had made till that time in the bookings module. The online payment facility can make the system more flexible (Figure 8).
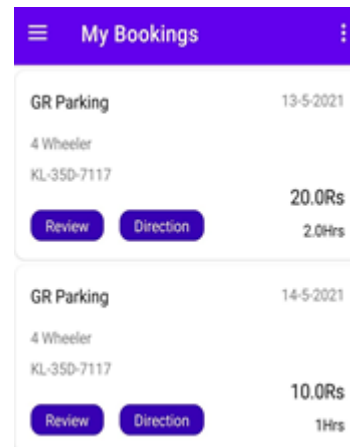

Fig 8: Booking Page

4.8 Rating and Review

The Customer also has an option to give reviews about the parking slot. The space user can comment on his experience in the parking area, so that can help other users to find a better space. Also can help the owner get feedback on the facility provided by him.
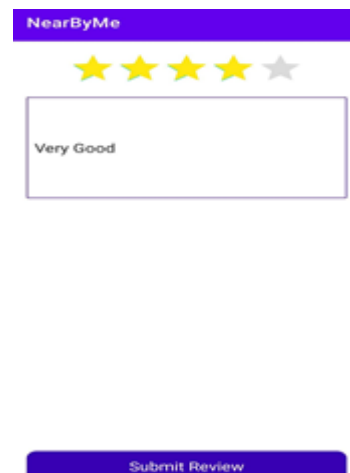

Fig 9: Rating and Review Page

5. TECHNOLOGY REQUIREMENTS

In the development of the NeraByMe-Share Parking System, various technologies are required. The technology requirements include;

- **Java**

  Java is an object oriented language. In our project we have used Java mainly for android app development in Android Studio. It helps us in enabling all the key features needed in our project by dividing each functionality into separate modules.

- **PHP**

  PHP is used as part of web development. It is a scripting language which enables us to connect the front end with a database. Using PHP we are maintaining the session tracking as well.

● **MySql**

MySql is the db we have used here. All the details related to all modules are stored in different tables and respective queries have been used to retrieve the data from the database.

● **Google Map**

Google map is enabled in Android app for providing the appropriate directions for the driver to his destination. Landowner can select the latitude and longitude of his land by navigating through the map provided in the webpage.

● **Payment Gateway**

This will help the users to pay the amount to landowners via online gateway which make it easier for drivers.

● **Android Studio**

Android app is mainly developed using Java in an IDE called Android Studio. It includes an advanced code editor that make it faster and easier to develop apps.

6. RESULTS

The NearByMe-Shared Parking system provides a web page for the admin and landowner to sign in and add details about the parking slot, and they can update or delete the parking slots. Customers can sign in to the application through their smart mobile and can pre-book the parking slots, he can localize the parking slots to find out the nearby parking slots. The payment portal allows users to make payments through online transactions and can also mention reviews about the parking slots based on their experience. Also, the customer can find out the directions to the parking slot with the help of google maps. The system helps the landowner to make money by renting out their private parking space.

7. CONCLUSIONS

The availability of parking spaces is an issue in metro cities of India. Various solutions developed to overcome the limitations. Those systems do not address all the challenges. Our project work focuses on increasing the availability of parking spaces in metro cities in a localized manner. This system allows people to rent out their private parking space on residential premises, when not in use. The spot owner can list out the time slots when their parking spaces are available. Customers can pre-book their parking slot by making payments. The system also provides efficient utilization of space and income for the space owner. The system helps to enhance the availability of parking spaces in a localized manner efficiently. In the future, the system can be enhanced to ensure more security and reliability by using a Blockchain-based system to store the land and vehicle-related details.

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