

Android Application for On-Street Parking

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Abstract- In cities like Mumbai where the population is at its peak and the roads are all messed with vehicle's and long traffics. In such over increasing population it becomes a difficult job to find a parking spot for our vehicle. We came up with an idea where users can logon to our application and find the perfect parking spot which is nearest to their destination. With this the users saves both time as well as fuel. The driver can easily view the parking availability on the application and drive straight to the spot without wasting any time. Hence this is an intelligent parking system where we take into account the drivers driving time to the spot and forecast the parking availability for different parking locations based on real time parking information. Users can enter the destination where they wish to go and based on the location, the system provides various parking spots in the area. In this paper, we have proposed an idea to book a parking spot through our application and generate a receipt for the user and also reflect the vacancies in real time on the application as well as the website operated by the admin. With such a system the parking authorities can easily manage their parking spaces efficiently.

Keywords- Parking Spot Booking, Car Park, Availability Status, Parking information.

I. INTRODUCTION

In metropolitan cities like Mumbai where the population is at its peak and the roads are all messed with vehicle's and long traffics. In such over increasing demand for vehicle's it becomes a difficult job to find a parking spot for our wheel's. Due to this the people are forced to haphazardly park their vehicle wherever they find space, which result in traffic offence like illegal, haphazard double or angular parking. To overcome such parking crisis in Mumbai the user can use a mobile application to check availability of parking slots, which are in the vicinity of their destination. Using that application driver can also book a parking slot. The application will provide a route for the driver from his current location to the parking slot with an estimated time considering traffic in the route. If the driver does not reach the parking spot on time than the slot booked will stand canceled. Thus, a simple application will help the driver to find a valid parking spot near their destination.

II. PROBLEM DEFINITION

Our main purpose behind pursuing this idea of developing an application where users could book a parking spot just like booking movie tickets is to save people's time and fuel and also relieve the congestion on Mumbai roads. With the help of this application users can enter their required location and based on that the application shows various parking lots nearby along with the vacancy status. The user then selects the desired parking lot, slot and the exact parking spot. Accordingly, the Google maps API provides a route to that parking lot showing the estimated time of arrival (eta). The system generates a time limit within which the user should reach the location otherwise the booking stands cancelled. The same will be notified to the customer. The time limit is generated based on the time user will take to reach the location (which also takes into account the traffic to reach the location) plus some extra time for variable reasons. Our system deals in real time and will perform real time monitoring of parking forfour wheelers. The complete implementation of this project is explained in great detail in the further sections of this paper

III. OBJECTIVE OF THE PROPOSED SYSTEM

This proposal is aimed at development of an application system through which the users could book their desired parking spot. The data is transferred in real time between the application and the website operated by the admin at the parking lot. To collect the data, store it and transfer it between the website and the application a common database solution is proposed. All this data will be transmitted wirelessly in real time. The main functions would include:

1. Acquiring various parking lots data
2. Login authentication for website and application
3. Real time parking availability status
4. Centralized server/database for all user data
5. Retaining user data for security purposes and also improving the user experience
6. Analyze and act upon that data

IV. METHODOLOGY

A. System Architecture:

Client-server architecture is best suited for the above system. A client-Server application is a distributed system consisting of both client and server software. The client process initiates a connection to the server, while the server process waits for request from any client. The major components of the architecture are: Application, Website, Central Database, Admin and Users.

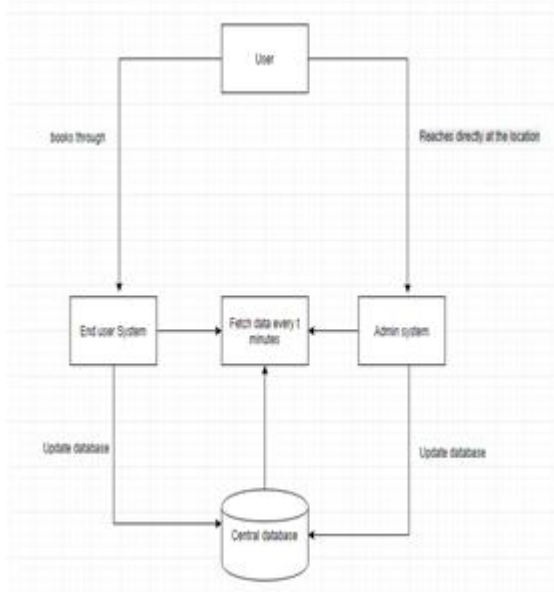


Fig.1. System Architecture

B. Prototype Model

The Prototype model is an incremental model where we build prototype versions of the system and keep deploying it incrementally. Our working is based on this model as we work in an incremental manner as we gather the initial and basic requirements and build the prototype and then as new requirements are discovered we make suitable improvements and roll out an update. It also allows us to experiment with the system and refine the requirements and also find areas of strength and weakness in the software.

V. SYSTEM WORKING

A. Working Mechanism

The user has to login to the application to book the desired parking spot. So first the user logs in the application, then the user enters the location. Based on the location the application shows all the nearby parking lots within a

predetermined perimeter. Clicking on the parking lot the details of the parking lot is shown to the user. The user then chooses a parking lot after which she/he is directed to a form where all the details are needed to be filled. After this the booking is confirmed and a slot is allotted to the user and a downloadable receipt is generated. On the admin side that is the website at the parking lot gets the information of the users who booked a parking spot along with each booking's unique id. This id could be used to get the users information. The application also supports a Google API which gives user the route and the estimated time to reach the parking lot so the system accordingly suggests the booking time to avoid any race conditions.

A. Working

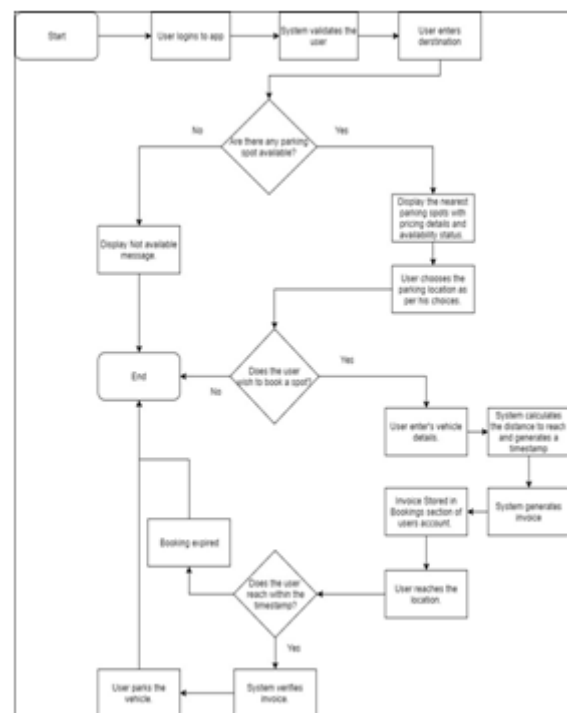


Fig.2. Block Diagram

- User Login/Signup
- User Enters Destination

The application displays an input field where the user has to enter the desired destination. Based on the destination various nearby parking lots are displayed on the application and if there are no parking lots nearby then a message is displayed stating “Not Available”.

- Book a Spot

If the user wants to book a spot than the application asks the user to enter certain details and after that the

application generates an invoice and also calculates the distance to reach the parking lot from the user’s location through a Google map API.

- *Reach within the timestamp*

The application checks whether the user reaches the parking spot within the stipulated timestamp and if not, then the booking is cancelled. Then the user needs to again book the spot.

- *Invoice Verification*

When the user reaches the parking spot after booking through the application the invoice is verified and the timer starts for that user.

B. Functionality

1. Mobile Application

1. Login and Signup

The users could Sign-up and Login on the application whereas the admin using the website is provided with the login credentials beforehand based on their location.

2. Nearby Parking Spots

After successfully logging in the user enters a desired location and searches for the nearby parking spots, which displays all the parking spots in an adjustable perimeter. The user could also view the details of the parking lots by clicking on a particular parking lot on the application [1].

3. Booking A Spot

The user after selecting a parking lot is asked for username, car info and car number. After filling up the details the user is able to book a parking spot [1][2].

4. Route to The Parking Spot

Finally, the user is shown a route to the desired parking location through an API of Google map. The user is shown the distance, traffic and the estimated time to reach the parking location.

5. Data Backup

The application and the website keep on taking backup of the data regularly, the backup is saved on the database server [1][2].

1. The backup will be taken automatically on a regular interval.

2. If the server crashes then the admin can restore his/her database from the backup which is stored on the database server.

2. Website

1. Check-in and Check-out

After the admin logs in to the website he is directed to a page of check-in and check-out. After that there is an Add and Remove button to update the details in the common database. Then there is also an Invoice generation button that generates an Invoice by retrieving all the information entered previously with a unique booking id. The check-out needs booking id and the check-out time followed by which there is a print bill button that generates a bill containing all the user details along with the Total Time, per hour rate and Amount Payable [3].

C. Sequence Diagram

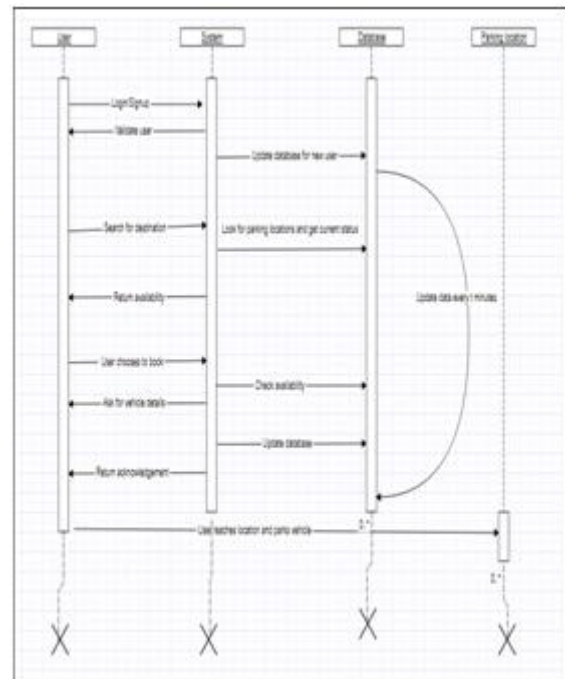


Fig. 3.1 Sequence Diagram for End User booking online

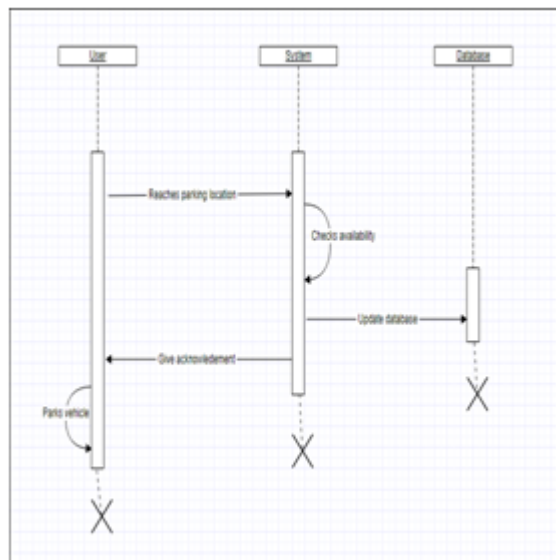


Fig.3.2 Sequence diagram for users directly reaching the location

D. Use Case Diagram

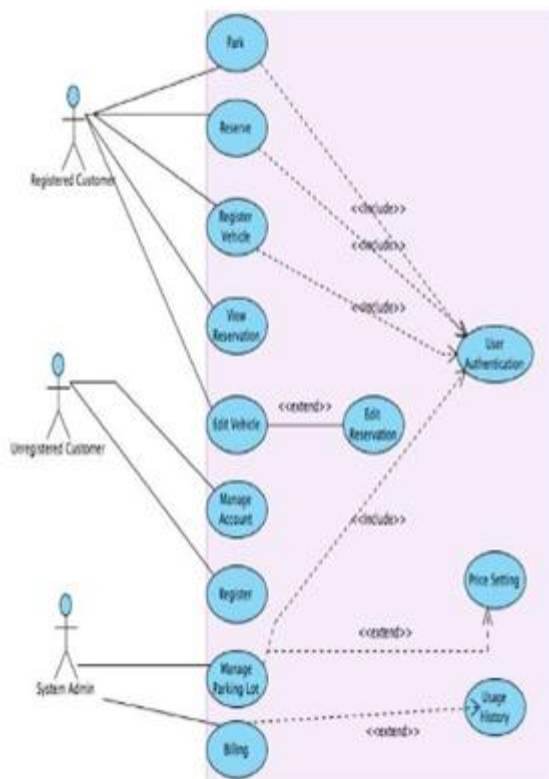


Fig.4 Use Case Diagram

VI. CONCLUSION

The main objective of this project is to allow the user to view the status of any parking lots and based on the users need and requirements she/he could book a parking spot. Generally, the customers tend to go to the parking lots

and then see if there is vacancy then they park their car or else they find some other location. So instead if the users already knew that the parking lot where the user is going to visit has vacancy or not and if not than from the application user could find another parking spot. So, our goal is to aid the users in finding and booking a parking spot saving their time and fuel and also relieving traffic on Mumbai roads.

VII. FUTURE WORK

Furthermore, using this system we could study the congestion caused at prime areas of Mumbai and provide more parking lot services thereby reducing the traffic problems. We could include the pass system for the customers that very often use the parking spaces by studying the data collected through the application and the website. And this data collected could be used for security purposes.

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