
ANDROID APPLICATION FOR SMART PARKING SYSTEM

Pranjali D. Jambhulkar*¹, Sejal R. Thaware*²

*^{1,2}Student, Department Of Information Technology, Yeshwantrao Chavan College Of Engineering, Nagpur, Maharashtra, India.

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. This paper provides a good insight into the guidance, monitoring and reservations components of the smart parking and directions to the future development. A cloud-based smart parking application will enable real-time monitoring and booking of parking availability by providing enhanced services to the end users as well as reduce the workload of the parking administrator.

Keywords: Android Application, Firebase, Cloud Storage, GPS, Real-Time System, Parking Space Detection.

I. 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. The Smart Parking Application aims at helping users to find the most suitable area for parking, make reservations and extend them, if required. 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 parking slot is available in parking, then user can book it for some specific time slot also, this system provides an additional feature of cancelling the bookings. It also utilizes the open ground for parking with security. Thus, it is going to solve the parking and traffic problem. In this case, it is not necessary to use an extra expensive camera and scanner for verification. 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. Security measures such as searching for the vehicle number in front of the driver recognition in order to avoid theft and the automatic billing process may also be the designed. We plan to broaden the testing on the real-time environment where users can have the "Smart Parking" system in their portable devices.

If the parking space is not available where customer wants to a park then this application helps the user to find the valid parking space nearby that location. This application helps the user to reserve the parking spot when they stay at home form not being frustrated of finding a parking spot. The interface is easy to use and allows the

user to easily switch between other apps. The Android mobile operating system is used, which can be found on many mobile phones today. The Android operating system uses a marketplace to sell applications for the phone. The web application combines geographic data and parking information with the user's location, social networks and other data sources to enable its users to conveniently find parking spaces when they come to work or drive into town. The application is particularly focused on collecting parking space availability data through crowdsourcing from the input of its users. In the delivery item we describe the desired functionality of the application, from which we extract the requirements for the mobile app, the web application and the backend system. We also analyze the data sources that will power the first prototype of the app.

II. 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. The monitoring system is designed as an integrated information system. The control system contains code, to perform all tasks. The efficient circular design is introduced with a special rack and pinion mechanism which is used to lift and place the car in a certain position [1].

The goal of this project is to automate parking lots and cars as well. A scale model of an automated parking system that can organize and manage the number of cars that can be parked at a particular place at any time based on the availability of a parking space. Automated parking is a method of parking an existing car using a sensor. Entry and exit of the order are done by android application [2].

III. METHODOLOGY

The slot allocation technique follows a chain as stated below:

Step1: Initially the slot choice is made by the person from his cell phone. He tests for the provision of a parking slot this is nearest to his location. If it's far available, he actions to the following level in any other case visit the preliminary state.

Step2: Transfers request for parking slot from the cell the use of Android application.

Step3: The Parking Control Unit (PCU) receives the slot quantity asked via way of means of the person.

Step4: If the payment is performed successfully, then the asked slot is reserved withinside the parking area.

Step5: After booking a specific slot by the person then the that slot gets marked and status of it shown

Step6: As quickly because the car receives entered into the parking slot, the timer receives ON and measures the whole time.

Step7: At the last when the vehicle moves out of the parking whole time get displayed to him by sending message.

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. Payment:

On availability of empty slot, the consumer can verify his reserving of his preferred slot. After booking a specific slot, the use can continue to the charge alternative in any other case terminate the complete process. The system requires full payment in advance /Hence, the person needs to provide all his card info to book his preferred slot. After a success payment he gets a slot number, each to his cellular and mail. After usage of a specific slot, he can circulate out of the parking place by clearing his payment.

8. Confirmation to user:

On a success of reservation, a confirmation page with user information is proven that's editable and Green is indicated to show user's reserved parking slot.

9. Parking Dashboard:

Parking dashboard gives more efficient distribution of parking slots and with the aid of using the use of this dashboard the parking owner can control their parking slots. the allocation and de-allocation of slot is done by parking owner. The dashboard additionally suggests reserved slots which may be allotted while the corresponding user verifies his information and confirms the selected slot.

Server Side:

Initially the administrator logs in the application through the use of his username and password. The administrator has authority to feature new customers and stores their info in the database which might be used for in addition purpose. On receiving the request at server aspect through user, the administrator indicates all to be had locations on the nearest requested destination.

1. 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

2. 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.

3. 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.

4. Users Feedback and Logout:

The administrator can take comments from specific users. He can both respond to the user's comments messages or easy delete them. The administrator can pass out of the application by absolutely clicking on logout button. He can test all of the info in his account and can logout.

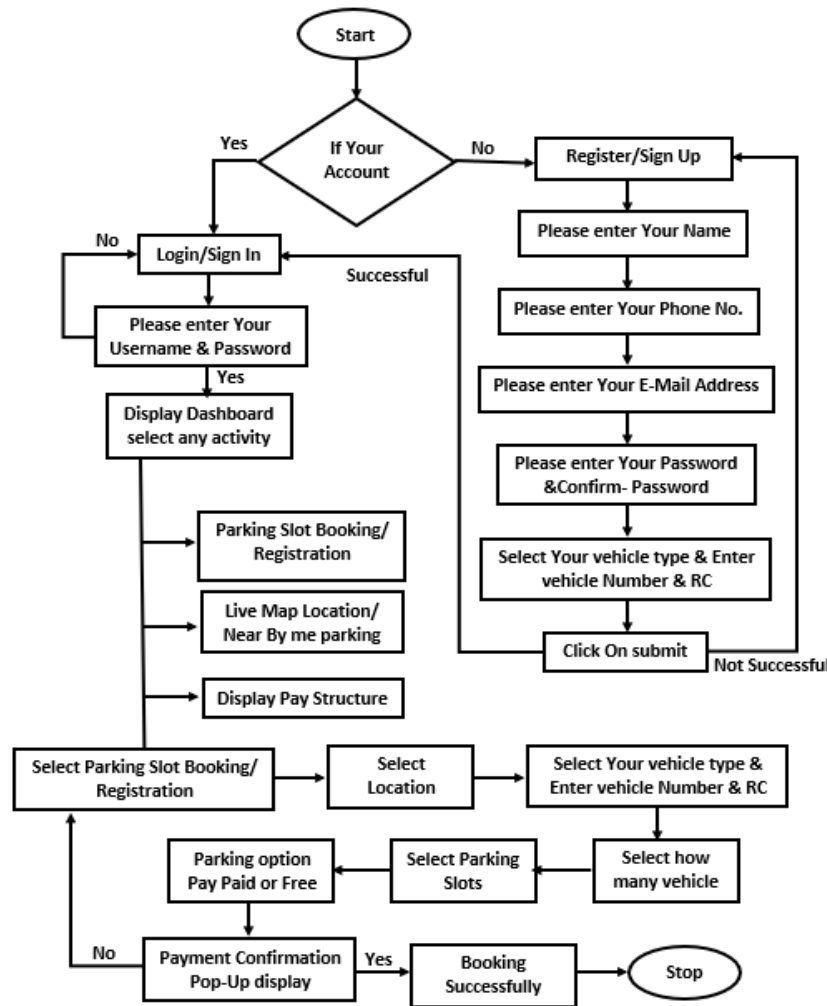


Figure 1: Flowchart

IV. 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

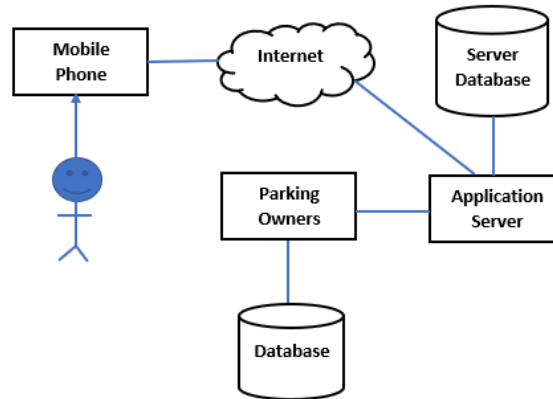


Figure 2: System Architecture

V. RESULTS AND DISCUSSION

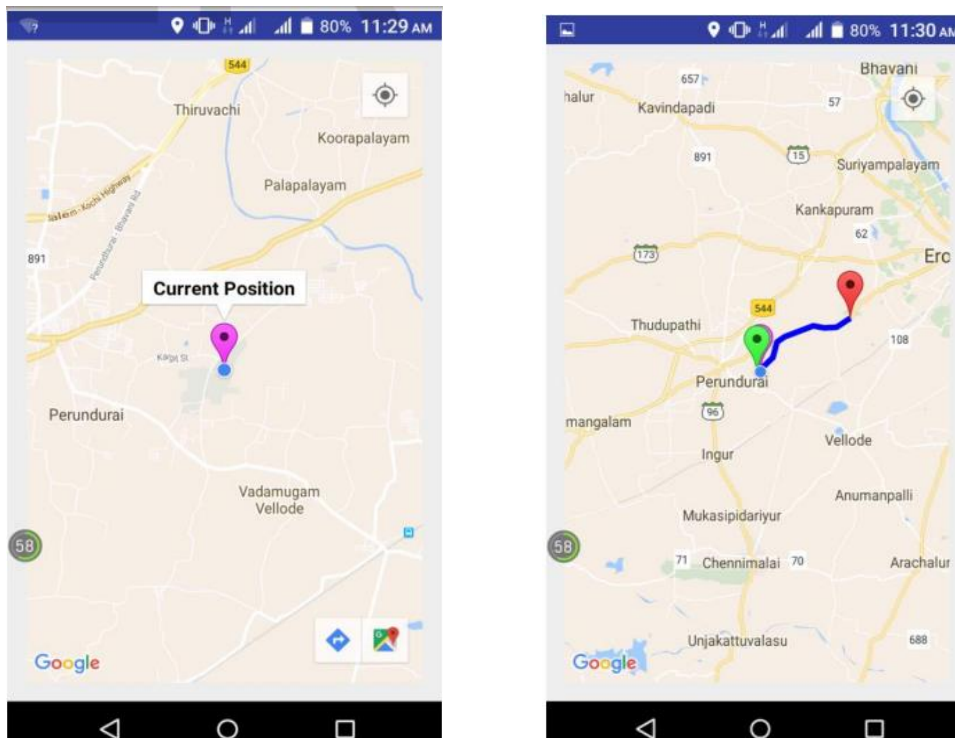


Figure 3: Result

The Application initially shows the current location of the user. Then the user should notify the destined location in the application. Then the applications show the route of the user, it will helpful to the user to find the location of the parking lot. The above figure shows the current position of the user. Then the following figure shows the route of the destined position by the marker representation. The marker is indicated in red color. Then the route is indicated in blue color. This shows the route from perundurai to nearest parking lot from perundurai.

VI. CONCLUSION

This article summarizes an efficient way to park a vehicle using recent technology. This app allows the user to take control of the parking decision unlike the traditional method of physically trying out multiple parking spots. Using this application on a large scale would benefit the user even if a user is in a new place. The app is user-friendly and convenient have introduced the concept of Smart Parking System which will be able to reduce traffic congestion, which will improve the quality of life of the citizen. Android mobile application called Car parking, a driver can find the available parking spaces in a given area and get the parking fees.

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VII. REFERENCES

- [1] M. A. R. Sarkar, A. A. Rokoni, M. O. Reza, M. F. Ismail, "Smart parking system with image processing facility", I. J. Intelligent System and Application, 41-47, 2012.
- [2] D. J. Bonde "Automated car parking system commanded by android application" in Proc. IEEE Conf.,03-05, Jan 2012.
- [3] R. Yusnita, FarizaNorbaya, and Norazwinawati Basharuddin "Intelligent Parking Space Detection System Based on Image Processing", International Journal of Innovation, Management and Technology, 232-253, 2012.
- [4] Yanfeng Geng, Christos G. Cassandras, "A new "Smart Parking" system Infrastructure and Implementation", Science Direct, Social and Science Behavioral sciences, 1278-1287, 2012
- [5] M. M. Rashid, A. Musa, M. AtaurRahman, and N. Farahana, A. Farhana "Automatic Parking Management System and Parking Fee Collection Based on Number Plate Recognition" International Journal of Machine Learning and Computing, 93-98, 2012.
- [6] Tejal Lotlikar Minla Chandrahasan, Ankita Mahadik, Madhusmita Oke, Anjali Yeole "Smart Parking Application September 2016 International Journal of Computer Applications 149(9):32-37DOI:10.5120/ijca2016911529
- [7] Zhanlin Ji, Ivan Ganchev¹, Máirtín O'Droma and Xueji Zhang, "A Cloud-Based Intelligent Car Parking Services for Smart Cities" 2014 XXXIth URSI General Assembly and Scientific Symposium (URSI GASS) Telecommunications Research Centre (TRC), University of Limerick, Ireland.
- [8] Sangwon Lee, Dukhee Yoon, Amitabha Ghosh Autonomous Networks Research Group Ming Hsieh Department of Electrical Engineering Intelligent Parking Iot Application Using Wireless Sensor Networks.
- [9] S. V. Srikanth, Pramod P. J, Dileep K. P, Tapas S, Mahesh U. Patil, Sarat Chandra Babu N "Design and Implementation of a Prototype Smart PARKing (SPARK) System Using Wireless Sensor Networks"
- [10] Amir O. Kotb, Yao-chun Shen, and Yi Huang "Smart Parking Guidance, Monitoring and Reservations" Senior Member, IEEE, Department of Electrical Engineering and Electronics, University of Liverpool, Liverpool, L69 3GJ UK.
- [11] Sangwon Lee; Dukhee Yoon; Amitabha Ghosh "Intelligent parking lot application using wireless sensor networks" 2008 International Symposium on Collaborative Technologies and Systems.
- [12] Amir O. Kotb; Yao-chun Shen; Yi Huang "Smart Parking Guidance, Monitoring and Reservations: A Review" IEEE Intelligent Transportation Systems Magazine (Volume: 9, Issue: 2, Summer 2017).