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# Android Application for Smart Parking System

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**ABSTRACT:** Due to a lack of parking spots, automobile parking has recently become a significant issue in urban areas. In most major cities, finding a parking spot may be extremely challenging and irritating, especially during rush hour. The main goal of the paper, Smart Parking System Using Android Application, is to lessen traffic congestion in roadways, multistory buildings, and malls caused by a lack of parking spaces. The proposed application offers a simple method for parking space reservation. The user of this programme can browse different parking lots as well as whether or not there is space available. He can reserve it for a specified time slot if the booking spot is open. When one is available near the user's location, the paper will show it. Utilising parking spaces effectively is the goal of our initiative. Additionally, this system offers users a new feature. Smart parking systems must be put in place to solve the parking issues. In this study, the historical context of parking issues is presented, and pertinent algorithms, systems, and smart parking strategies are reviewed and debated. This system also offers the ability to cancel reservations. Anytime, the user may cancel their reserved space. Users can also make payments online based on the time it takes to reserve a space, at which point the amount can be computed and the payment can be made. The guiding, monitoring, and reservations aspects of the smart parking are well-explained in this study, along with recommendations for the development's future. By enhancing services to end users and reducing the workload of the parking administrator, a cloud-based smart parking application would enable real-time monitoring and booking of parking availability.

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

## I. INTRODUCTION

Every day, more people are using personal autos. Because of this, trying to find a parking space during busy times is not only time-consuming but also wasteful of fuel. The drivers' constant quest for a suitable parking space increases traffic. Increased vehicle exhaust volume has a detrimental effect on the environment. Therefore, reservation-based smart parking is now a must. The majority of currently used parking lots do not have a system in place. The majority of them are manually run and just somewhat efficient. Every user should have the I demand. Should be more effective, user-friendly, and efficient. They ought to offer more protection. Our Android app "valid spot" was created with the intention of assisting users with online parking reservations. The Smart Parking Application's goal is to assist users in choosing the best parking location, making reservations, and, if necessary, extending them. The user of this programme can view numerous parking places and select one to see whether or not a parking space is available. If a parking space is available, the user may reserve it for a certain time frame as well. This system also offers the option to revoke reservations. Additionally, parking with security is provided on the open ground. As a result, the parking and traffic issues will be resolved. A more expensive camera and scanner are not required in this instance for verification. The Android application is used to construct the smart parking system based on slot reservations. With the help of the app's slot allocation functions, users can book their own parking space at the most affordable price. It is a useful method for dealing with parking problems because it relieves traffic congestion and offers an automatic billing system. Using a layered parking technique, this work is expanded into a completely automated system. Security measures may also be designed, such as looking up the vehicle number in front of the driver identification system to prevent theft and the automatic invoicing system. We want to expand testing in a real-world setting where people can use the "Smart Parking" app on their mobile devices. This programme aids the user in locating a suitable parking place close to the desired location if the desired parking space is not readily available. When a user stays at home, this application enables them to reserve a parking space so that they are not annoyed by the difficulty of locating one. The user-friendly layout

makes it simple to transition between other programmes. The mobile operating system Android, which is utilised by many smartphones today, is employed. A marketplace is used by the Android operating system to sell phone applications. The web application makes it simple for users to quickly locate parking spaces when they arrive at work or drive into town by fusing geographic data and parking information with the user's location, social networks, and other data sources. The programme is especially concerned with gathering information about parking space availability through crowdsourcing from the input of its users. We outline the desired application features in the delivery item, from which we derive the needs for the backend system, the web application, and the mobile application. Additionally, we examine the data sources that will power the initial app prototype.

## II. LITERATURE SURVEY

Technology has been advancing quickly recently in all fields, and people are keeping up with the times as a result. The "The Smart Parking Application" has been created to help individuals park their cars more quickly while also assisting them in doing so legally and away from busy roads so they won't get upset trying to find a spot. The "Parking system controlled by Android application" is a scale model of a parking system that can control and manage how many vehicles can be parked in a specific location at any one moment based on parking space availability. There are many articles on this subject that utilise the technology that has been discovered through all of this information and technological study. Listed below are a few of such studies. expensive. Finding machine learning tools or capabilities to process the collected data presents another challenge. Additionally, it is essential to ensure that all parties have great real-time functionality with one another and minimise error occurrence.

In this study, intelligent parking systems gather data about available places, process it, and then position the automobile there. Based on the suggested architecture, a parking assistance system prototype has been created. A sophisticated control system is required to integrate the entire operation. The monitoring system is envisioned as a comprehensive information network. Code is present in the control system to carry out all tasks. A unique rack and pinion system is employed to lift and position the car in the efficient circular design, which is introduced.

This concept aims to automate both parking lots and automobiles. A scale model of an automated parking system that can arrange and control how many automobiles can be parked in a specific location at any one moment depending on the availability of a parking space. A sensor is used to park an existing vehicle using automated parking. The android application handles the entry and exit of the order.

## III. METHODOLOGY

The chain of steps for the slot allocation technique is as follows:

Step 1: The person first selects a spot using his mobile device. He checks to see whether there is a parking space available that is close to where he is. If it's close by, he moves on to the next stage; otherwise, he goes to the preparatory state.

Step 2: Transfers a parking slot request made on a cell phone using an Android application.

Step 3: After receiving the requested slot number from the person, the Parking Control Unit (PCU) continues.

Step 4: The requested space is allocated inside the parking area if the payment is made successfully.

Step 5: After a person books a certain time slot, that time slot is marked and its status is displayed.

Step 6: The timer turns on and starts recording the duration of the time as soon as the automobile is parked.

Step 7: Finally, when the car pulls away from the parking spot, the entire time will be displayed to him by message.

### Modules:

Three modules make up the bulk of the real-time android application parking system.

- User Module,
- Administrator Module,
- and Booking Module are them.

User module :

The application's user interface/user experience are the focus of this module. This module gives the user the flexibility to sign up, log in, make a reservation, and pay. If a user is brand-new to the application, they must first register by entering their information. The user signs in using the user-id and password after registering. Once logged in, the user can browse parking spaces, reserve certain spaces, and then complete the online payment.

**Administrator Module:**

The application's main module is this one. It manages the database and carries out various actions on it in the backend. As soon as a user registers with the application, the administrator stores all of his data in the database. The administrator is the only person who has access to the database that contains information about all parking spaces (both available and reserved), their cost for reservations, and user information. Additionally, the administrator gives the user a means of payment.

**Booking Module:**

This application's core module, which deals with parking spot reservations, is here. When the user is prepared to make a reservation, the booking module enters the picture to give the user the data they need. This booking module handles the essential processing in relation to the available slot, the cost to book the slot, and other related factors.

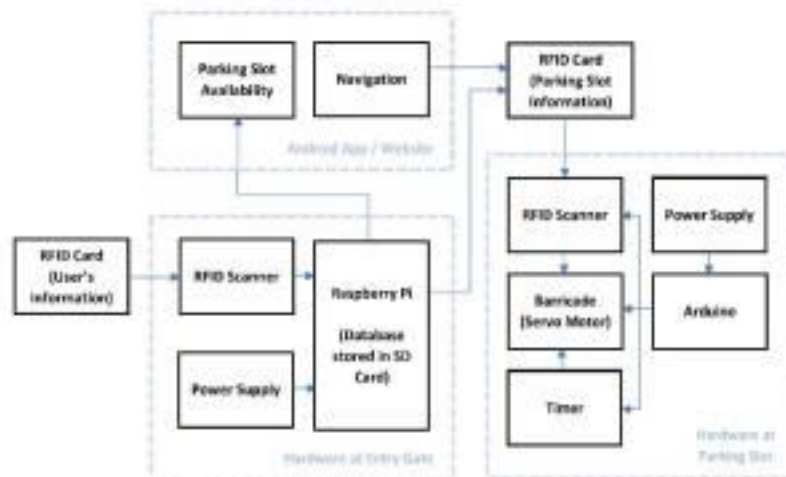
**Client Side :**

1. Start The Application
2. Registration
3. Login
4. Selection of location for parking
5. Select vehicle type
6. Availability
7. Payment
8. Confirmation to user
9. Parking Dashboard

**Server Side:**

1. Login
2. Add and view Parking Locations
3. Booked Slots
4. Users Feedback and Logout

**BLOCK DIAGRAM DESCRIPTION**



This section describes the Smart Parking System block diagram by outlining each block's operational principal. It provides a dynamic perspective of how the entire system is interconnected. Three distinct functional blocks can be conceptually separated from the entire system. Hardware at the entrance gate, the Android app (S-Park), and the parking space hardware, as shown in The website and Android app were created primarily to provide information on the parking spaces that are currently accessible in various parking zones. According to Fig. 2, the unoccupied and occupied parking spaces are depicted as green and red, respectively. Google Maps navigation from the entrance to the

preferred parking space is also available. To create the app, Android Studio with Java is utilised, whereas HTML and CSS are used to create the website.

### System Architecture

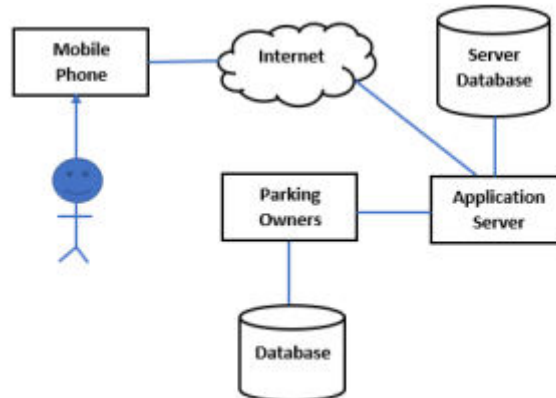


Figure 2: System Architecture

The six parts of the smart parking model are depicted in the system architecture: park owner, user, internet, application server, server database, park owner database, and more. The dashboard of parking lot owners contains their own database of parked and unparked spaces. Users can sign up for the app online using the mobile phone API. The GPS location is tracked by the application server, which compares it to the closest parking space. All parking owner information and GPS location information are stored in the primary server database.

### Hardware requirement: -

- System: intel i5 processor
- Hard disk: 40GB
- Monitor: 15.inch
- RAM : 8GB

### Software requirement: -

- Operating System : windows 10
- Coding Language: kotlin
- IDE: Android Studio
- Database: firebase

## IV. CONCLUSION

The six parts of the smart parking model are depicted in the system architecture: park owner, user, internet, application server, server database, park owner database, and more. The dashboard of parking lot owners contains their own database of parked and unparked spaces. Users can sign up for the app online using the mobile phone API. The GPS location is tracked by the application server, which compares it to the closest parking space. All parking owner information and GPS location information are stored in the primary server database. Drivers can locate available parking spaces in a specific region and learn the cost of parking by using the Android mobile application Car Parking.

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