

# Parking Getaway And Finder : An Android Application

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**Abstract-** *In India, with the increasing number of vehicles, the problem of parking is also increasing. It is a common scenario that people park their cars on the roads behind other vehicles. This, in turn, creates chaos among the people, leads to fights and most importantly, creates traffic problems on the roads. To overcome these problems, very few numbers of people stick their contact details on their vehicles to avoid any problem caused due to their vehicle. However, this lets strangers invade their privacy and thus is not an effective solution. The “Parking Getaway and Finder” is an android application which helps the owners of the vehicles to find an effective solution of the above problem without compromising with their privacy. A QR Code is generated for every user who registers on the Parking Getaway and Finder app. The owner can stick this code on the vehicle and thereafter, if any person is affected because of the owner’s parked vehicle, he/she can easily contact the owner by scanning the QR Code. The app also helps the users to find available parking slots in the registered parking areas by using Google Places API.*

**Keywords-** Android Application, Firebase, JAVA, QR Code, Simple Mail Transfer Protocol, Google Places API

## I. INTRODUCTION

With nearly 1,200 vehicles being added to the city roads daily, parking problems in Delhi are compounding by the day. Colony roads, parking slots, basements and open parking areas in buildings and even open spaces now remain clogged with vehicles.

With families getting smaller and the total number of motor vehicles exceeding the total number of heads per family, the parking scenario is woefully falling short of the current requirements in the country. The situation is such that on any given working day approximately 40% of the roads in urban India are taken up for just parking the cars. The problem has been further exacerbated by the fact that nowadays even people from low income group are able to own cars. The number of families with cars has become much more than what the country is able to manage.

As it is, the cities in India are highly congested and on top of that the parked cars claim a lot of space that could otherwise be used in a better way. Thanks to poor, and at times zero, navigability, Indian cities are regarded as some of the worst options for living. One can also add the issue of pollution to this mix and understand the enormity of the crisis. In this context it needs to be understood that the Indian cities, with the possible exception of Chandigarh, were never planned in such a way so as to accommodate a deluge of cars as is the situation now. The apathy of present day urban planners has only made the situation worse.

It is mostly seen that people park their vehicles behind other vehicles and inappropriately anywhere on the roads. Frequent arguments, fights and even murders over the issue are becoming commonplace. The authorities have fallen well short of providing a wholesome solution to the problem. And with five lakh people coming to the city every year, even the suggested solutions come with a huge question mark.

The Parking Getaway and Finder application is implemented in Java based Android operating system and provides an efficacious solution to the parking problem by a simple concept of QR Code generation. A QR Code is generated for every user who registers on the Parking Getaway and Finder app. This QR Code is generated by the combination of Date of Birth and Phone Number, and is therefore unique for each user. It is generated through QRGen API which is an open-source, multi-format 1D/2D barcode image processing library implemented in Java, with ports to other languages. The owner can stick this code on the vehicle and thereafter, if any person is affected because of the owner’s parked vehicle, he/she can easily contact the owner by scanning the QR Code. To check the genuineness of the affected person, a feature of sending real-time image and location through Email is provided so that no person takes undue advantage of the application by notifying the owner of the vehicle without any fault.

The application also helps its users to find available parking slots in the registered parking areas. It uses the Google Places API to find the locations which can be used for legal parking. The application requires an admin for every

registered parking area. Whenever any user requests for a parking slot, the request goes to the admin of that particular parking area. The admin then allots the parking slots to the users on the basis of availability.

## II. PROPOSED SYSTEM

### Modules

#### 1. Register User

This module helps the user to register him on this application. The user signs in through his/her Email ID. The registration process is then done by entering the following details:

- Phone Number
- Date of Birth
- Vehicle Number
- Token ID

All these fields are necessary to complete the registration process. The data is saved on the Firebase Database which is a real-time cloud-hosted database. It is a NoSQL database and has different optimizations and functionality as compared to a relational database. Data is stored as JSON and each connected client is synchronized in real time to the stored data.

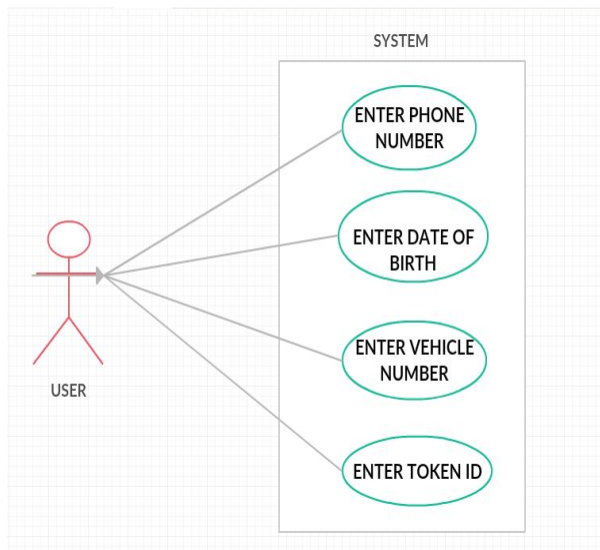


Figure 1. Use Case Diagram: Register User

#### 2. QR Code Generation

Once the user successfully enters the above fields and clicks on “SAVE DETAILS”, he gets registered on the application. The QR Code is then automatically generated for

the user using the QRGen API. The QR Code is generated by the combination of Name, Email ID and Token ID so that it is unique for each user.

#### 3. Send Notification

This module helps the user to send notification to the driver of the vehicle whose vehicle has created problem for the user.

This module is further divided into two parts:

- Scan the QR Code

This lets the user to scan the QR Code which is pasted on the vehicle which has created problem for him/her. By scanning the QR Code, the name of the driver is displayed on the screen.

- Click Image

To ensure the authenticity of the problem, a feature of real-time image capturing is given. This assures that the user does not unnecessarily disturb the driver of the vehicle.

After capturing the QR Code and the image, the notification is sent to the driver by clicking on the “Send Notification” button. The user can not resend the notification to the same driver before a specified time limit.

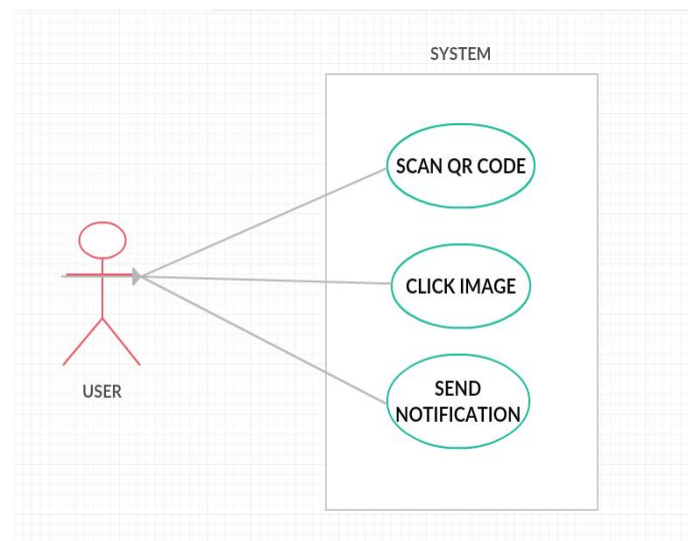


Figure 2. Use Case Diagram: Send Notification

#### 4. Receive Notification

After the user sends a notification to the driver, the notification is received in two parts:

- Application Notification

This notification is received by the Firebase Cloud Messaging Service. The driver receives the notification and has two options:

- To accept the message
- To delete the message

Correspondingly, the notification is sent back to the user whether his request as accepted or deleted.

- Image Notification

The real-time image of the vehicle is sent to the driver at his registered Email ID through Simple Mail Transfer Protocol (SMTP). SMTP is a TCP/IP protocol used in sending and receiving e-mail and is usually implemented to operate over Internet port 25. By viewing the image, the driver can decide to take the desired action.

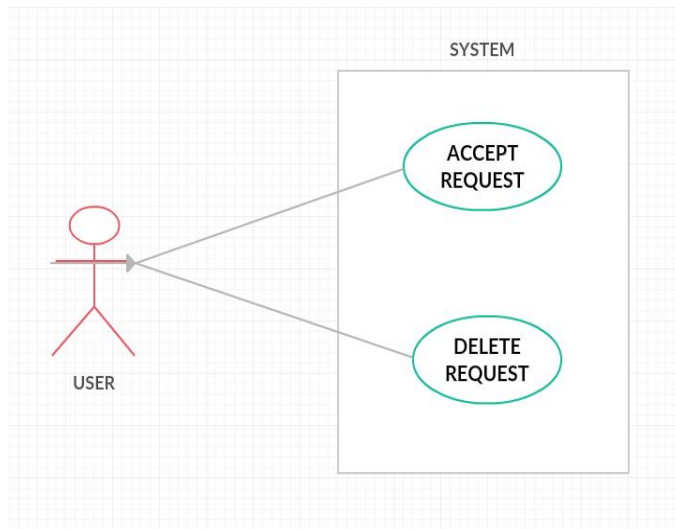


Figure 3. Use Case Diagram: Receive Notification

## 5. Find Parking Location

This module is used by the user to find available parking slot in the registered parking areas. The user enters the location where he needs to park his vehicle. The app displays all the registered parking areas near that location. The user accordingly selects the parking area and requests for the parking slot, if it is available.

After the user has sent the request, the notification goes to the admin of that parking area. He has two options:

- To accept the request

In this case, the admin mark this slot unavailable for further users. This helps the users to obtain real-time information of the parking status. The confirmation notification goes back to the user.

- To delete the request

In this case, the admin does not accept the user's parking request and the declination notification is sent back to the user.

## III. WORKING OF APPLICATION

For Parking Getaway, the application works in the following manner:

- The user should have this application installed in their mobile phones.
- The user is then required to register on the app by entering personal details like Name, Date of Birth, Phone Number, Email ID, etc.
- The QR Code is generated with the help of the combination of Name, Email ID and Token ID.
- The user can then paste the generated QR code on his/her vehicle.
- If, at any time, a chaos is created by the parked vehicle, then, by scanning the QR Code, "Send Notification" option is shown.
- By clicking on this option, an automated message is sent to the owner of that vehicle, and he can then take appropriate action.

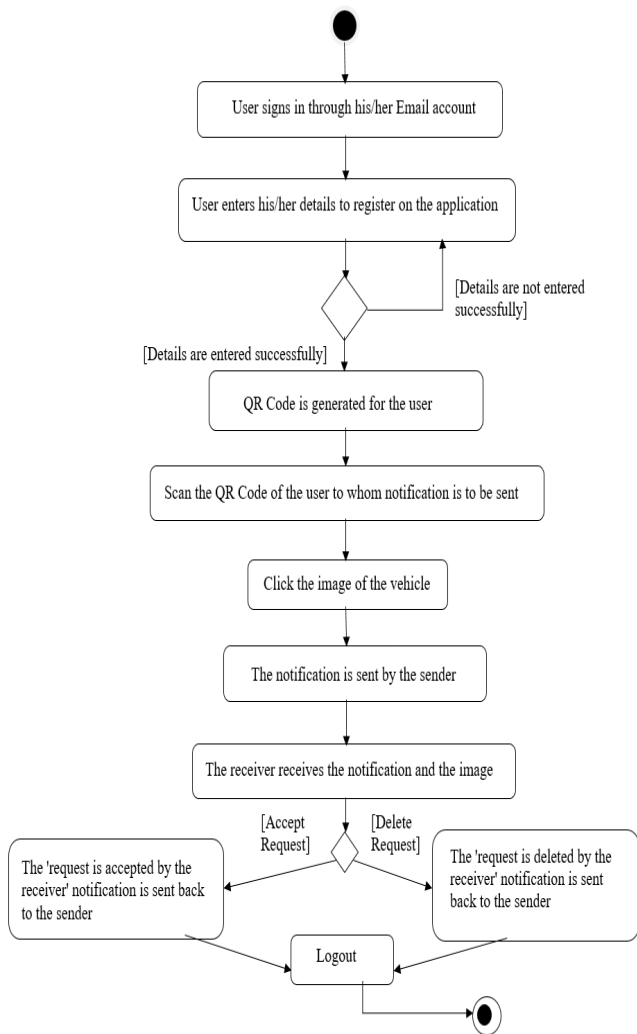


Figure 4. Activity Diagram: Parking Getaway

For Parking Finder, the user has to follow the following steps:

- The user enters his current location where he wants to park the vehicle.
- The app finds all the registered parking areas available in that location.
- The user then selects the required parking area and requests the admin for a parking slot.
- The admin then either accepts or rejects the user’s request and the corresponding notification is sent back to the user.
- If the admin accepts the request, then he marks that slot unavailable for other user.
- When the user frees that parking slot, he is charged for the number of hours his vehicle was parked in the registered parking area.
- The slot is then made available for other users.

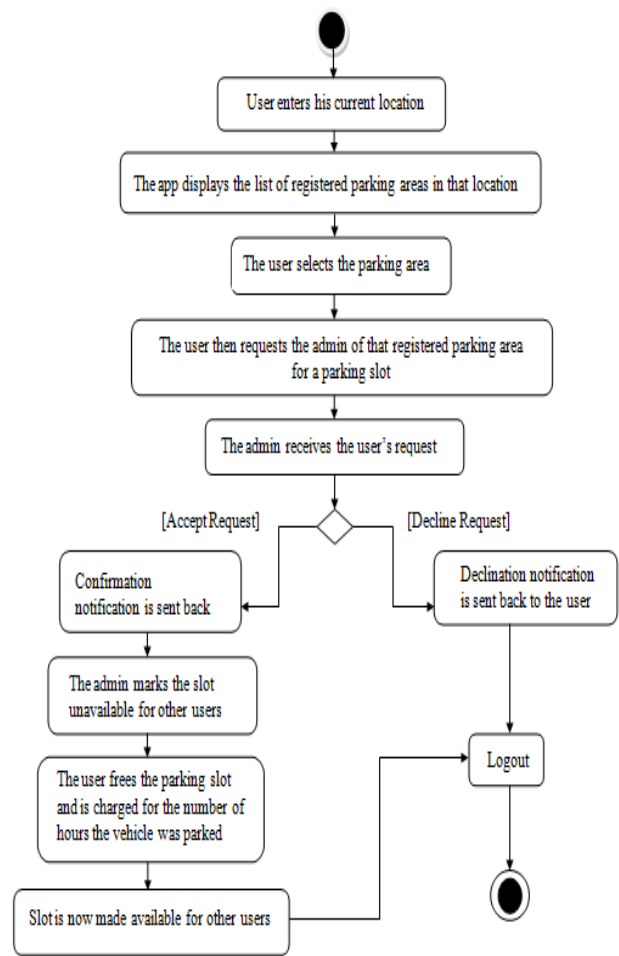


Figure 5. Activity Diagram: Parking Finder

**V. CONCLUSION**

In this paper, we proposed a method to easily get away from the unorganized parking problems. It uses the technologies like Android, Firebase Database and Simple Mail Transfer Protocol (SMTP) which makes it more efficient. It uses advanced features like GPS, Chatbot to provide more facilities to the users. The application also makes it easier to find registered parking areas in any location. In whole, this application will bring a huge difference and will also contribute in making the roads less chaotic.

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