

## **APPROVAL**

This Project titled “**Smart Car Parking System**”, submitted by Sheikh Sarwar Hossain ID: 142-15-3839 Sherajis Salakin ID: 142-15-3701 And Nilufa Chowdhury ID: 142-15-3759 to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering. The presentation has been held on 7<sup>th</sup> May, 2018.

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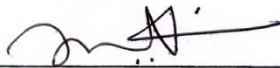
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# **Smart Car Parking System**

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This Report Presented in Partial Fulfillment of the Requirements for the Degree  
of Bachelor of Science in Computer Science and Engineering.

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**DAFFODIL INTERNATIONAL UNIVERSITY**

**DHAKA, BANGLADESH**

**MAY, 2018**

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## **DECLARATION**

We are declaring that, this project has been done by us under the supervision of **Ms. Ummev Hafsa Billah, Lecturer, Department of CSE**, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science & Engineering and approved as to its style and contents. The presentation has been held on 7<sup>th</sup> May, 2018.

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We would like to express our heartiest gratitude to **Dr. Syed Akhter Hossain**, Professor and Head, Department of CSE, Daffodil International University for his kind help to finish our project and also to other faculty member and the staff of CSE department of Daffodil International University.

Finally, we must thank with due respect the constant support and patience of our parents.

We would like to thank our entire course mates also.

## **ABSTRACT**

In Present day the number of personal vehicles usage is increasing rapidly and in future this rate may be twice than now. People likes personal vehicles than public transportation like bus or train. It is very difficult and frustrating as well to find parking space in most metropolitan areas, especially during the office times. It is very hard to find proper and secure parking space. So for this there is a need to provide sufficient parking places for those user who likes to travel with their own rides. The aim of this paper is to propose a design of Android based Smart Parking System which can be able to regulate the number of cars to be parked in a designated parking area.

The idea behind our Android Application-“Smart Car Parking System” is to help the user analyses area’s where parking is available and number of slots free in that area.

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# **CHAPTER 1**

## **Introduction**

### **1.1 Introduction**

An operating system for Smartphone's and other devices developed by Android Inc. and later purchased by Google. The Android platform is based on the Linux operating system and features numerous apps developed by Google and by third-party developers. Most of the Phones are running the Android operating system is the primary competitor. According to media reports, illegal parking of vehicles occupies as much as 30% of the city streets, and naturally, the problem is seriously hampering normal traffic flow in addition to causing the nuisance to pedestrians. Lack of Motivation, lack of monitoring, Un-responsible people, bad traffic management system, as well as inadequate parking facilities are responsible for the growing illegal parking. In absence of car parking facilities, vehicles are being randomly parked on the streets.

So this project helps the car parking system and control the traffic system. This app has been designed for search parking place in the city near user's requirements. Google maps has been used to navigate to the desire position.

### **1.2 Motivation**

The main idea behind the Smart Car Parking System is to help the user to find parking space, where parking is available and the number of slots free in that area. From the map the user can select the area which he asked for. If it is available some hours before to his arrival time. The application proposed in this paper makes finding parking space easily as it reduces the searching and waiting time for empty slots. The main Motivation is the scenario of our daily city life. Especially Those city which are over polluted like Dhaka or others big city.

### **1.3 Objective**

To make it's easy and user-friendly with less cost. Now a day in Dhaka city traffic problem is one of the major problem including others big city. Random car parking is one of the reasons for the traffic jam. Some people park their car on the road so for those people we create the application to solve the problem in Dhaka city.

### **1.4 Expected Outcome**

- The user can easily find parking place for particular locations.
- Cost-effective and user-friendly.
- It's saved our time to searching parking space.
- User can confirm their order by online.

But it requires an internet connection.

### **1.5 Report Layout**

In the chapter2, we talk about the background of our project. the scope and challenges of the project. In chapter 3, we specified the requirement of the project. In the section, we defined the DFD (data flow diagram), use case and design requirements. We also discussed the requirement collection. We specified the front end and the back end design of the project. in chapter 4. We talking about the implementation of the whole project and we tested every section of the projected weather the application is working as expected in chapter 5 and chapter 6, we discussed conclusion, Limitations of Our Application and the scope for further development of the project.

## **CHAPTER2**

### **Background**

#### **2.1 Introduction**

When Variety of occasions is going up then we visit various public places like Shopping malls, Five-star hotels, multiplex cinema halls, etc. The difficulty we facing first at these places is finding the availability of parking space. Most of the times we need to check through multiple parking slots for a free space. The problem will be more painful if the parking is multistoried. Thus the problem is time-consuming.

A smart apps is the solution for this kinds of problems. Our proposed system presents an Application on car parking that regulates the number of cars that can be parked in a given space at any given time based on the parking space. When a car comes to the entrance, it will be stopped at the main gate and the driver get off the car. Using the Android application on his Android device, the user commands the Parking Control Unit to check the Status of available Parking slots, through a call or SMS. On the reply, corresponding information is provided to the user, by means of call or SMS.

If the availability of Parking space is confirmed, the user commands the car to get parked in the particular slot. The car traces its path to the entrance of the parking area and parks the car. If they're not available user can also search parking space toot herniates building fora parking slot.

Thus this system proves to be useful for the purpose of the car parking automation and thereby helps reduce loss of time, as the searching of the free parking space is handled by the Parking Control Unit.

#### **2.2 Related Work**

When we make a decision that we will build these types of an Android Application for our final year project, we search in Google play store for the related application. We have found few Android Application as like our application theme in Google play store But



similar kind of application is not available now Bangladesh. Now we want to discuss this Android Application

### 2.2.1 ParqEx

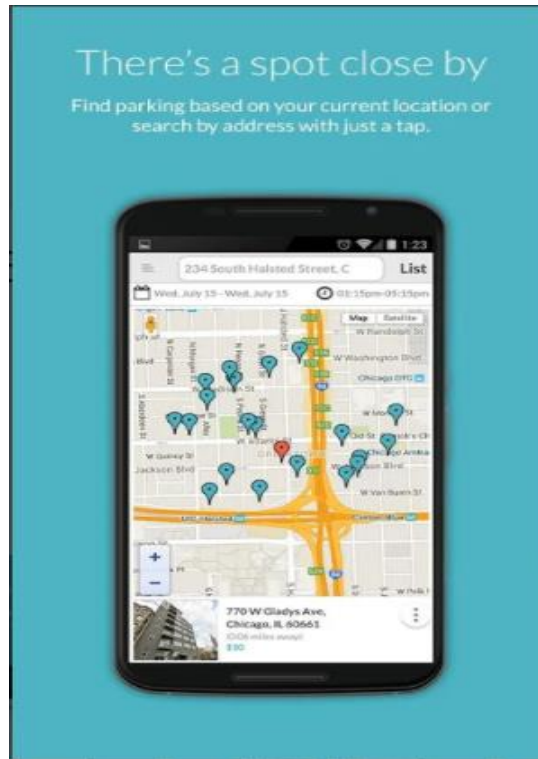


Figure 2.1: ParkEx App [7]

- In this app, user can search the parking slot
- User can search the parking slot in map

### 2.2.2 ParkNav



Figure 2.2: ParkNavApp [8]

This is the similar app above

- User can search the parking place
- Search in a map
- Show the path of destination

But need per month Cost for using it.

### 2.3 Comparative Studies

These Android applications have some problems and limitations.

User can't find the feedback on these changes. So they did not give real-time server to the user. Most of the application has also a major problem is supporting the particular region. They used just their database most of the time. These applications structured is so much complex. So these applications are also not user-friendly for any type of user.

But in our android application, we try to fix all of the problems, faults, and limitations. Firstly, our android application is not a static application; it is dynamic, it means this is an online application. In this application, we use Firebase database for the real-time database. Though it doesn't access without connection to the internet. And we also developed a Website for those user who wants to see this from home using PC. From the statistical report of 2018 more than 47% people in our country use internet, so it's not a big problems. Now-a-days we call our country as 'Digital Bangladesh'. So we think that the user of our application will not be faced any types of problems to use internet connection. Without internet user can see the log in our android application but if he/she want any types of car parking or rent parking, firstly he/she needs to connect internet for GPS location, then he/she can access this Application. Hope our android application is so user-friendly than another related android application. That's why we hope that user can enjoy by using our android application.

#### **2.4 Scope of the Project**

- Traffic jam is a nightmare for those people who lived in big city like Dhaka, Chittagong. To control the traffic we will apply it.
- To save user time when we are on the road.
- To security the car.
- Collecting all information about the car. It is easy to find out the car when it's stolen.
- Searching the nearby available parking slot. User can easily park their car in the Nearby location.
- Try to develop offline and online both types of Android application.
- Also, try to build the Android application Bengali and English both types of Language in future.

#### **2.5 Challenges**

Every Developer wants to make anything different from others, but the developer has always to face some different types of challenges, competition, and obstacles. As like

this project have some different types of challenges, competition, and obstacles too. Our project is about online car parking system. But on the present time we are more addicted to Facebook, WhatsApp, Viber, IMO, Instagram, Snap-chat and many other social media application and also online games like Clash of clan, Pool etc. So it is quite hard to making a strong place for it.

And we are trying to give valid information in this app. If we face any types of the problem about any button or information of our application, we are trying to sort out those problems and trying to solve the problem. We are providing our 100% hard work to develop this project. So we believe that one day it will gain a strong placed as a favorite application of the user.

## **2.6 Problem Statement**

Without challenge there is no word, it's more like "no pain no gain". Similarly, in our work, we also faced some challenges.

Our country not have a strong position for technology so that it is very difficult to maintain it and getting advised for it. In our country large number of public and private transport came into acts with insufficient road and untrained drivers. That's why we faced traffic jam. Illegal car parking on the road is the main reason for jam. We can get rid of this problem by using this application. But it needed the internet connection using this application and internet is the main fact. Payment method is not available for all users, They have to use cash on hand payment after or before parking. So it is a big challenge for us. And maybe there is a good side of it's too.

## **2.7 Our Project Work**

User can search the parking location, search on Google maps, also can see their current location to car parking slot destination from our project which is also helpful for our countries people and added this option on our related websites also. It will be more helpful to the user.

## CHAPTER 3

### Requirement Specification

#### 3.1 Business Process Modeling

Business process modeling (BPM) is the way to represent activity of an institute, so that the current process may be analyzed. The term 'business model' is thus used for a broad range of informal and formal descriptions to represent core aspects of including purpose, structures, operational processes and policies. 'Flow Diagram' is the main characteristic methodology. Here we are trying to describe our project's business model using Data Flow Diagram. Normally, Data Flow Diagram describes how data is processed through a system or project.

In the figure, we are trying to draw a level of Data Flow Diagram of our system. Figure: 3.1 represent the Data Flow Diagram of our project's system.

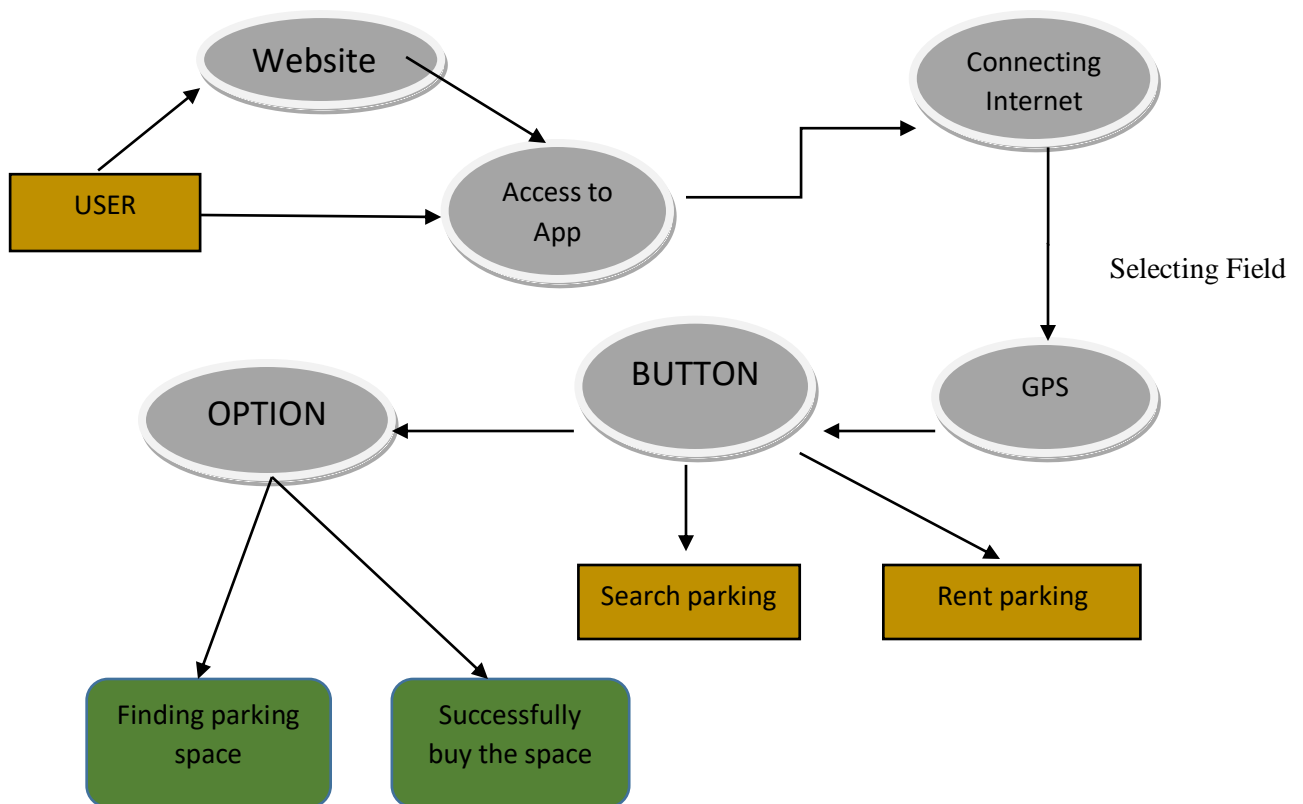


Figure 3.1: Business Process Modeling.

### **3.2 Requirement Collection and Analysis**

Requirements analysis is defined as requirements engineering that is the way of determining user expectations for a system. These features, called requirements, must be quantifiable, relevant and detailed. Requirements analysis involves frequent communication with system users to determine specific feature expectations, resolution of conflict or ambiguity in requirements as demanded by the various users or groups of users, avoidance of feature creep and documentation of all aspects of the project development process from start to finish. Requirements analysis is a team effort that demands a combination of hardware, software and human factors. For project development process, there are two types of requirements. One is the functional requirement and another is the non-functional requirement.

### **3.3 Use Case Modeling and Description**

A use case is a list of actions or event steps typically defining the interactions between a role and a system to achieve a goal. In the general word is use case model is the simple way to described total action with function for making something. Here a role is known in the Unified Modeling Language as an actor. Use case analysis is an important useful requirement analysis technique that has been widely used in modern software engineering. There are many ways to write a use case in text.

In the figure 3.2, we are trying to draw a level of use case for our system. It means represent the use case of our project's system.

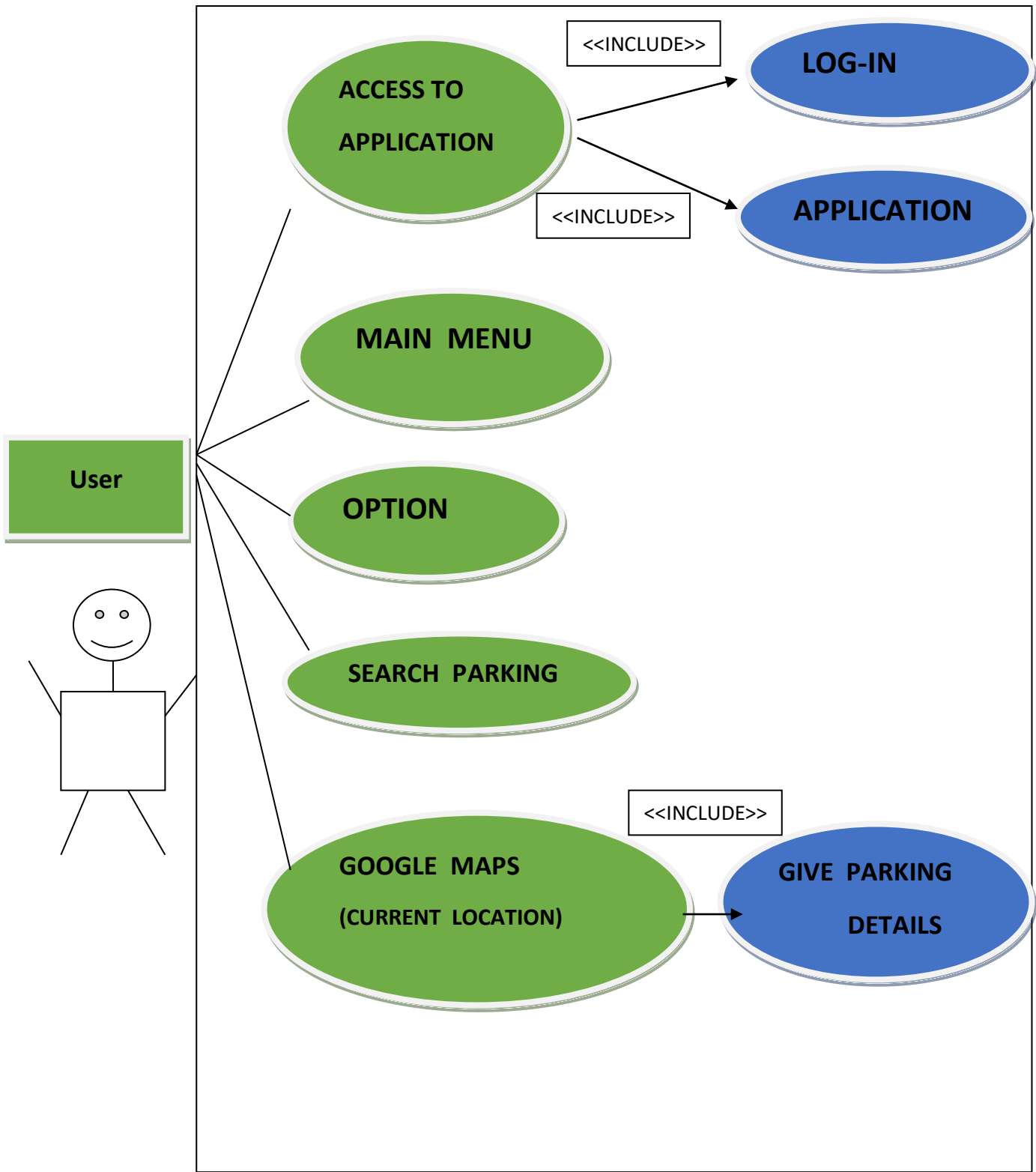


Figure 3.2: Use Case Model.

### 3.4 Logical Data Model

An intelligent information display or consistent outline is an information model of a particular issue area communicated freely of a specific database administration item or capacity innovation yet as far as information structures, for example, social tables and segments, question situated classes, or XML labels.

As a database, we utilize Firebase as database server.

Firebase is a versatile and web application improvement stage created by Firebase, Inc. in 2011, at that point gained by Google in 2014. Firebase Analytics is a without cost application estimation arrangement that gives understanding into application utilization and client engagement.

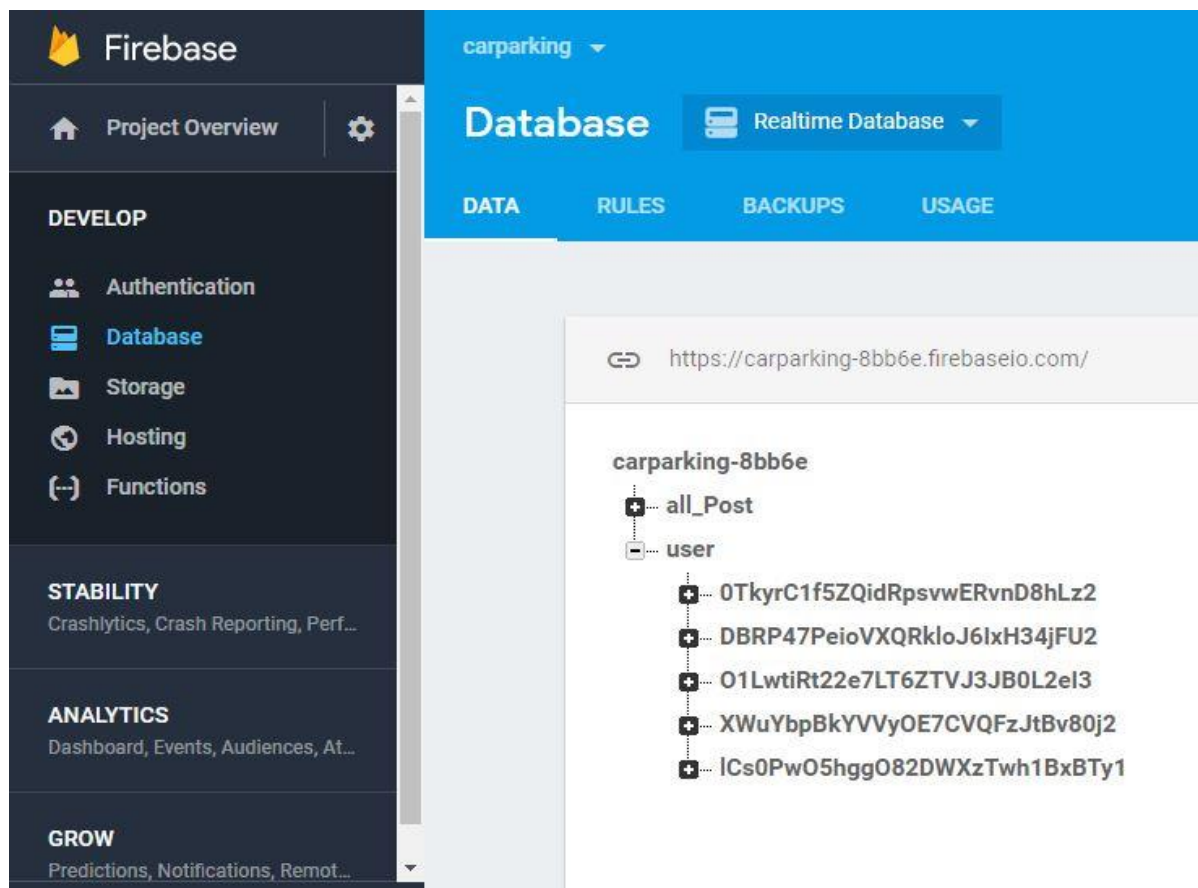


Figure 3.3: Logical Data Model.



### **3.5 Design Requirements**

The design requirements for our project will be creating the difference between other projects. Because at first we were simulated some projects and also found out some problem with these project. Then we are working on designing our project which is based on to solve specific problems and our problem statements. We try our best from our heart for designing our project. We try to make our project user-friendly. We also try to provide all things to our project which are necessary for a user to use our application easily. As like, we provide a lot of parking space details, GPS location, parking space information, direction etc.

- In our android application, we design a normal front page so that any user can easily understand our application.
- We design the login option. The user can log in to their Gmail account.
- We design the button with perfect size and shape in this application.
- We also add the online maps for searching any parking slot
- User can see his/her location in this application is very clear and visible
- We design and add all information to like owner location, house number, post office, cost of parking, available parking lots, map position etc.
- We design the Website
- The design of our application very user-friendly, complex free.

### **3.6 Waterfall Model**

The waterfall model is a relatively linear sequential design approach for certain areas of engineering design. In software development, it tends to be among the less iterative and flexible approaches, as progress flows in largely one direction ("downwards" like a waterfall) through the phases of conception, initiation, analysis, design, construction, testing, deployment and maintenance.

The waterfall development model originated in the manufacturing and construction industries; where the highly structured physical environments meant that design changes became prohibitively expensive much sooner in the development process. When first

adopted for software development, there were no recognized alternatives for knowledge-based creative work.

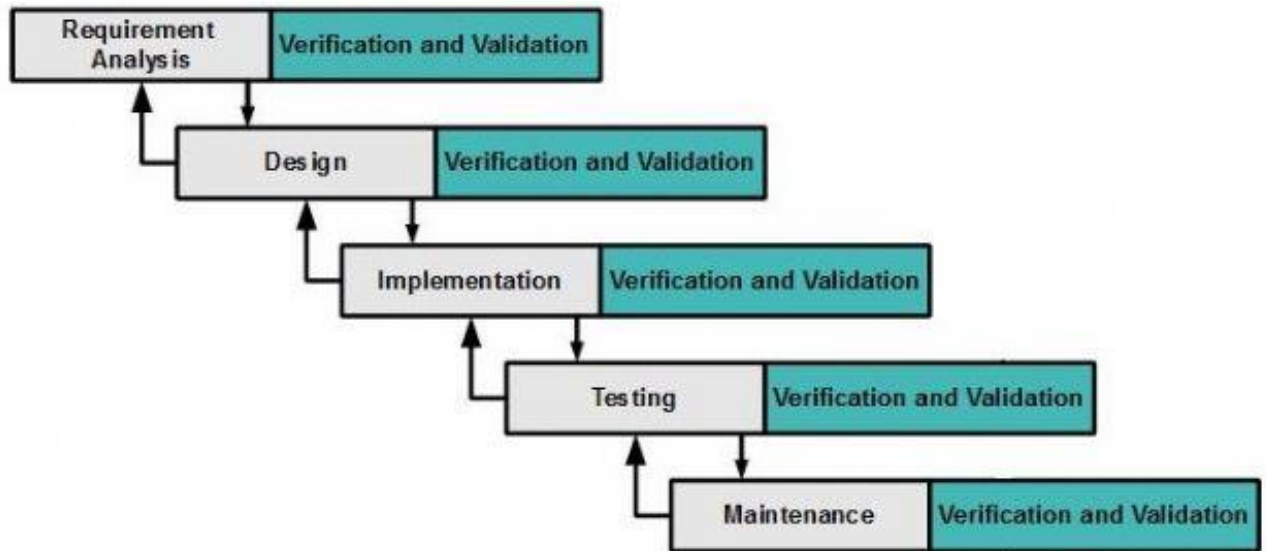


Figure 3.4: Waterfall Model.

### 3.7 Requirement Collection and Analysis

Requirements analysis involves frequent communication with system users to determine specific feature expectations. It is also called as requirements engineering. These features, called requirements, must be significant, relevant and detailed. Requirements analysis involves frequent communication with system users to determine specific feature expectations, resolution of conflict or ambiguity in requirements as demanded by the various users or groups of users, avoidance of feature creep and documentation of all aspects of the project development process from start to finish. For the project development process, there are two types of requirements. One is the functional requirement and another is the non-functional requirement.

### **3.7.1 Functional Requirement**

Functional requirement defines a function of a system or its component. A function as a set of inputs, the behavior, and outputs. Functional requirements are those which are related to the technical functionality of the system as like application software can perform. A typical functional requirement will contain a unique name and number, a brief summary, and a rationale from the point of view of our system, the application has many functional requirements as like maintaining the database and maintaining server.

### **3.7.2 Non-functional Requirement**

Non-functional requirements are often called "quality attributes" of a system. Non-functional requirement (NFR) is a requirement that specifies pattern that can be used to judge the operation of a system in particular conditions, rather than specific behaviors as like the application is how much effect, user-friendly, performance issue of the application etc. From the point of view of our system, the application has many functional requirements as more efficient, relevant, optimize performance, and smoother operation, loading on quickly, memory consuming and parsing data from online. Application's User Interface is user-friendly for excellent user experience.

## **CHAPTER 4**

### **Design Specification**

#### **4.1 Front-end Design**

The front-end is everything required with what the client sees, including plan and a few dialects. The front-end configuration is the UI plan what the client can see when he/she opens the application or sites. That means the most important things of a project is front-end designing. Usually<sup>1</sup>, most of the users expect a simple User Interface or Graphical User Interface from the developer, when he/she wants to open any application or website. If the front end design is so complex, the application fails to attract of the user.

Therefore, we tried to design our application front-end as simple as possible. We also tried to easily accessible graphical user interface for the user. But, it is really so tough matter when anyone designs a graphical user interface for providing these types of facility for the user. But we tried our best for a simple design of our application. Hope, our application is so user-friendly and the user can easily access to our application. We attach our android application's front-end design as follows: In figure 4.1, it shows the home page user interface of our application.

In figure 4.1, it shows the login page. The user can log in and registration here. Here, the user can log in to Gmail, by using their Gmail manually. If user chose manually login then he should sign up first

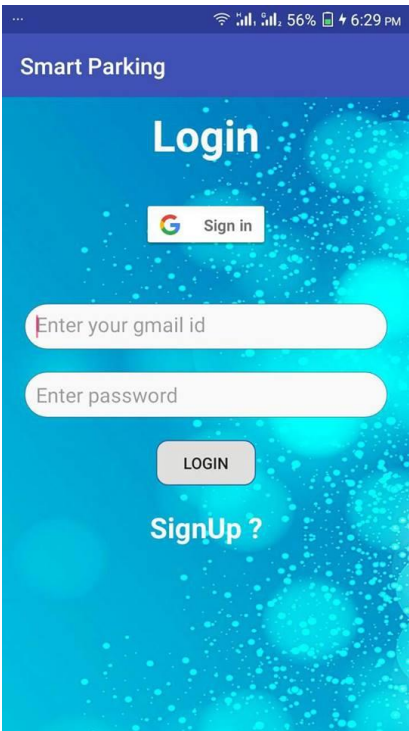


Figure 4.1: Login and Sign up Page.

#### 4.1.1 Manually Login

At first, the user should fill up the sign-up page. In the sign-up page, user fill up the following form figure -4.2

- Take a photo/ select from gallery
- Username
- Date of birth
- Gmail id
- Password
- Phone number
- Full address
- Gender

After login user can find the following page like fig 4.3

The image shows a mobile application registration form. At the top, a blue header bar contains a back arrow and the text "Registration Here". Below the header is a grey silhouette placeholder for a profile picture. A bright cyan button labeled "Take Photo" is positioned below the placeholder. To the right of the photo area are two large, rounded rectangular input fields: "Your Phone Number" and "Full Address". Below the "Take Photo" button are four more rounded rectangular input fields: "Your Name", "Date Of Birth", "Your gmail id", and "Gmail password". To the right of these fields is a "Gender" section with two radio button options: "Male" (which is selected) and "Female". At the bottom right of the form is a grey button labeled "SUBMIT". The top of the screen shows a status bar with a back arrow, signal strength, 56% battery, and 6:29 PM.

Figure 4.2: Registration Form.

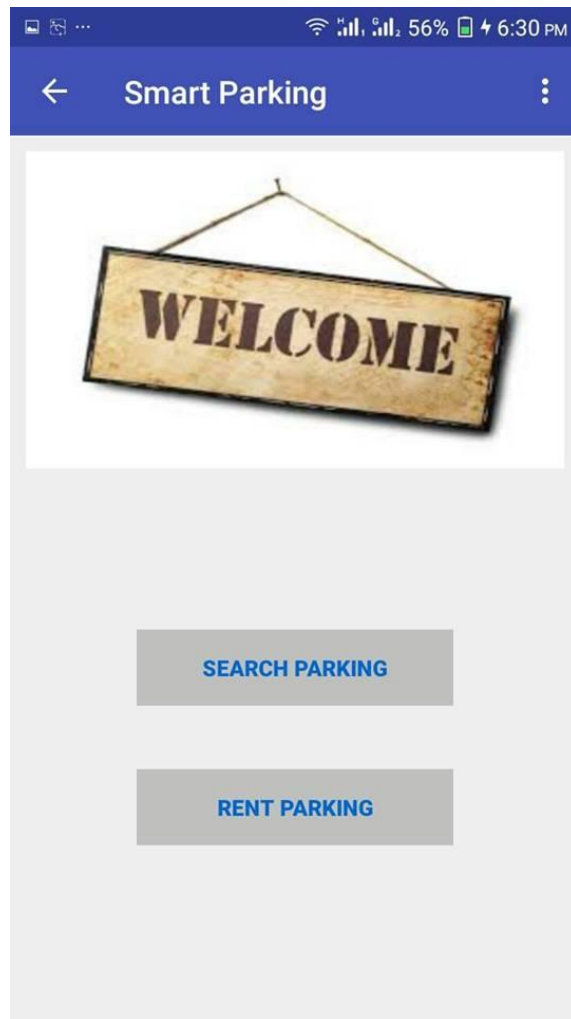


Figure 4.3: Search and Rent Parking Page.

In fig 4.3 it shows the two button

One is " search parking "and another one is "Rent parking". If the user needs to search the available car parking space then he should press the "search parking" button .then he/she can see the available car parking space in the maps and "rent parking" but is only for the owner of the parking space. By this button, he/she can add all details about his/her car parking space .after add all information it shows on the maps.

In the welcome page at first, the user should enable his/her GPS in the device

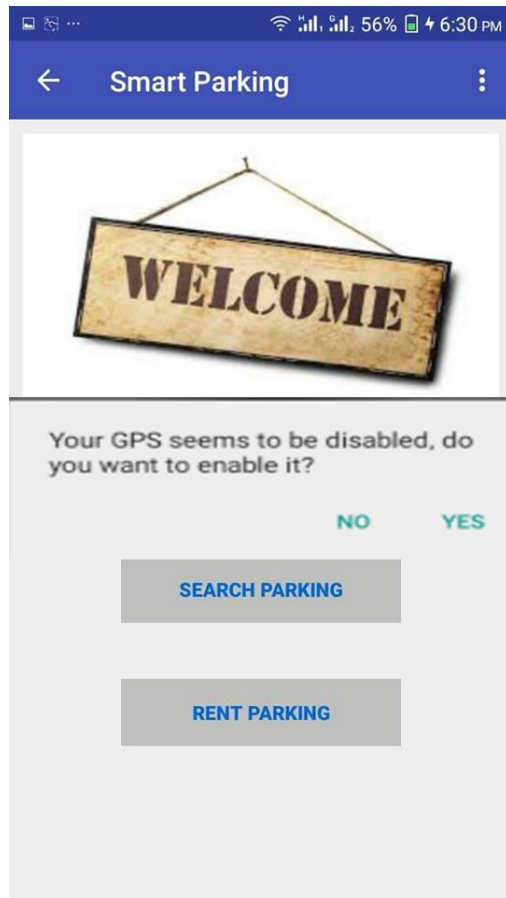


Figure 4.4: Enable GPS.

Parking space owner add his/her parking space and information as like following fig 4.5




← Add Your Parking Lots

Give Require Informations

House No

House Name (optional)



Take Photo

Near By (optional)

← Add Your Parking Lots

Road Name/Number(optional)

Area/colony Name

Your Phone Number

Post Office

Upazila

City/State Name

Available Parking Lots

Cost Per Hour Taka

Select Position In Map

Available Parking Lots

Cost Per Hour Taka

Select Position In Map

SUBMIT

Figure 4.5: Data Input for Add Parking Space.

After submitted the form, parking space add in the maps

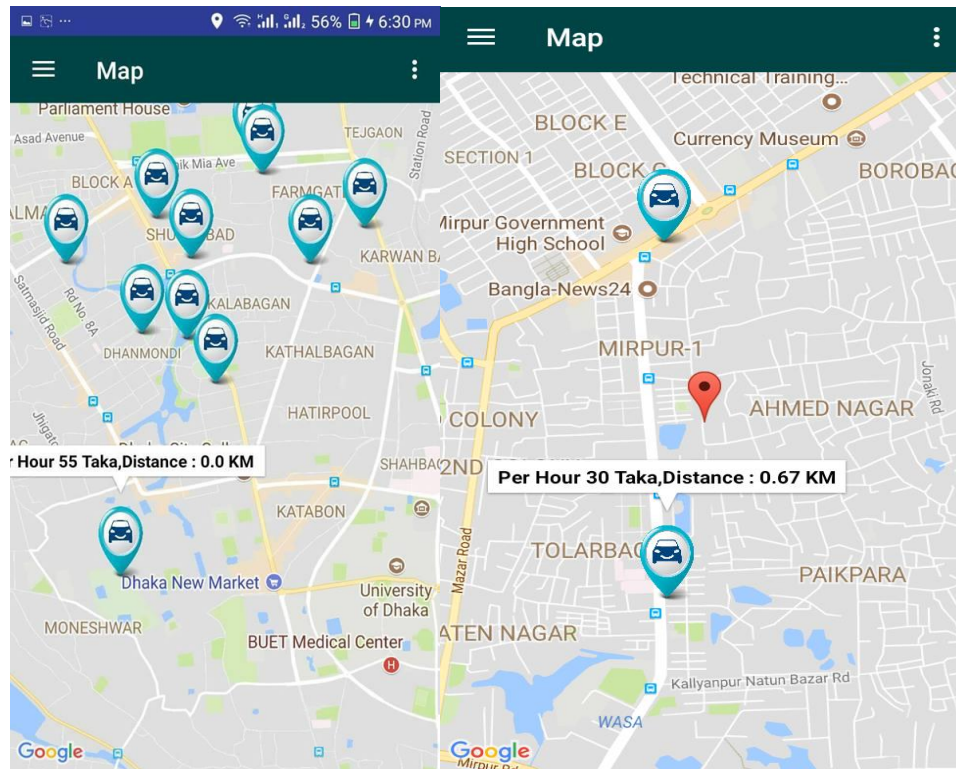


Figure 4.6: Current Location, Parking Location.

In fig 4.6 its show the maps. Here ” red symbol” icon is the user location .now user can search his/her nearby available parking space .if parking space owner add their information then the user can find the car parking space .in this map ” car symbol “ is the available car parking slots. If any user need to know any car parking space they should click the “car symbol” icon. User can identify total distance, current location to parking space location is shows and the cost of-of total money  
 In fig 4.7 it shows the information of the parking slot

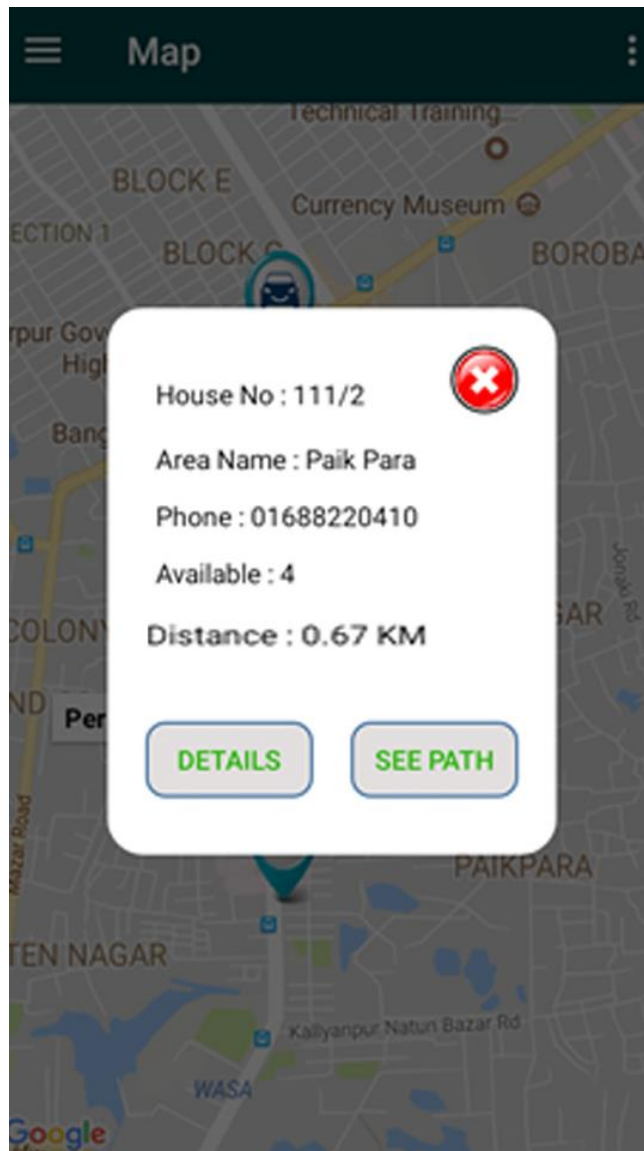


Figure 4.7: Parking Space Details in Map.

If user click the “car symbol” icon then he/she can see this page

- House no:
- Area name:
- Phone number:
- Available parking slot:
- Distance:

And two buttons, one is “DETAILS” and another one is “SEE PATH”

If user click the DETAILS, then he/she can find the page as following the figure 4.8

← All Details

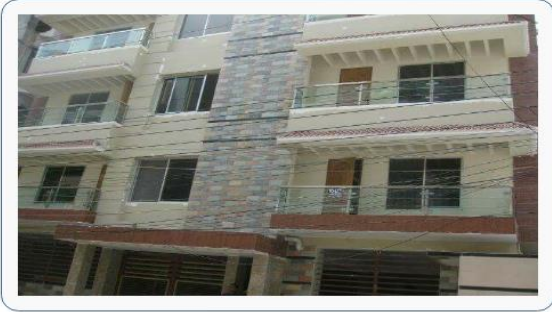
### All Details Information

House No : 111/2

House Name : Hosain villa

Available Parking Lots : 4

Cost Per Hour : 30 Taka



Near By : Naj Villa

Near By : Naj Villa

Road Name/Number : Akota Road

Area/colony Name : Paik Para

Phone Number : 01688220410

Post Office : Mirpur

Upazila : Mirpur

City/State Name : Dhaka

Figure 4.8: Parking Space Information.

If user click the “SEE PATH’ then user can see the page as like figure 4.9

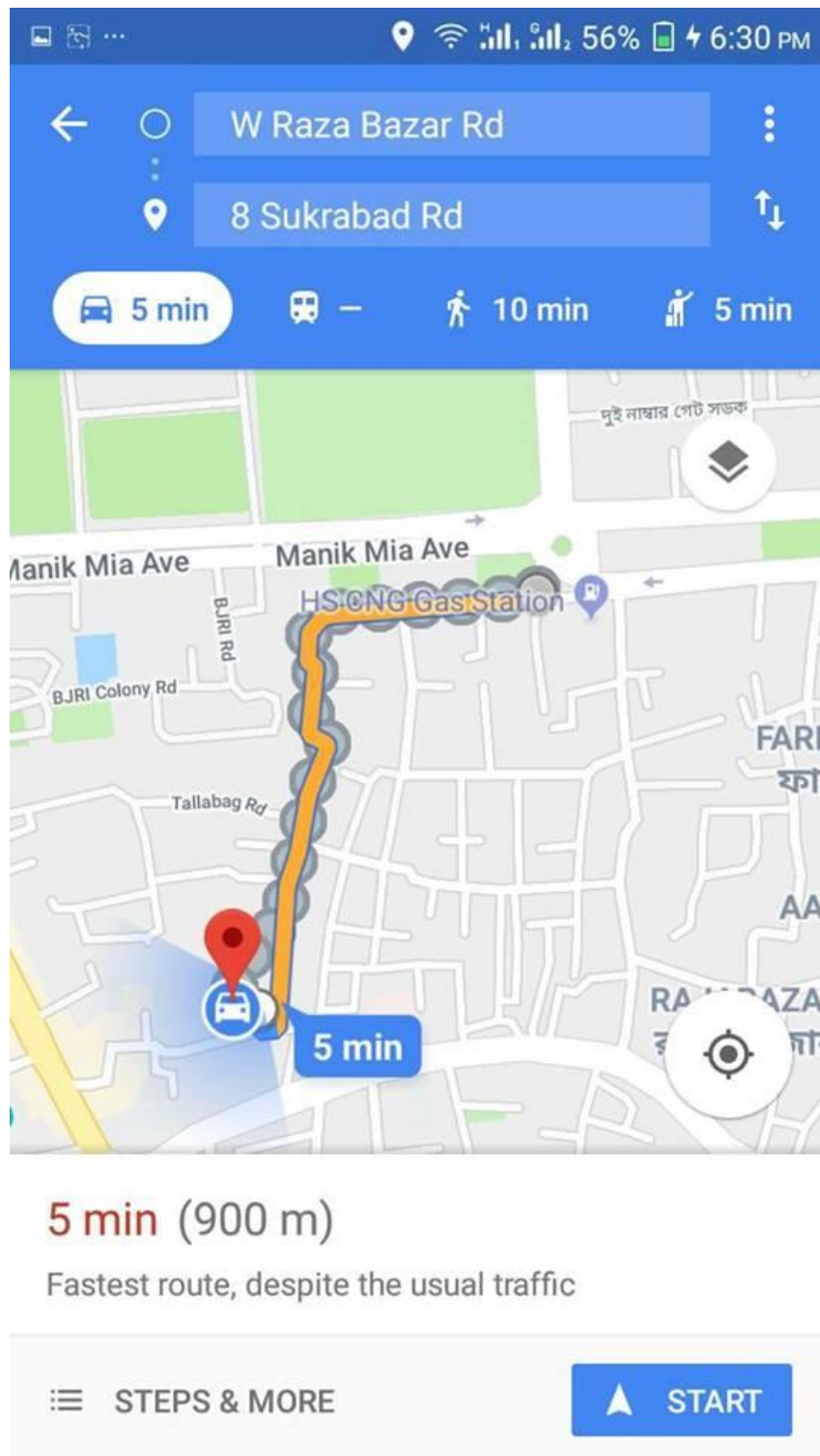


Figure 4.9: Location Path.

After click “SEE PATHS” it’s automatically open by google maps (build in maps) and show the path from his/her choosing location to the car parking space location. Also, show the shortest path and alternative path.

## **4.2 Back-end Design**

The back-end is likewise called server-side design. The back-end configuration is essentially how the site functions, refreshes, changes, support and in addition to other things. The greater part of that attempts to help the front-end of the site. The back-end configuration alludes to everything, the client can't find in the program, similar to databases and servers. Normally, individuals who take a shot at the back-end are called software engineers or designers. Back-end engineers are generally stressed over things like security, structure and substance administration.

The back-end has three parts to it such as Server, Application, and Database. But it is so difficult to handle back-end part in android application than the web application. Because, web device components and attributes are not limited, but android device components and attributes are so limited. But we tried our best for back-end design of our application.

We use Firebase as the database server for our application’s database for our application's server connection on our application as back-end design. We attach our application’s back-end design as follows: In figure 4.10, it shows all the post of our user in our application.

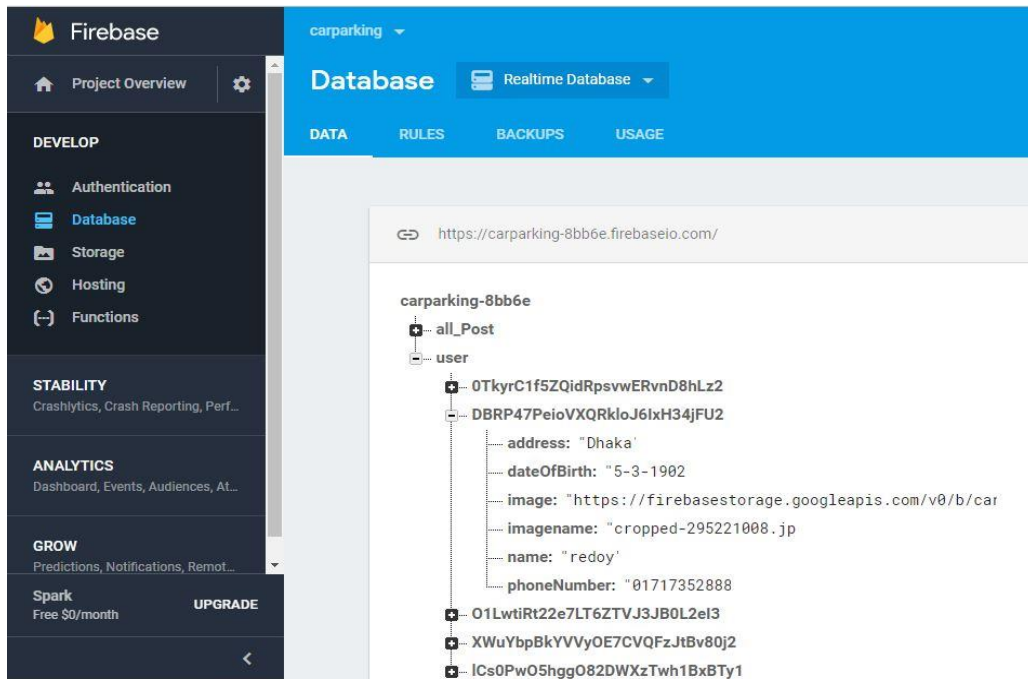


Figure 4.10: Database.

In the figure 4.11, we use Authentication of SIGN-IN METHOD in Firebase Database. Here we Enable SIGN-IN METHOD is Email, Gmail. So the user can easily sign in with his/her valid Email, Gmail.

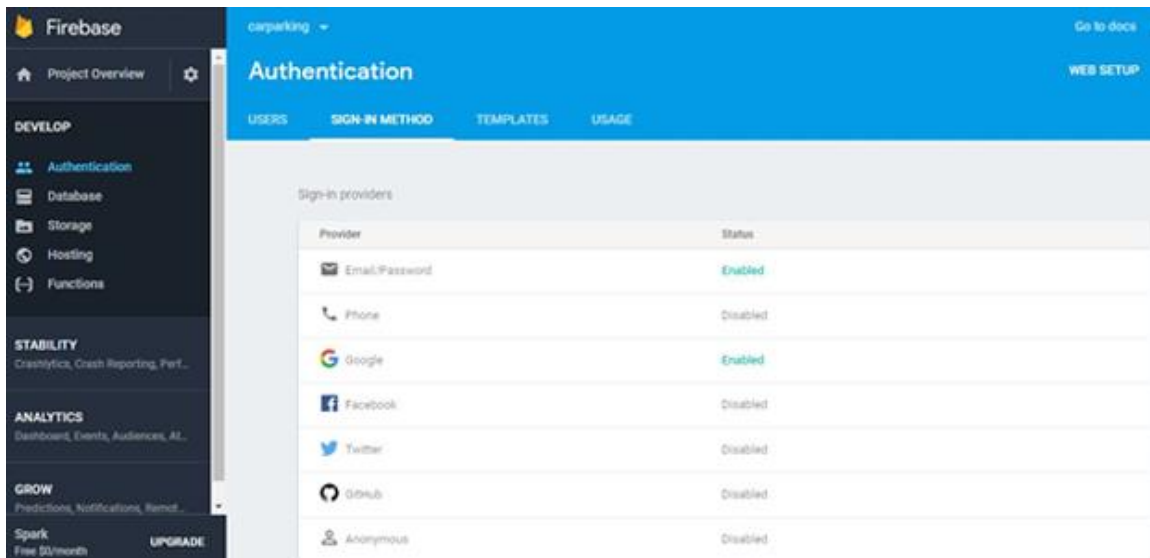


Figure 4.11: Enable SIGN-IN METHOD.



In the figure 4.12, we use the Authentication of our database. Here the user can sign in by using Email. The firebase Authentication checks the validity of Email from the Google account. If the Email are valid then the user easily can sign in our application.

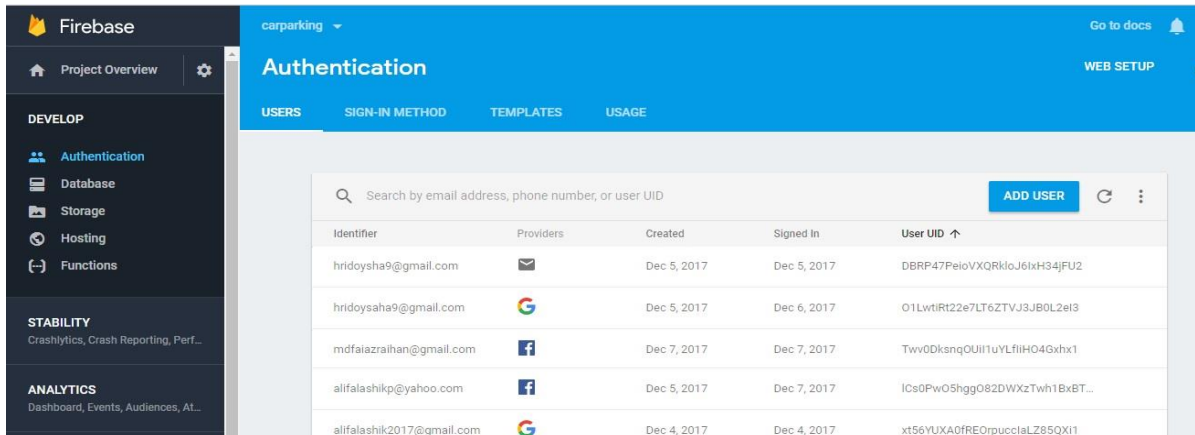


Figure 4.12: Authentication.

In figure 4.13, it shows Database table with some data of our application. Here we store the user profile picture and parking image. The user can see his details information in the app from this database and also update his picture and data.

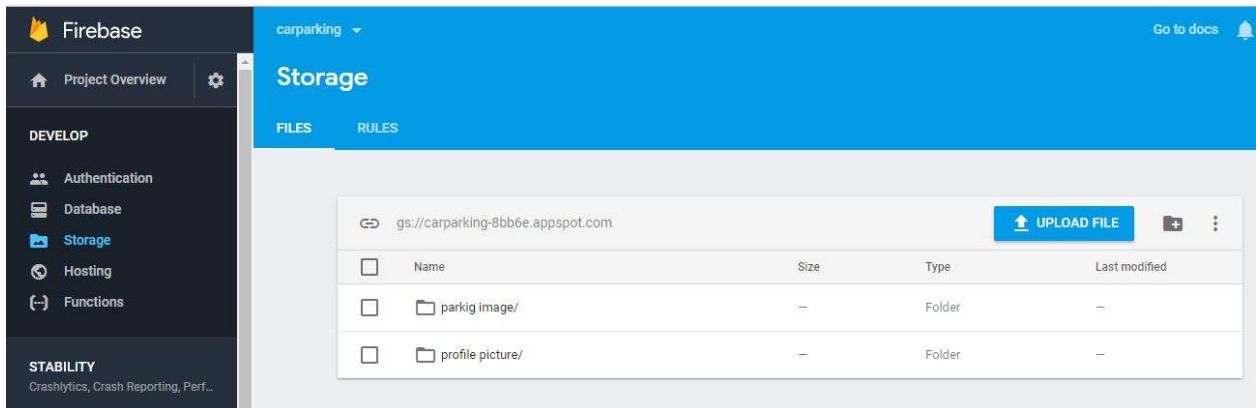


Figure 4.13: Storage Data.

In figure 4.14, it shows the parking owner house image and the type of image with the created date and time. If the user updates the picture we can see the updated picture with the time and date.



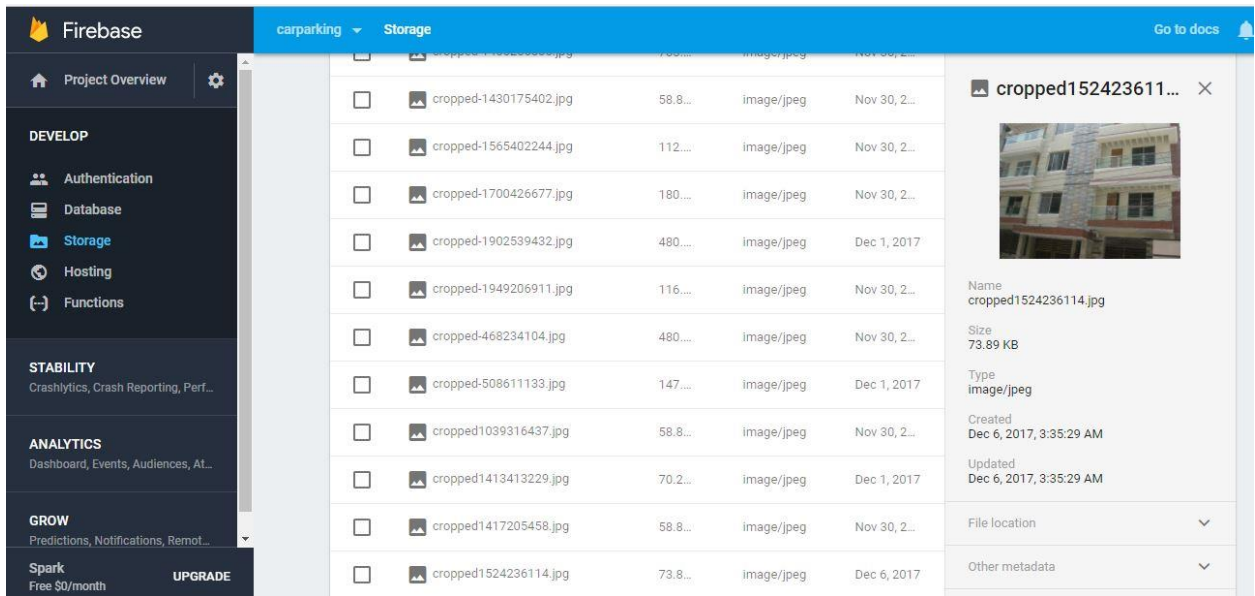


Figure 4.14: Owner House Image.

In figure 4.15, it shows the user profile image and the type of image with the created date and time. If the user updates the picture we can see the updated picture with the time and date.

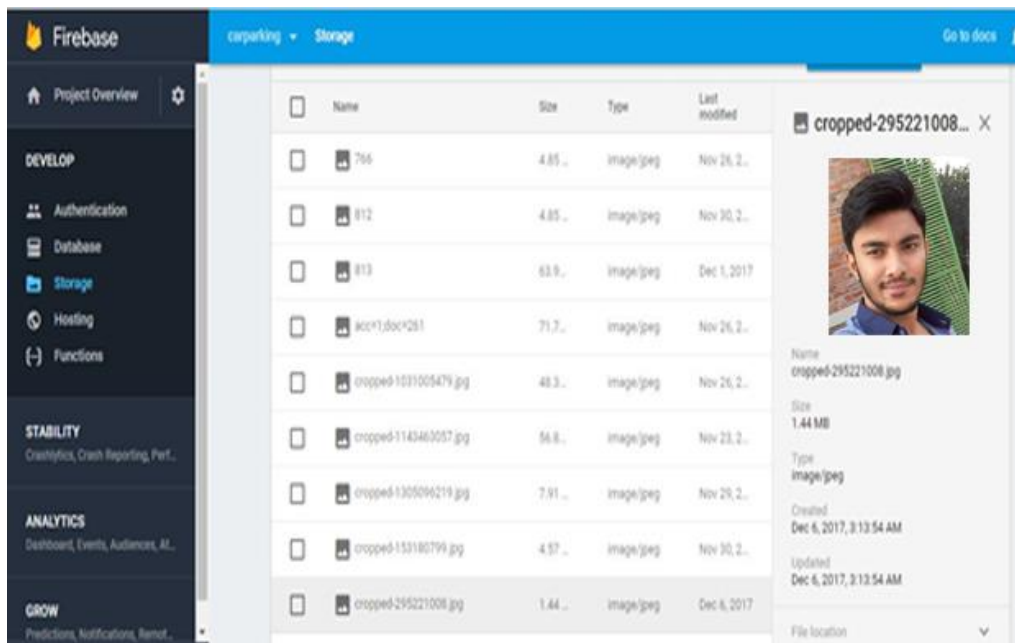


Figure 4.15: User Profile Image.

In the figure 4.16, we can see all the user's information of our application. Here is the user address, Date of Birth, image, name, Phone Number.

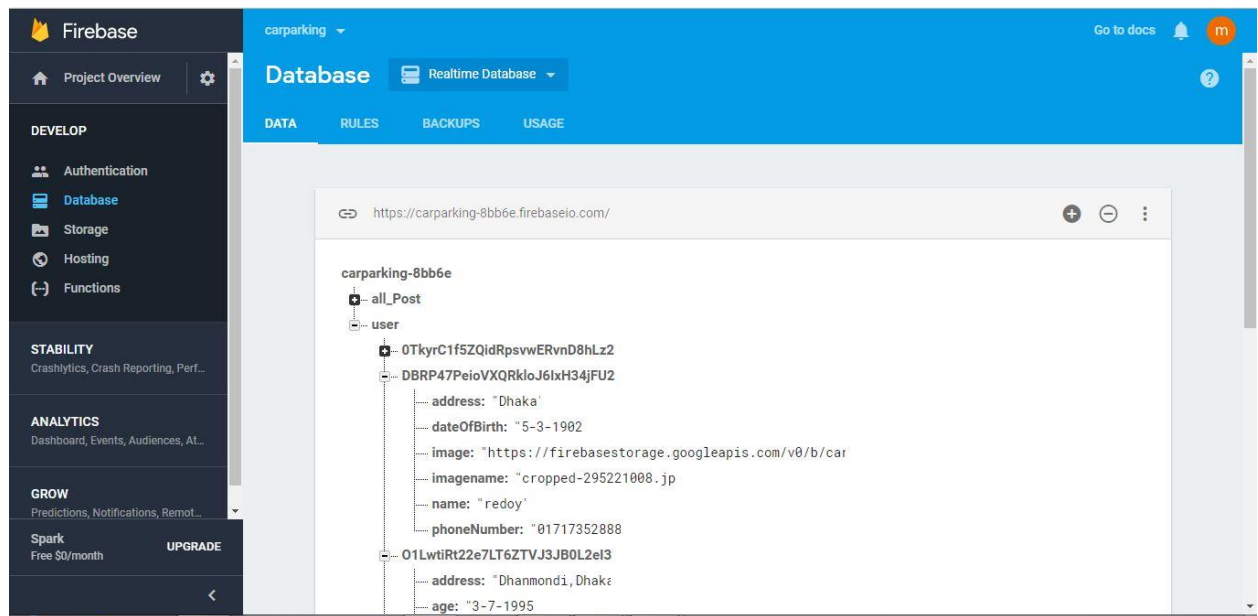


Figure 4.16: User Information.

### 4.3 Interaction Design and UX

Association configuration is particularly a train which analyzes the connection (through an interface) between a framework and its client. Collaboration configuration can be comprehended in basic (however not streamlined) terms: it is the outline of the cooperation amongst clients and items. The objective of cooperation configuration is to make items that empower the client to accomplish their target in the most ideal way imaginable. This is worried about what the goal(s) of a client is, and thusly what associations are important to accomplish these objectives. It might likewise consolidate configuration concentrated on how data ought to be introduced inside such a framework to empower the client to best comprehend that data through this is frequently thought to be the different teach of "data plan" as well.

Client encounter (UX) outline is the way toward making items that give important and actually significant encounters. This includes the cautious plan of both an item's

convenience and the delight shoppers will get from utilizing it. It is likewise worried about the whole procedure of gaining and incorporating the item, including parts of marking, plan, convenience, and capacity.

In our application, some features can interact with the user and application. We added an email option by which any user can send mail to us. If any user faces any problems, lacks or drawback, they can send mail to us for solving these kinds of problems.

For User Experience (UX) design we have tried our best for designing a simple and easily mobile application. We have tried to give some fantastic and well experience by using our application. We keep our application too simple and also easy for the better experience, feelings, and performance for the user of using our application. Hope our systems information is secured and helpful for the user.

#### **4.4 Implementation Requirements**

To implement our android application project, we used different types of tools, attributes, and components which are helped us to develop our android application project successfully. In Implementation requirements area, we discuss all those tools, attributes and components that we have used to develop our android application project and making attractive to the user.

##### **4.4.1 Android Studio**

Android Studio is the official IDE (Integrated Development Environment) or tool (layman terms) for developing application exclusively for Android platform.

It has a solid proofreader apparatus for creating inventive UI and emulators for various variants to test and recreate sensors without having real Android gadgets.

It likewise has an exceptionally valuable Gradle module utilizing which you can make application documents (apk) with various designs. Also, it makes sending out and transferring apk on play store simple with a solitary snap. It likewise has ANT fabricate in the event that you favor that.

In the current updates, Android studio has brought moment run which makes testing much quicker and less demanding.

There may be a lot more features to it but I have tried and jot down as many useful and major features as possible. I hope this addresses your query. [6]

#### **4.4.1.1 Basic Android Overview**

Android is a far reaching stage, which implies it is an entire programming stack for a cell phone. It gives every one of the apparatuses structures to creating versatile application essentially, rapidly and effortlessly. We outline our application with Extensible Markup Language (XML), association with database server with Java Language in Android Studio. Android is additionally open source stage where the designer can make any sorts of the UI which the engineer needs to plan his/her application. The engineer can compose any programming dialect for his/her application in the android studio. So the engineer can without much of a stretch create distinctive kinds of the versatile application by utilizing it for client communication.

#### **4.4.2 The Emulator**

An Android emulator is an Android Virtual Device (AVD) that represents a specific Android device. You can use an Android emulator as a target platform to run and test your Android applications on your PC.

#### **4.4.3 Android SDK**

The Android SDK (software development kit) is a set of development tools used to develop applications for Android platform. The Android SDK includes the following:

- Required libraries
- Debugger
- An emulator
- Relevant documentation for the Android application program interfaces (APIs)

- Sample source code

#### **4.4.4 Firebase Database server**

Android is a far reaching stage, which implies it is an entire programming stack for a cell phone. It gives every one of the apparatuses structures to creating versatile application essentially, rapidly and effortlessly. We outline our application with Extensible Markup Language (XML), association with database server with Java Language in Android Studio.

Android is additionally open source stage where the designer can make any sorts of the UI which the engineer needs to plan his/her application. The engineer can compose any programming dialect for his/her application in the android studio. So the engineer can without much of a stretch create distinctive kinds of the versatile application by utilizing it for client communication.

Firebase gives a constant database and backend as an administration. The administration gives application designers an API that enables application information to be synchronized crosswise over customers and put away on Firebase's cloud. Firebase Storage gives secure document transfers and downloads for Firebase applications, paying little respect to organize quality. We utilize it to store pictures or other client produced content. Firebase Storage is upheld by Google Cloud Storage.

#### **4.4.5 Our Web Based Service**

It is an online stage chiefly utilized for auto stopping administration framework. It gave extensive variety of data including some related news data. It likewise gives auto stop data and looking usefulness in one of its sub-area. Client can scan for an auto stop utilizing name or address; it can likewise channel the outcome by various auto stop write and charging mode.

This is an exceptionally comfort and client arranged plan, which enable client to channel data and find data rapidly by their expectation. It additionally gives fundamentals data on most auto stop including their address, telephone number, number of parking spots and standard charges.

#### **4.4.6 Platform**

**Operating Systems:** Microsoft Windows

**Technologies Used:**

**Front End:** HTML5 CSS3 and Responsive Bootstrap

**Web Developing language:** PHP

**RDBMS (Back end):** MySQL

**Software Requirements:** PHP 5.0, APACHE HTTP Server

#### **4.4.7 Technology Overview**

##### **Why We Choose PHP?**

PHP is a broadly useful scripting dialect that is particularly suited to server-side web advancement where PHP by and large keeps running on a web server. PHP code is installed into the HTML source document. Any PHP code in an asked for record is executed by the PHP runtime, for the most part to make dynamic website page content. It can likewise be utilized for summon line scripting and customer side GUI applications. PHP can be conveyed on numerous web servers and working frameworks, and can be utilized with numerous social database administration frameworks (RDBMS). It is accessible complimentary, and the PHP Group gives the entire source code to clients to fabricate, alter and reach out for their own particular utilize.

## **MySQL**

MySQL is a social database administration framework (RDBMS) that keeps running as a server giving multi-client access to various databases. MySQL is a prevalent decision of database for use in web applications and is an open source item. The way toward setting up a MySQL database differs from host to have, nonetheless we will wind up with a database name, a client name and a secret key.

Before utilizing our database, we should make a table. A table is an area of the database for putting away related data. In a table we will set up the diverse fields which will be utilized as a part of that table. Making a table in PHPMy admin is straightforward, we simply type the name, select the quantity of fields and tap the 'go' catch. We will then be taken to a setup screen where you should make the fields for the database. Another method for making databases and tables in PHPMy admin is by executing straightforward SQL statements. We have utilized this technique with a specific end goal to make our database and tables.

## **Wamp Server**

Wamp is a little and light Apache dissemination containing the most basic web improvement advancements in a solitary bundle. Its substance, little size, and convenience make it the perfect device for understudies creating and testing applications in PHP and MySQL. Wamp is accessible as a free download in two particular bundles: full and lite. While the full bundle download gives a wide exhibit of advancement instruments, Wamp Lite contains the fundamental innovations that meet the Ontario Skills Competition principles. The light form is a little bundle containing Apache HTTP Server, PHP, MySQL, PHP My admin, and SQLite.

#### 4.4.8 Our Responsive Pages

The following table illustrated some example URI in our system.

Table 4.1: Our Pages URL

URL	Description
http://localhost/Final_Project_Site/	Our Home Page
http://localhost/Final_Project_Site/booking.php	Booking Information
http://localhost/Final_Project_Site/about.php	About Our Team
http://localhost/Final_Project_Site/contact.php	Contact Our Team

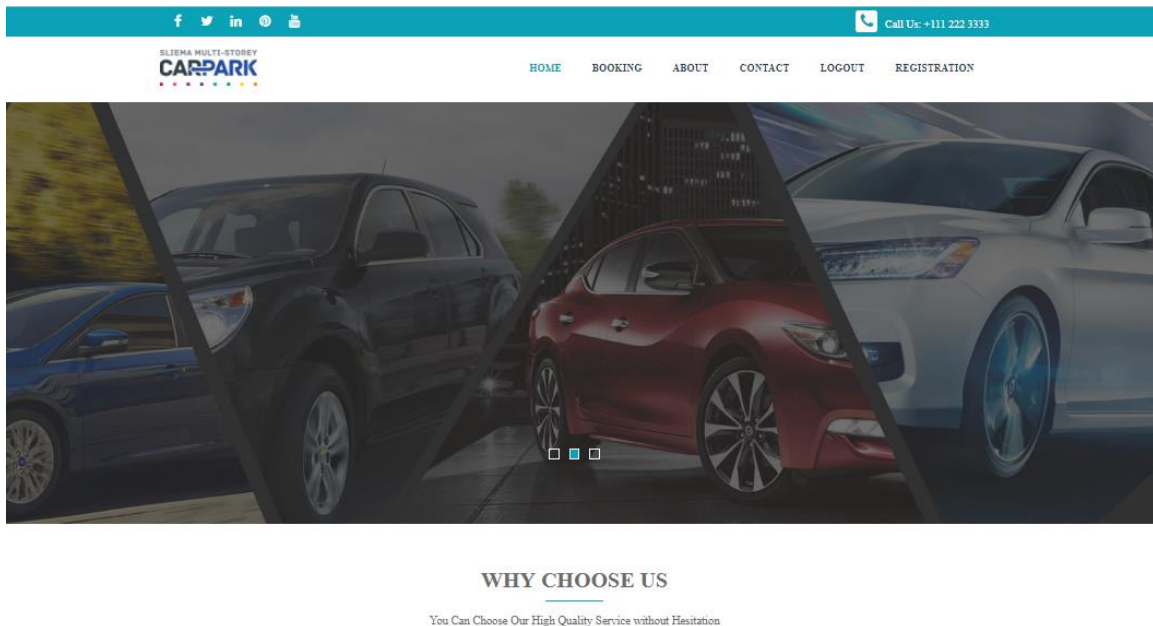


Figure 4.17: Responsive Home Page 1



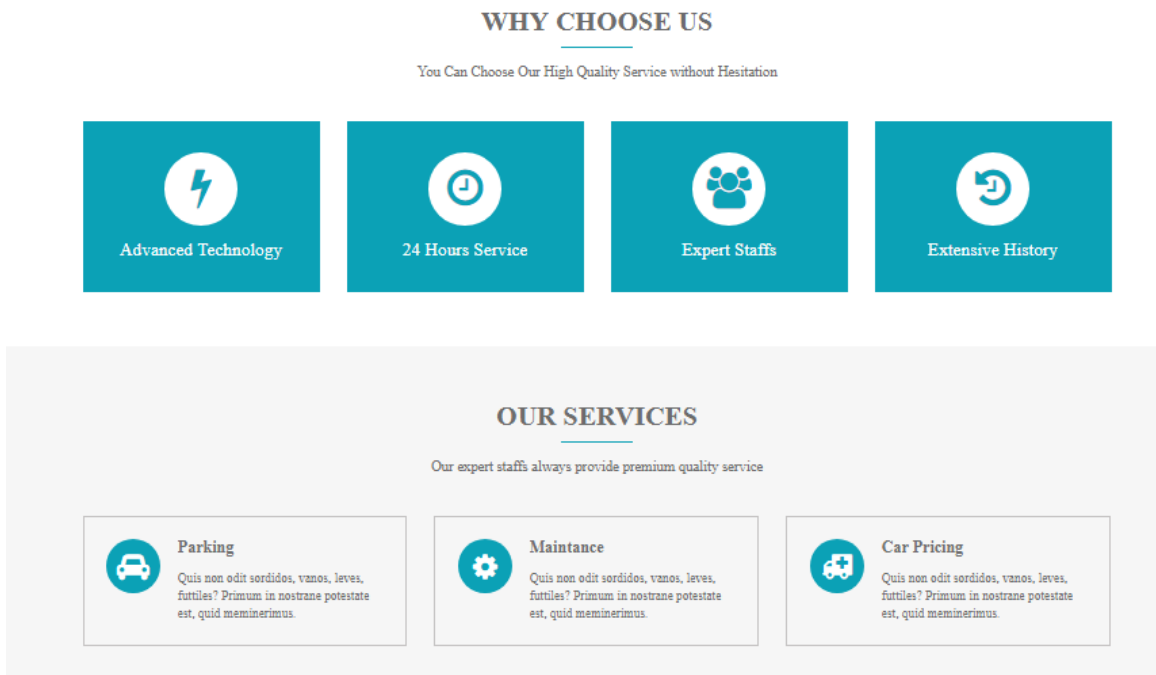


Figure 4.18: Responsive Home Page 2

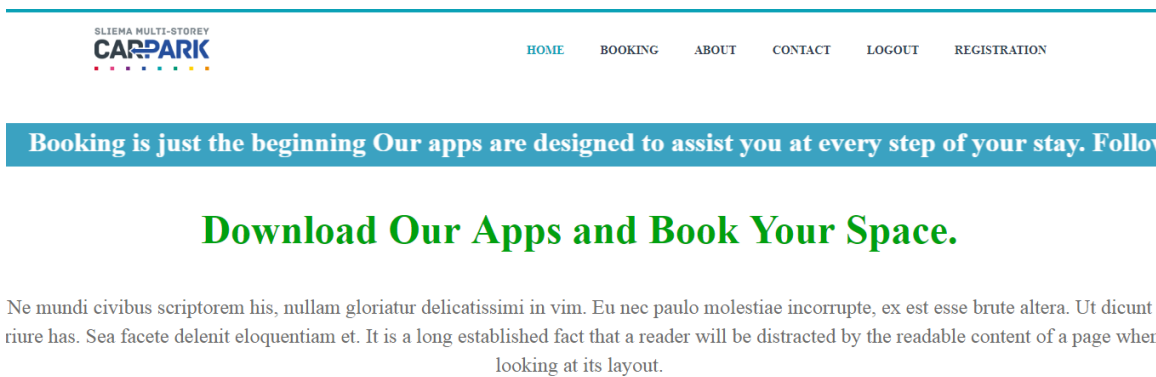


Figure 4.19: Booking Part Section

## **Chapter 5**

### **Implementation and Testing**

#### **5.1 Implementation of Database**

The usage stage is the place engineer introduces the Database Management System (DBMS) on the required equipment, streamline the database to run best on that equipment and programming stage, and make the database and load the information. The underlying information could be either new information caught straightforwardly or existing information imported from a DBMS. The engineer can build up database security and give the different clients that the designer has distinguished access relevant to their prerequisites.

##### **5.1.1 Database Design**

We have used Firebase Database Server as data manager to store our android application data. The Firebase Real-time Database is a cloud-hosted database. Data is stored as JSON and synchronized in real time to every connected client. We build cross-platform apps with our Android all of our clients share one Real-time Database instance and automatically receive updates with the newest data.

Support for most Firebase Database features:

- Firebase has no date question compose and does not permit diving sorts.
- Create, copy, drop, rename and alter databases, tables, fields, and indexes.
- Upkeep server, databases, and tables, with recommendations on server setup.
- They're fantastically useful for things like setting up a table view to show a rundown of items in a Firebase gathering.
- The Firebase Real-time Database can be gotten to specifically from a cell phone or web program; there's no requirement for an application server.

- This guide covers a portion of the key ideas in information engineering and best practices for organizing the JSON information in your Firebase Real-time Database.

The author ask for parameter enables access to information secured by Firebase Real-time Database Rules and is upheld by all demand writes.

- We can develop inquiries to channel information in view of different components. To begin, you indicate how you need your information to be separated utilizing the request by the parameter.
- Creating graphics of our database layout in various formats
- Update some of the keys for a defined path without replacing all of the data.
- Firebase SDKs for Cloud Storage coordinate with Firebase Authentication to give straightforward and natural confirmation to engineers.
- We can use our declarative security model to allow access based on filename, size, content type, and other metadata.

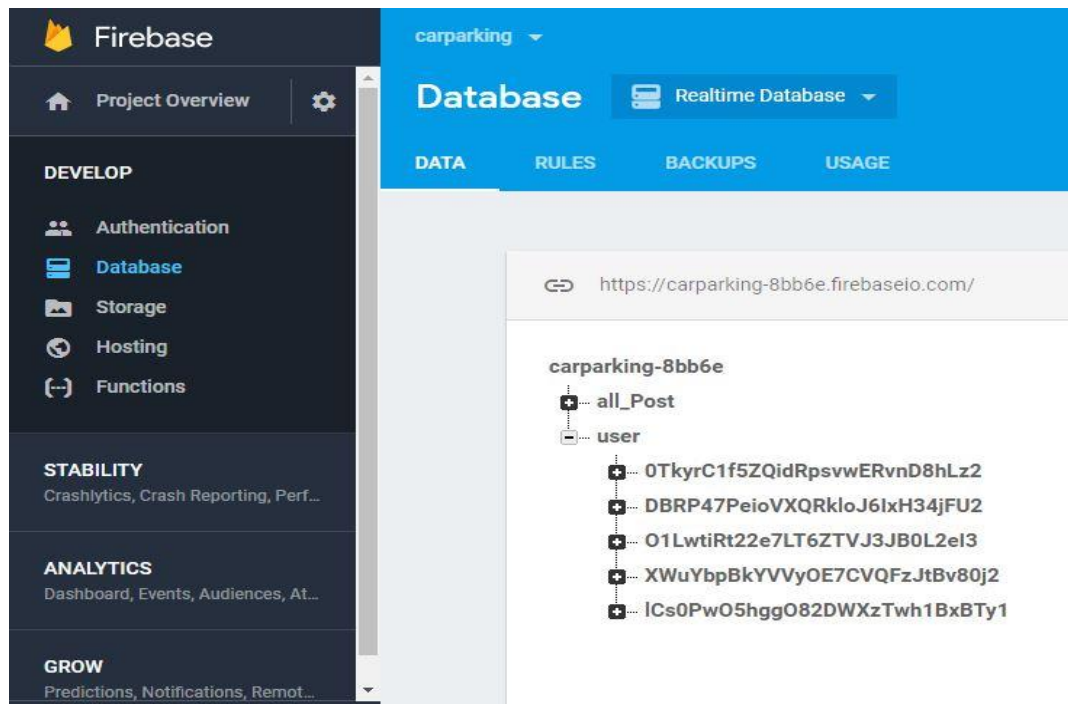


Figure 5.1: Firebase Database.

## 5.2 Implementation of Front-end Design

It is extremely a decent test to build up an exquisite front-end outline which will be pulled in to the client. Since, for building up an outline for Android gadgets, all the time engineer needs to consider the show measurement of the android gadget, it is extremely intense work to adjust the plan with android show estimate. Once in a while it can't settle with the show for some reasons. Thus, a designer needs to check a few times of his/her android application by building or running on an android gadget. For intuitive outline, we generally endeavor to think as a straightforward and less demanding in UI plan for making client fascination in our android application. We likewise attempt a few materials and devices outline for making and making fascination in the client. Then again, the client can appreciate utilizing an exceptionally basic and less demanding interface. So it was extremely a decent test to us when we were outlined our android application's UI.

In any case, most difficult part is to make our android application. There are a great deal of and numerous kinds of advanced mobile phones that help Android. However, these are not same quality affirmation. Some of them have the exceptionally powerless equipment part, shortly weight those gadget getting's hang and carry on like unusual. These reasons happen for various kinds of rendition. So we plan the application which will be upheld to every one of the gadgets as like more established to the more up to date form and we guarantee that our android application is secure and won't make any additional weight on gadgets. We attached our application front-end implemented design below:

In figure 5.2, it shows the home page or login/registration page of our application. User need to login or registration for using our application. The user doesn't need to connect internet to open the home page of our applications. The user can see here login button, sign up button, Gmail for login automatically. The user can click on any button for his/her need.

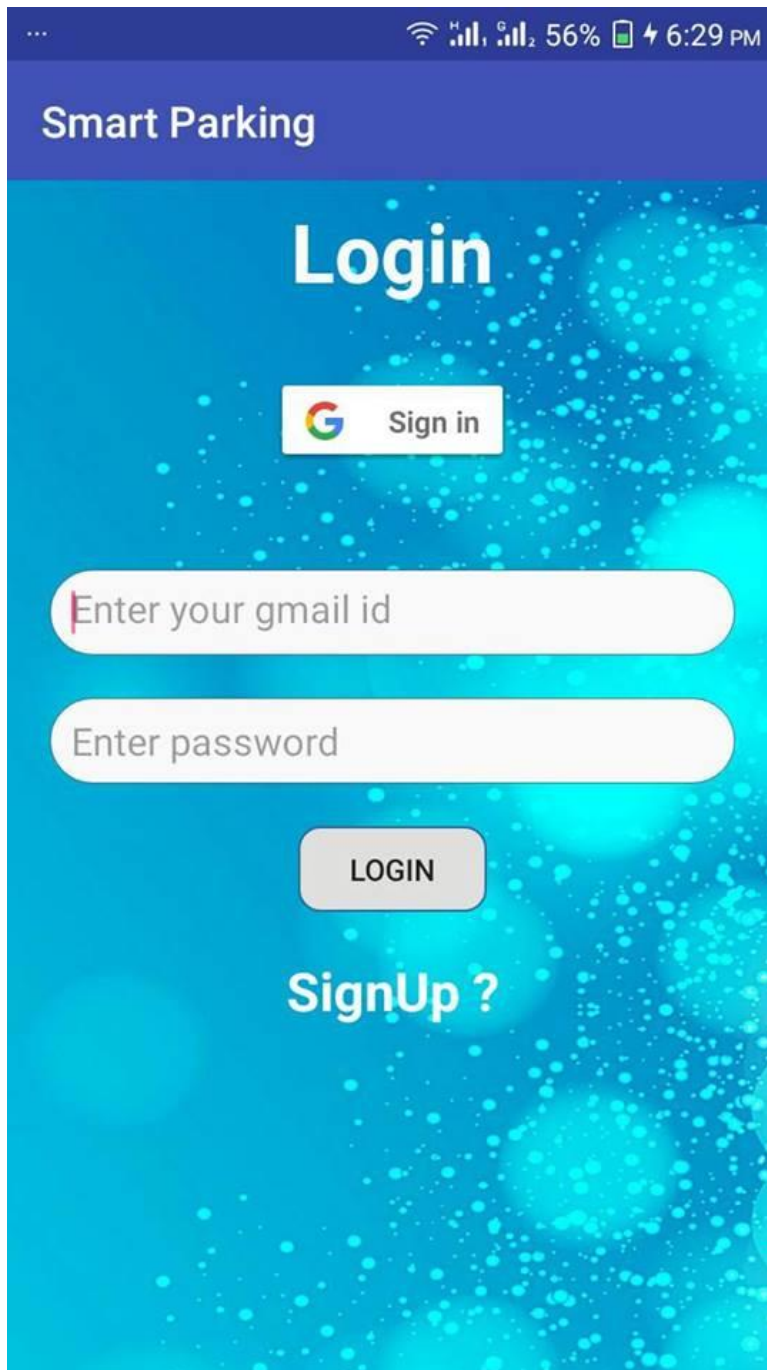


Figure 5.2: Main Page (login, sign up).

In figure 5.3, it shows the search parking and rent parking page of our application. The user needs to connect internet to open the home page of our applications. The user can

see here two buttons one is search parking another is rent parking. Search parking only for searching the parking space on the maps and rent parking means parking space owner add his/her parking slots location cost etc. The information here. The user can click on any button for his/her needed any types of information from here.

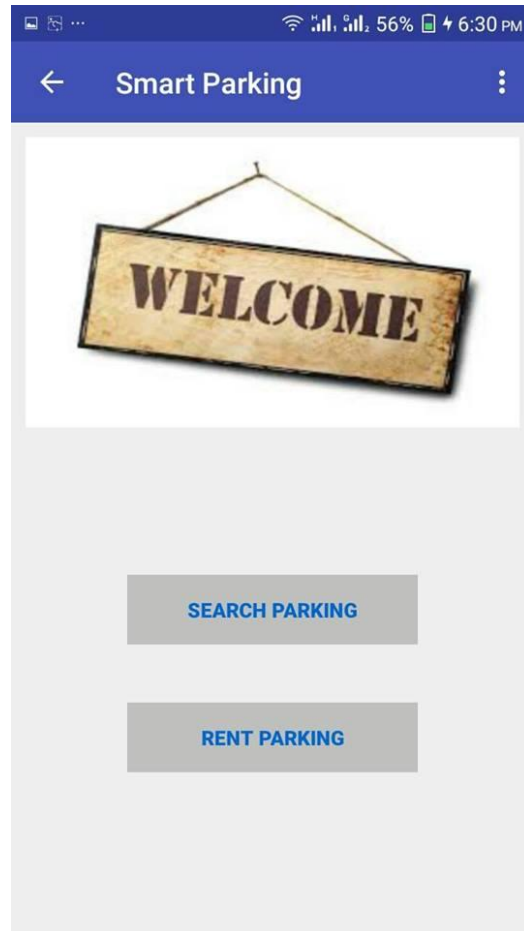


Figure 5.3: Search and Rent Parking Page.

In figure 5.4 it the map of the current location and available car parking space location. The user also needs to connect internet and GPS for opening this page of our applications. The user can get some information about parking space by clicking car icon. If user selects any parking space then on the car icon its shows cost and distance. For this feature user can easily find out the destination and all of the information

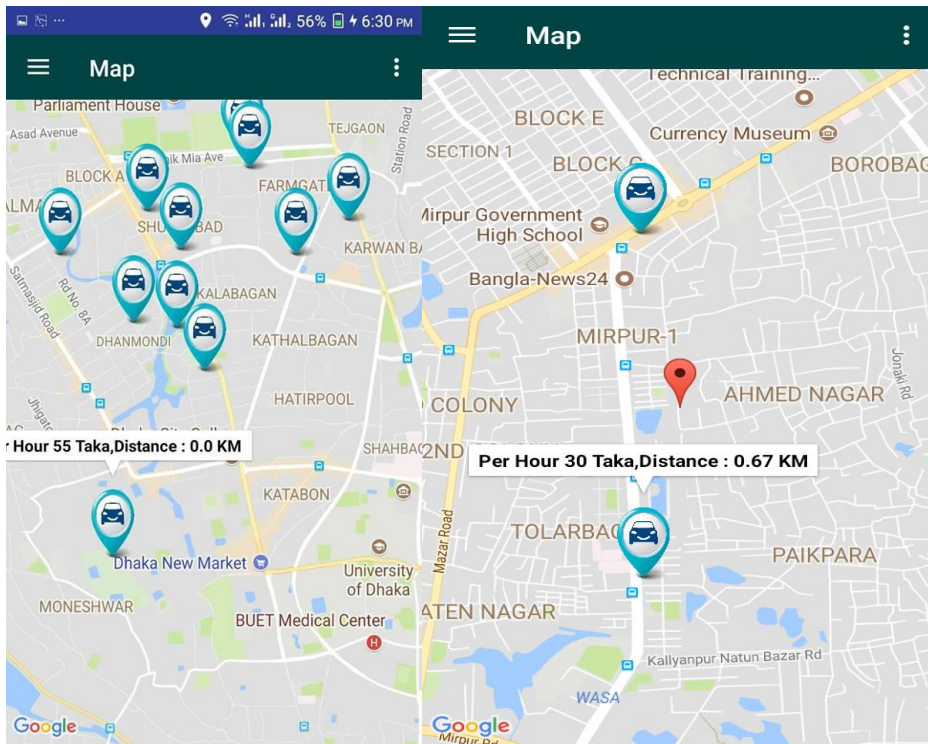


Figure 5.4: Current Location, Parking Location

In figure 5.5 it shows the total path from user current location to selected parking space. The user also needs to connect internet and GPS for opening this page of our applications. For this feature, user can easily find out their selected parking space, its shows shortest path, an alternative path.

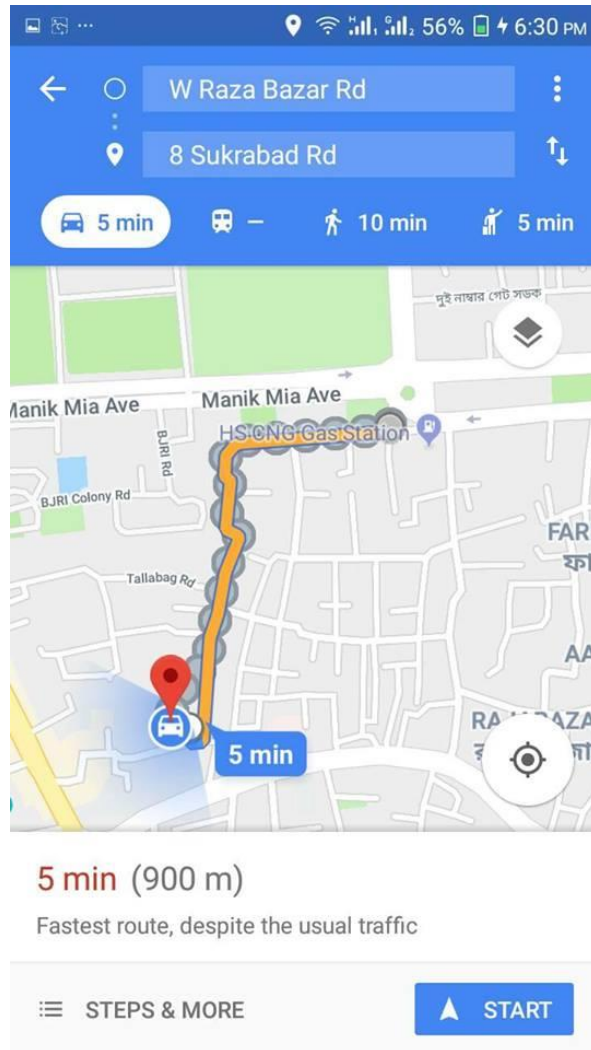


Figure 5.5: Location Path.

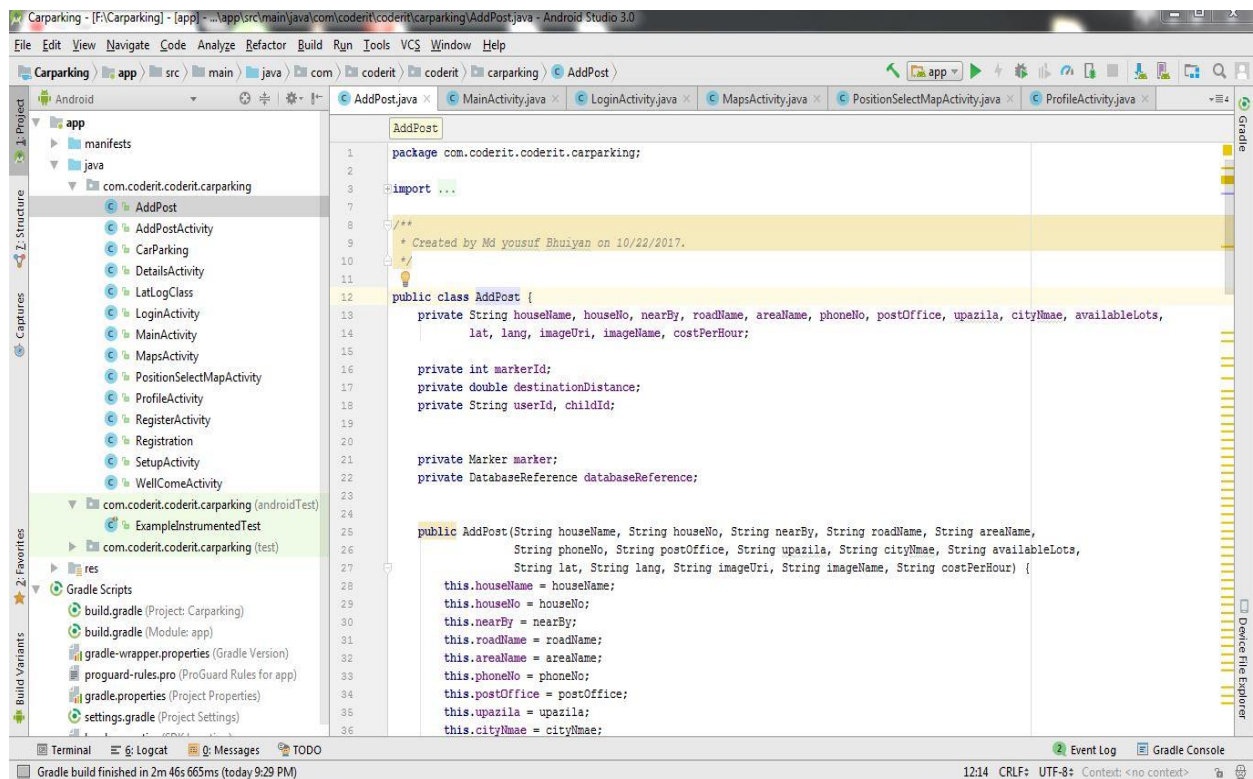


### 5.3 Implementation of Interactions

Communication is a sort of activity that happens as at least two items have an impact upon each other. The possibility of a two-way impact is basic in the idea of connection, instead of a restricted causal impact. Here we execution the backend plan of our application which is compelling to the front end outline.

#### 5.3.1 Implementation of Java and XML Code

We use the android studio for our application user interface design with XML file and for java code to connect to the XML file, Firebase database server. In figure 5.6 and figure 5.7, it shows both screenshots of Java Code and XML Code.



```
1 package com.coderit.coderit.carparking;
2
3 import ...
4
5 /**
6  * Created by Md yousuf Bhuiyan on 10/22/2017.
7  */
8
9
10
11
12 public class AddPost {
13     private String houseName, houseNo, nearBy, roadName, areaName, phoneNo, postOffice, upazila, cityNameae, availableLots,
14         lat, lang, imageUri, imageName, costPerHour;
15
16     private int markerId;
17     private double destinationDistance;
18     private String userId, childId;
19
20
21     private Marker marker;
22     private DatabaseReference databaseReference;
23
24
25
26     public AddPost(String houseName, String houseNo, String nearBy, String roadName, String areaName,
27         String phoneNo, String postOffice, String upazila, String cityNameae, String availableLots,
28         String lat, String lang, String imageUri, String imageName, String costPerHour) {
29         this.houseName = houseName;
30         this.houseNo = houseNo;
31         this.nearBy = nearBy;
32         this.roadName = roadName;
33         this.areaName = areaName;
34         this.phoneNo = phoneNo;
35         this.postOffice = postOffice;
36         this.upazila = upazila;
37         this.cityNameae = cityNameae;
```

Figure 5.6: Java Code.

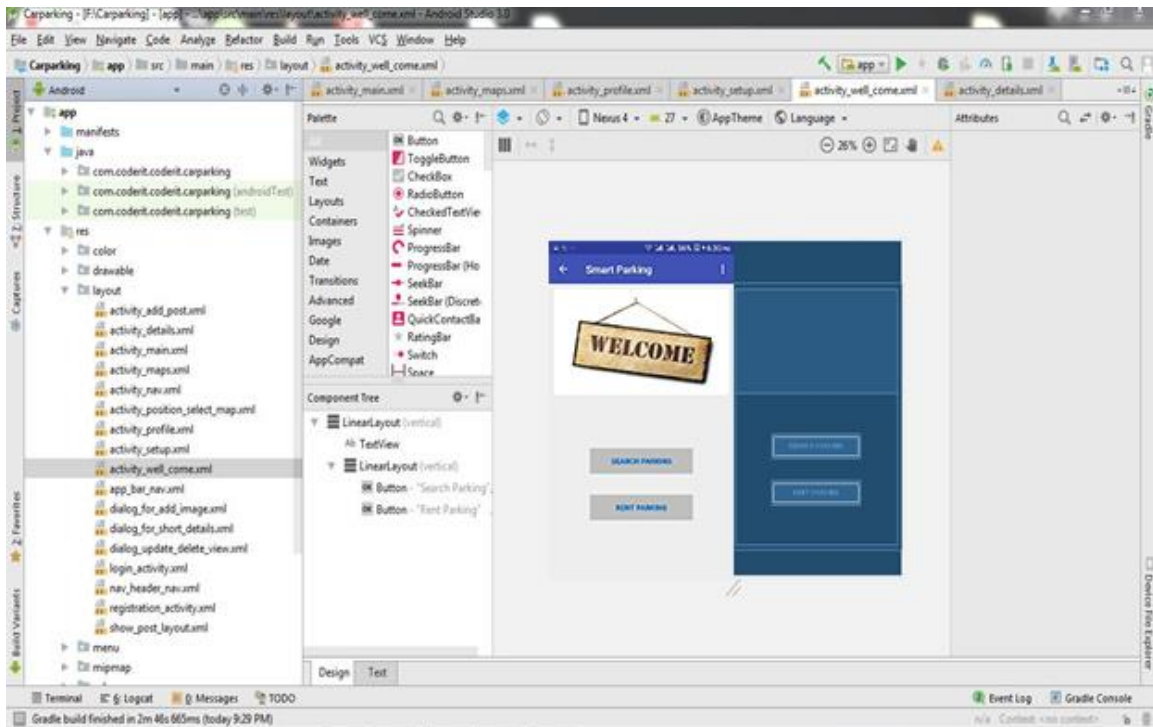


Figure 5.7: XML Code

We use the android studio for our application design and connection with internet & GPS location. Because, in the android studio, is supported many types of language. In java code, we use some class, method, and process for search parking or rent parking. We use JSON parsing method for parsing data from online to the user device. That means the major work was done in java code. In XML code, we take some text-view, button and image view for our application. By using in XML coding, we design our application.

## 5.4 Testing Implementation

Table 5.2: Test Case for online car parking system

Test Case	Test Input	Expected Output	Actual Output	Result	Tested On
1. Install Application	Tested on various Android version - <ul style="list-style-type: none"> <li>• Jelly Bean (4.1-4.3.1)</li> <li>• Kit Kat(4.4- 4.4.4)</li> <li>• Lollipop(5.5-5.0.2)</li> <li>• Marshmallow(6.0)</li> </ul>	Successfully Install all those versions.	Install successful	Passed	03/3/2018
2. Email	Blank or incorrect email	To warn that correct email must be entered.	Showed the warning	Passed	03/3/2018
3. Map View	Click on the SEARCH PARKING & RENT PARKING button.	To show the Map.	Show the Map successfully	passed	03/3/2018
4. Path view	Click on the SEE PATH button.	To show the path direction.	See path direction successfully	passed	03/3/2018

## **5.5 Test Results and Reports**

The test report is needed to reflect the result of testing the application in a formal way, which gives an opportunity to estimate the result of testing quickly. It is a document that records data obtained from a determine experiment in an organized manner, describe the environmental or operating systems conditions and shows the comparison of test results with objectives, which are so important for any types of application.

In table 5.4, we showed the test case, test input, expected output, actual output and finally We find our expected results for our application. The test result was quite successful. The user satisfies to using our application. Our expectation will be that user can easily use and understand our application as a better user interface.

## **CHAPTER 6**

### **Conclusion and Future Scope**

#### **6.1 Discussion and Conclusion**

Our android based mobile application has been successfully implemented. For implementing our application, we tested the application with many types of smartphones, we saw that our application worked properly.

The application design is very user-friendly we hope so. The user interface is so simple and not looking like as a complex view. The user can easily handle it. We tried our best to complete all required file of our application. It's a very useful application for finding nearby and available parking lot and it helps our traffic system.

We hope that people will use our application and will get required a proper service.

#### **6.2 Scope for Future Developments**

The “Smart Parking” Application can be developed for other popular mobile operating systems like OS platform.

If we find any scope for developing in future, we want to develop and change something of our application. Our future developments scopes are given below:

- Our application can be used as an alternative to the present parking systems in malls, at railway stations, near airports, theatres, etc. as an efficient means to park.
- Try to add more language, Firstly English.
- In future, our application can be implemented for promising operating systems like Firefox OS, chrome.
- Online payment system.
- Online advanced booking system.
- Automated parking system in every parking place.
  - This application is only run on android operator system. Other platform or other users cannot use the application.

- Being Bangla is our main language, other people can't use this apps properly.
- User must have internet connection to use it.
- Here is not available online payment system.
- No Pre booking option.

## Reference:

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- [8]Parknav apps,<https://play.google.com/store/apps/details?id=com.faspark.android&hl=en>: Last Access: [8.00pm] [10-01-2018]
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## PlagiarismReport

