

Android Based Mobile Application Smart Traveller

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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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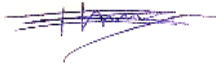
DAFFODIL INTERNATIONAL UNIVERSITY

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APPROVAL

This Project titled “Android Based Mobile Application Smart Traveller”, submitted by Shah Md. Redoan Ruhid, ID No: 173-15-10287 Md. Mahmudul Hasan, ID No: 173-15-10302 and Md. Sabbir Ahamed, ID No: 173-15-10360 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 and approved as to its style and contents. The presentation has been held on 6th January 2022

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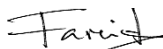
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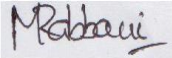
We hereby declare that, this project has been done by us under the supervision of **Md. Jueal Mia, Senior Lecturer, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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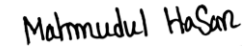


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ABSTRACT

When a traveler wants to visit a place, the traveler looks for information about the place like- how to go, what are the popular spots to visit there, what are the best rated hotels to stay, what could be the estimated budget to travel there, what problems did the other travelers faced after going there etc. but we have seen that, travelers often have a complain that they cannot obtain all of these necessary information. This smart travel guide application seeks to solve these kind of problems faced by the traveler before and after going on a place. By using latest information about a place and any other guidance-related details requested by the traveler. The traveler can explore tourist destinations in a better way. The application includes features like- places of Bangladesh, Booking services, Budget tour, Nearby restaurants, ATM's and more. The traveler can book a hotel to stay and also rent a vehicle (Car, bike, bicycle) at the tour place. With this application the traveler can get information about hotels, vehicle rent providers, tour events, emergency services and information about problems faced by others travelers, so that travelers can take precautions before going anywhere. We thought that, a traveler could make a perfect trip and a better tour plan, if we use these features in the application.

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CHAPTER 1

GENERAL INFORMATION

1.1 Introduction

We are living in an era where technology is everything. And it's getting advanced day by day. We humans are also adapting the advancement of technology with our day to day life. As the technology is improving, we are also trying to improve ourselves. In a way so that we can use this technological advancement for the betterment of our society and country. The smartphone industry is one of the sector of advancement. A report shows that there are currently 6.37 billion smartphone users in the world and that's almost 80.69% people around the world. [1] Another report shows, in 2020 the smartphone users of Bangladesh are 53.3 million out of the total population of 164.69 million. [2] According to statistics, Android holds a market share of 75% globally with 2.8 billion plus active users, and in 2020 there were 2.95 million applications available in Google Play Store, and now in 2021 the amount reached to 3.48 million. [3] From the reports we can say that, the usage and development of android application is increasing. In Asia region, the number of app developers are 760,000. [4] A statistics of shows that, Google Play Store has a number of 86,257 travel related applications. [5] If we talk about what encouraged us to develop travel related application then we would say that, the enjoyment of going on trips. Think about it, who doesn't love to travel? We all do. From this, we came up with the idea of our development.

Smart Traveler is a travel guide application. The users are the admin and the traveler. The admin will have the control of all the functions in the application like – adding or deleting any kind of data, seeing the information of all the users etc. Travelers will be able to get information's about the places of Bangladesh, book hotels rooms and rental services and the emergency contacts if needed in some kind of danger. By using this app, travelers can easily make the best trip, and also they can find most needed information for making their trip more enjoyable.

1.2 Objective

The goals before the development of the application. Before the implementation we must set some objectives. Without any goals, we cannot come up with proper outcome. The objectives of our application are -

- Provide information about available hotel rooms, rental services
- Provide available emergency contacts information
- Provide an idea of the budget or amount the traveler would need before going on a tour
- Provide a timeline, which includes all kinds of experience of places shared by the travelers.
- Provide information's about nearby things around a place like – restaurants, ATM's etc.

1.3 Motivation

Often we see that, travelers are unable to get emergency services at an unknown place. As the place is unknown, so the risks or problems will also be unknown to the travelers. Here comes the topic of safety or taking precaution before going anywhere. We tried to get the information of some emergency services for the safety of the travelers. Many times most of us or the travelers do not have the proper information about hotels and rental services before going anywhere. Then we have to face some consequences of finding hotels by walk and other service related problems. That is why we thought to make an application, where the travelers will get hotels information with room details. Wherever we travel, we have to find nearby restaurants to eat, ATM's to withdraw cash and probably many other things. But most of the time, travelers do not know about the nearby restaurants or ATM's as the place is unknown to the travelers. We thought to develop the application where travelers could get this information just by giving their exact location on the app. Before going on a trip, we must know about the minimum cost. Specially the details of where and how much the traveler would need to spend. In the application, we wanted to show the minimum budget with detailed information.

1.4 Expected Outcome

The results of goals. Goals that we want to implement in the application. Below are the expected outcomes of our application -

- Travelers will be able to get all the necessary information before going to a place
- Overcome the unknown situations or problems or risks faced by other travelers by sharing their experience
- Get convenient and satisfactory traveling experience for Bangladeshi travelers
- Get to know about the available emergency contacts
- Booking services with feedback option
- Authentication while login into the application

CHAPTER 2

BACKGROUND

2.1 Related works

There are some travelling related applications on Google Play Store developed for Bangladeshi people. We have installed and used some of the application and seen the functionalities. Let's talk about some of them.

'Vromon Guide' is an android application available on Google Play Store. The application was developed by 'Contentiod'. The application offers detail information about lots of places of Bangladesh and travel destinations outside Bangladesh. When we used the application, we found that they also include important information about how to go on a place, hotels and resorts information, the best food of a place, what could be the cost of going on a trip etc. There are sections in the application like popular places, video which leads to their YouTube channel and there is a section where people can save information offline. There is also a section related to bloggers. The information of any place is shown in a well categorized way. If anyone wants to know about a place then they have go on Bangladesh section, then the district section, and then the place. There is also a search option to search anything by typing in Bengali. The application does not show anything without internet. [6]

'TourToday BD' is another travel related application developed by 'Brothers Bangladesh'. This application is also available on Play Store. After opening the application, to get the information of any place users have to select the place name, place type and the district of that place. The information is also shown in a categorized way. The users cannot use this application without internet connection. People can only see the information without internet if information's are saved offline. If travelers want to add any information about any place or other things, then they can also do that within the application. If the travelers need any kind advice regarding any trip then they can also get advice from the advice section of the application. The application also shows the information about best hotels and best foods related to any place. There is no search option in the application to search about anything. The application is rated 3 by the users. [7]

'Hello Tourist' is an application which is developed by 'Latent Soft' and launched by 'Tourist Police' of Bangladesh. It is also available on Google Play Store. This application was developed for the tourist around the country. In this application, there are contact numbers of all the tourist police zone of Bangladesh. The emergency number 999 is also listed here. All of the contacts are developed like users can call the numbers just by tapping on it and it will take them to the call pad. Almost all the tourist spots of Bangladesh are listed in the application. The details of the tourist spots are shown in the tour guide section. Details like how to go on a place, what are the best food of a place, and what is the budget. The details of hotels are also given but in another section. The tourist can make any kind of complains and give feedbacks in the application. Some laws and rules are given in the application. Laws regarding safety for the nature, not to make violence, not to get involve with cyber-crime and other travelling related rules. There are precautions and safety measurements given in the application so that the travelers could be safe in an unknown place or situation. There are some Frequently Asked Questions (FAQ's) given in the app. If any kind of news comes regarding danger or something important then it will also be shown in the application. There is no search option in the app. The app is not completely online neither offline. This app is not yet rated but it is very useful for the travelers. [8]

2.2 Comparative studies

After using the above-mentioned applications, we did find many interesting and important features which is useful for the travelers. Features like –

- Almost every tourist destination of Bangladesh
- Information of tourist police
- Tourist destination information like – how to go, what are the hotels, estimated cost to visit
- Saving information offline

Probably these features are enough, if the traveler wants to go on a trip by using those applications. But still, when we used these applications we found some features are missing like –

- There is no account creation feature
- There is no booking system
- No location tracking system
- Travelers cannot find nearby restaurants/ATM's
- No timeline where travelers could share their experience
- No history or record of recent trip
- No record of users

If the travelers could have an account by registering into the system and make booking of hotels and other services then it would be more convenient. But unfortunately there is no record keeping system. Without any kind of database management system the application cannot keep any kind of record of users. To provide a convenient trip the above-mentioned features are needed within the system.

2.3 Scope of the problem

We have wanted to overcome the lacking's of previously developed applications. We have come up with a system where travelers can easily create an account. After creating an account, the traveler can log in into the application, and they can see the nearby restaurants, ATM's etc. by sharing their location. They can book hotels and other rental services. As we wanted to keep the records of users information that is why we have used database. We wanted to make sure the traveler could get all the services at one place. To make a convenient trip for the travelers we wanted to make sure they get everything within the application.

2.4 Challenges

As there are lots of travel related applications available, so it's kind of a challenge to develop something which is already there. The competition of Android application development is also getting higher day by day. As the enormous competition going on, the struggles are also infinite in developing android application. In this struggling situation, we had to come up with new ideas or try to develop the existing ones in a better way. Otherwise it will be waste to develop one. As we thought to develop our application like the existing ones, so we had to generate some new features. [9]

It is common to every developer that, whenever developers want to develop or implement a system then they have to face some challenges. The challenges that we faced to develop the application are -

- Implementing the idea into a visual representation by using diagrams
- Collecting authentic data before development
- Making proper authentication when user tries to create an account and login into the application
- Getting the proper workable API to show the real time available data around the location on the map
- For the convenient use of the application we had to make sure the app is device compatible and fits on every screen

CHAPTER 3

REQUIREMENT SPECIFICATION

3.1 Requirement Collection and Analysis

Most of the requirements for our projects were collected from travel related websites and applications that were previously developed. The requirements were mainly-

- The detail information of every tourist destination
- Contacts of tourist police
- Hotels information
- Rental services information
- API selection to show nearby things around the location
- Emergency contacts like – Fire service, Ambulance, Hospital etc.

Above-mentioned data were used in the application so that we could provide a system where the travelers could get updated and authentic information.

3.2 Use Case Modeling and Description

Use case diagram is told to be the blueprint of any system. [10] Use case diagram gives a visual representation about the requirements of the system. Represents the probable outcomes but not the actual ones. This diagram is effective before doing the development. Use case diagram explains the functional requirements of a system. To explain the functionalities of a system, the diagram uses actors, use cases (system requirements) and the relationship between them. Association defines the type of the relationship between actors and use cases. To show association, arrowheads are used with a direct link. The person, who interacts with the system is defined as Actor. And the Use case denotes the features or functionalities of an actor. Between actors and Use cases, there are three kinds of association. If the actor must do or have a functionality then the relation is include. For example: to place an order, the customer must log in into the system. The relationship is extend when there is a chance of having may in a function . For example: password shows invalid if user enters a wrong password, that means user may or can enter either correct or either wrong password. An the third relationship is called generalization which denotes parent-child relationship of an Use case. [11]

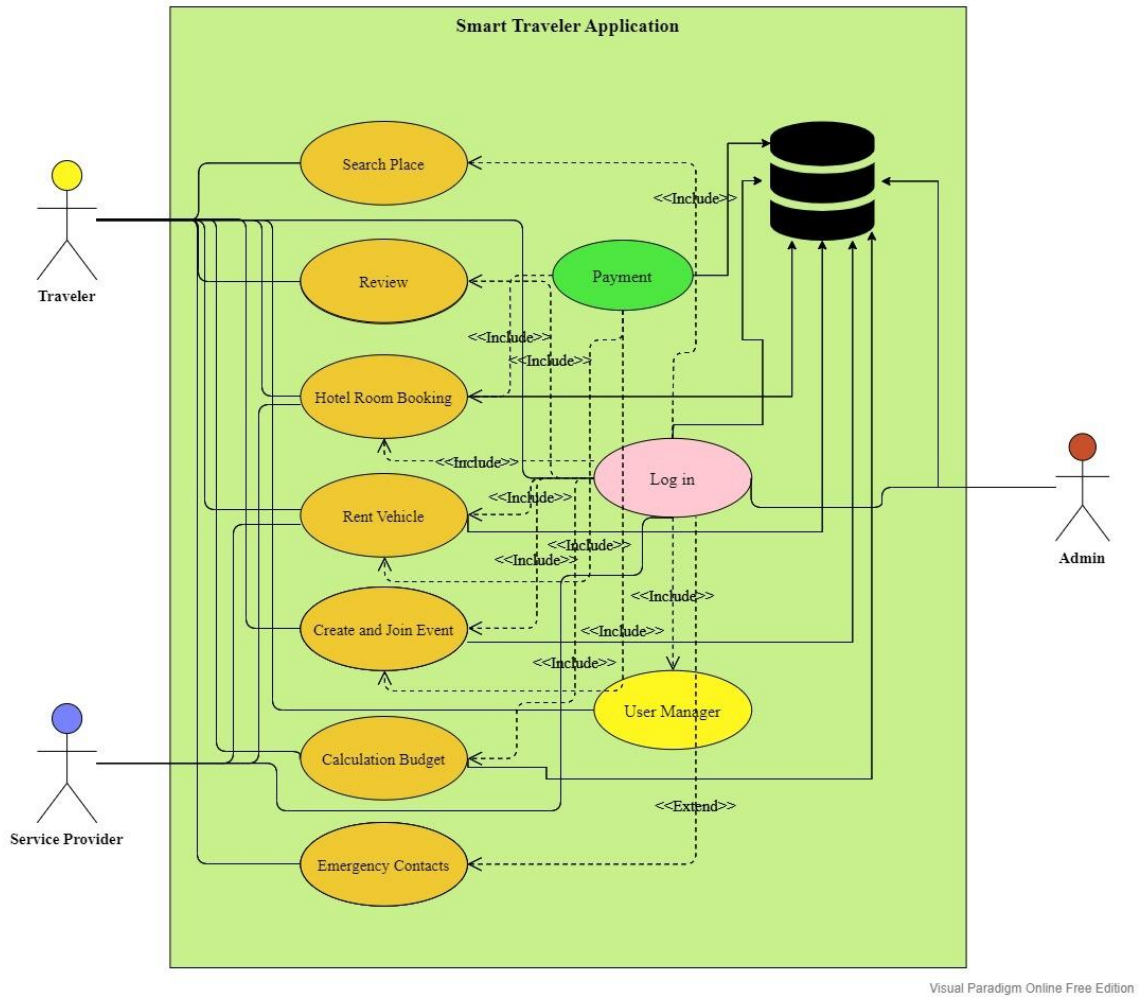


Figure 3.2.1: Use Case Diagram

Table 3.2.2: Description of Use case for Places

Use Case Name	Places
Pre-Condition	Connect to the internet and Login
Primary Path	<ol style="list-style-type: none"> 1. Enter into the application 2. Go to places and select any category 3. Show category wise places

Table 3.2.3: Description of Use case for Timeline

Use Case Name	Timeline
Pre-Condition	Connect to the internet and Login
Primary Path	<ol style="list-style-type: none"> 1. Enter into the application 2. Go to the timeline 3. Create and post on timeline

Table 3.2.4: Description of Use case for Hotel Room Booking

Use Case Name	Hotel Room Booking
Pre-Condition	Connect to the internet and Login
Primary Path	<ol style="list-style-type: none"> 1. Enter into the application 2. Go to the hotel service 3. Show and select room for booking

Table 3.2.5: Describe of Use case for Rental Vehicle

Use Case Name	Rental Vehicle
Pre-Condition	Connect to the internet and Login
Primary Path	<ol style="list-style-type: none"> 1. Enter into the application 2. Go to the rental service 3. Show and select vehicle for booking

Table 3.2.6: Description of Use case for Create and Join Event

Use Case Name	Create and Join Event
Pre-Condition	Connect to the internet and Login
Primary Path	<ol style="list-style-type: none"> 1. Enter into the application 2. Go to the events 3. Create an event 4. If there is an event already created then join 5. To join the event then make bookings

Table 3.2.7: Description of Use case for Calculation Budget

Use Case Name	Calculation Budget
Pre-Condition	Connect to the internet and Login
Primary Path	<ol style="list-style-type: none"> 1. Enter into the application 2. Go to the budget calculator 3. Select the range of your budget 4. Press filter to show the places within the budget

Table 3.2.8: Description of Use case for Emergency Contacts

Use Case Name	Emergency Contacts
Pre-Condition	Connect to the internet
Primary Path	<ol style="list-style-type: none"> 1. Enter into the application 2. Go to the emergency contacts 3. Search for the location 4. Find and select the emergency service 5. Select your needed emergency contact for call

Table 3.2.9: Describe of Use case for User Manager

Use Case Name	User Manager
Pre-Condition	Connect to the internet and Login
Primary Path	<ol style="list-style-type: none"> 1. Enter into the application 2. Go to the user manager 3. Edit your user profile and update it

3.3 Logical Data Model

The key thing of data modeling is, one of the model serves as a blueprint of data and it's logical data model. It establishes relationship and structures the elements of data. With the help of logical data model, more information can be added to the elements of conceptual data. Components of logical data model represents Entities which denotes persons or characters, Attributes which describes detail information about Entities and Relationship between entities. One of the data modeling technique is Entity Relationship (E-R) model. From the components of the logical data model, it can be known that the components are same for ER Model also and built with the Entity Relationship Diagram (ERD). [12]

The database of an application can be described with ERD in a much better way. It will be easy to explain about the database by knowing briefly about the components of ERD. The entity denotes the number of tables needed for the database. Entities are nouns of characters, events and other things. Relationships are described with associations with the entities. The relationships can be one to one, one to many and many to many. The more described information about entities are the Attributes. For example, if student is the entity then students name, students roll, students course would be the attributes. [13]

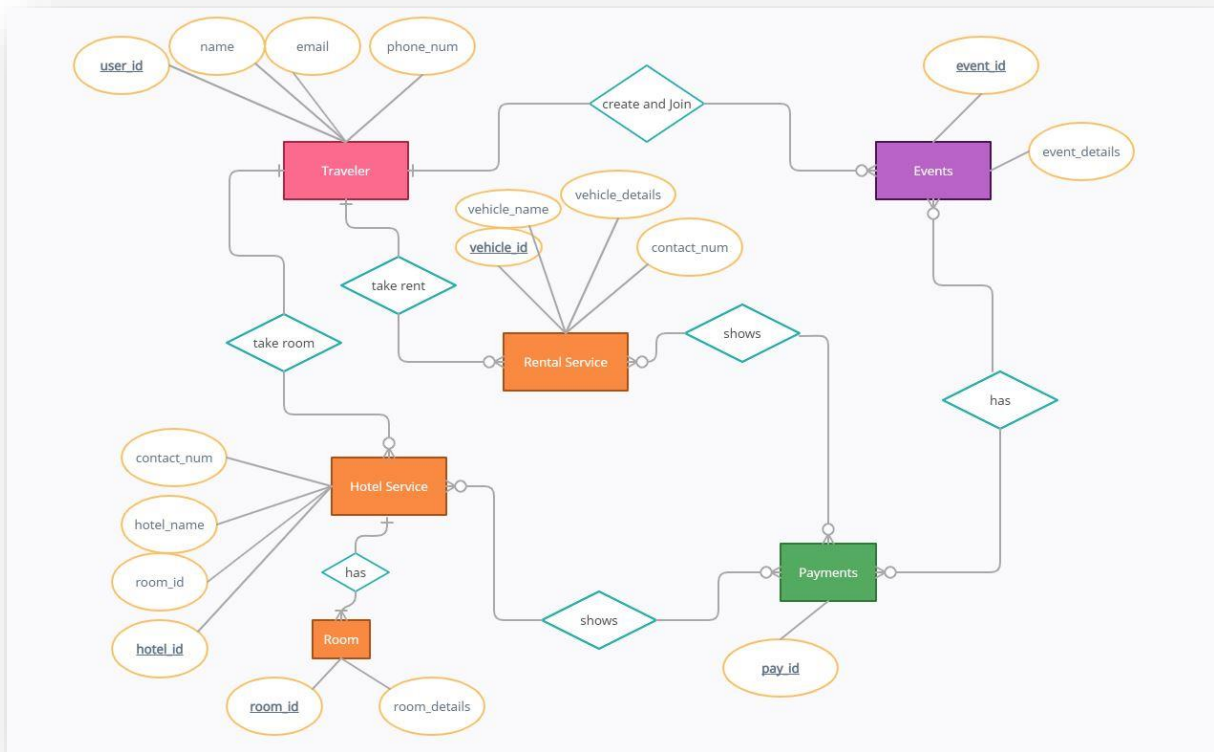


Fig 3.3.1: ER Diagram

3.4 Data Flow Diagram

As the name says, DFD shows the flow of data of a system. It represents the outputs and inputs of an entity through the process. Data is not controlled in DFD but only shows the visual illustration. For the proper visualization, data flow diagram uses Process, Data flow, Warehouse and Terminator as the components. Process is represented with circle or oval or rectangle or rounded rectangle symbol. It shows the data which comes as an input and goes to the output. Arrow symbol denotes the flow of data with direction and the flow is named according the information which moves through the entities. Two horizontal line symbol is used for warehouse which stores the data. Data flow from the warehouse is the reading of the stored data and data flow to the warehouse expresses the editing or updating the data. The entity that communicates with the system from outside is the terminator. The examples can be given as an organization or an authority which does not belong to the system. [14] Below are the Data Flow Diagram of our project with level-0,1 and 2.

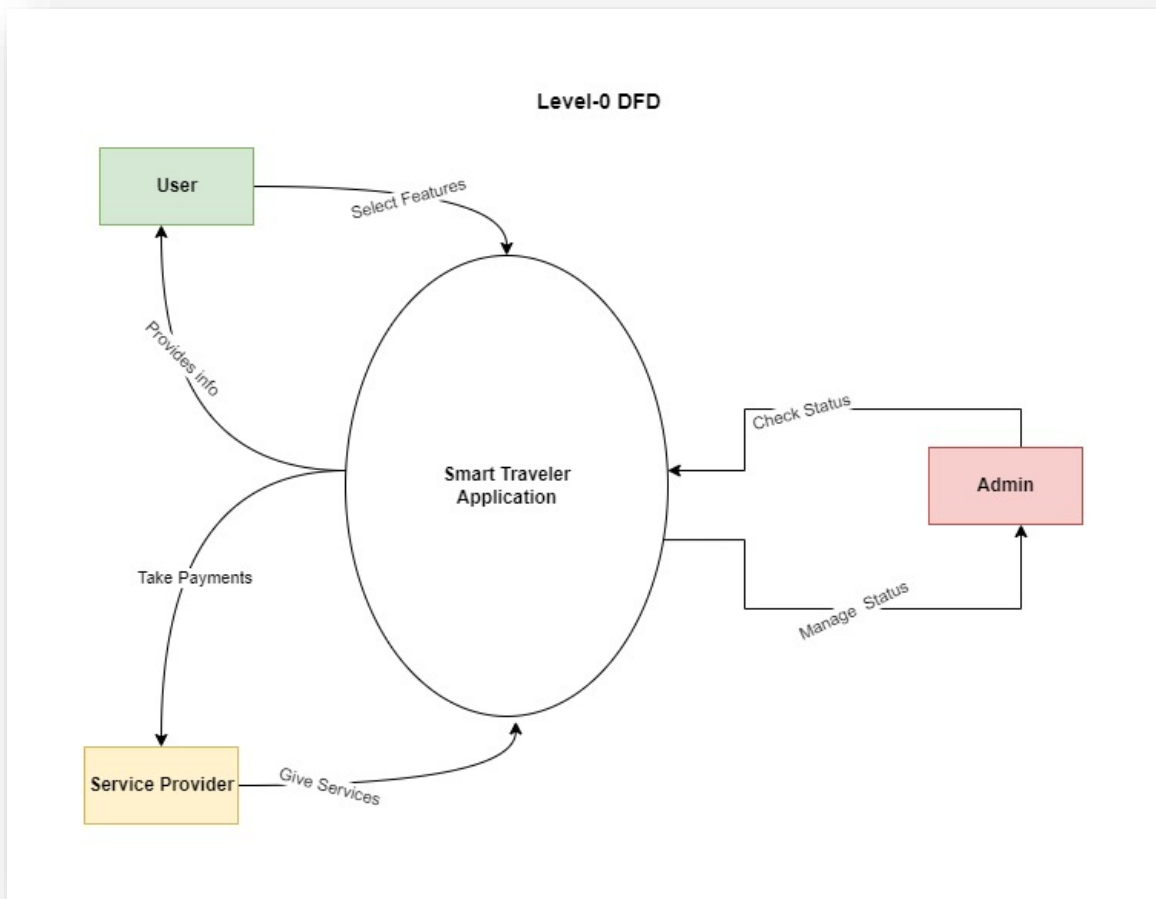


Figure 3.4.1: Level-0 DFD

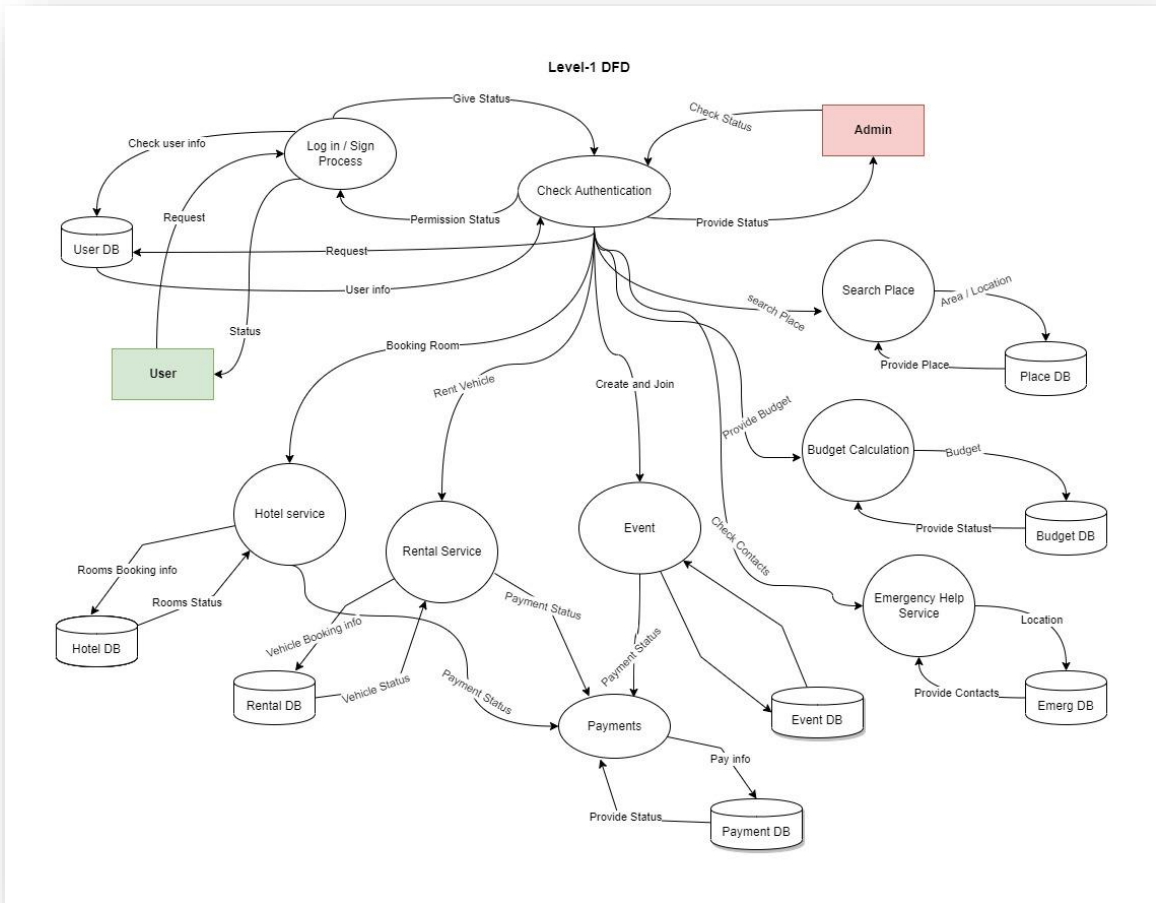


Figure 3.4.2: Level-1 DFD

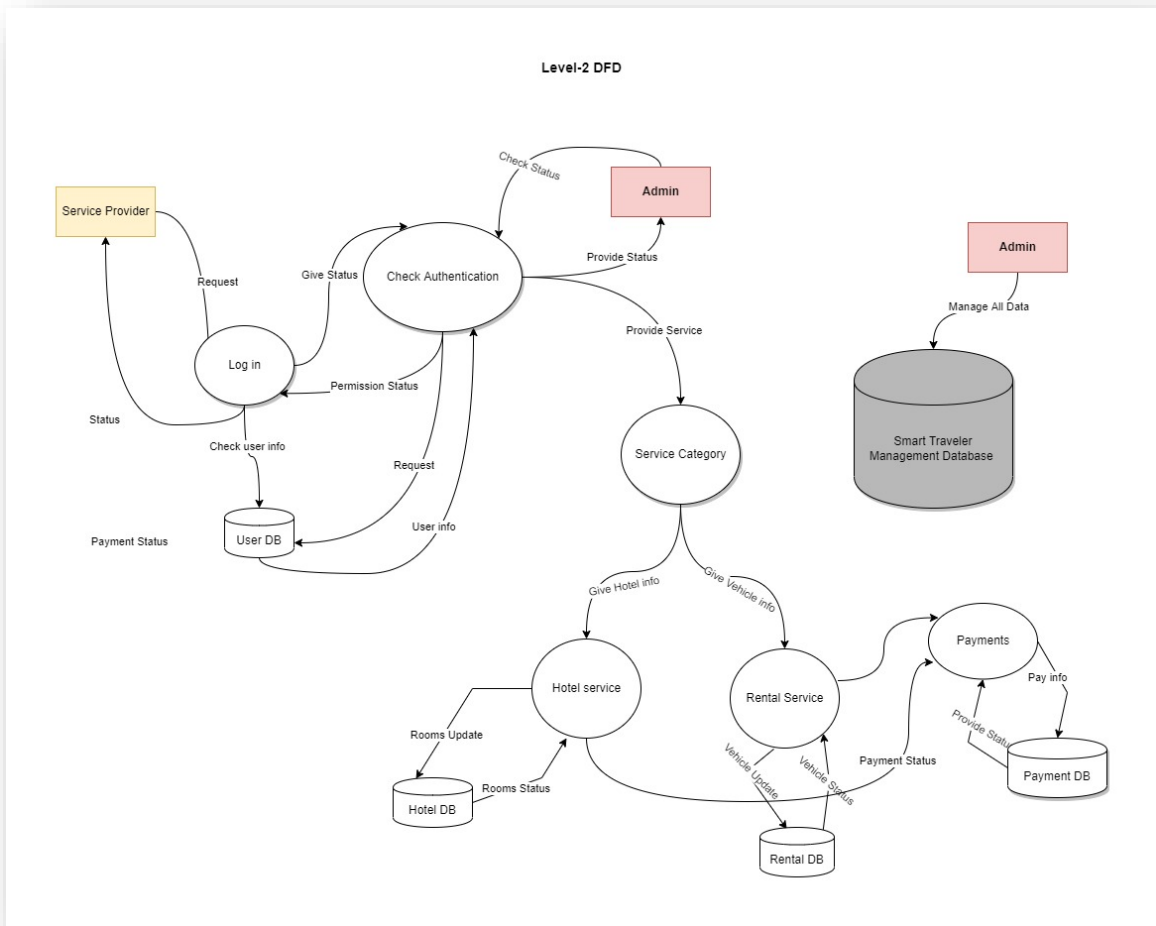


Figure 3.4.3: Level-2 DFD

CHAPTER 4

DESIGN SPECIFICATION

4.1 Front-end Design

It is the client-side of an application. After opening an application, whatever the client sees in the front is the frontend design. The frontend of any website or application is the key thing that attracts the user as there are colored and stylish texts, beautiful buttons, scrolling and sliding pictures, navigation menu, and much more. Frontend developers have to work hard on the appearance, behavior, structure, and content of an application according to the clients interest. The design part of any project is kind of tough to do as it depends upon users interest. From our point of view, the design part takes more time than the development part. As users interact the most with the frontend part of an application, it has to be designed beautifully and in a responsive way so that users are satisfied. Building an application in a responsive way means that, the application can be installed and used on all kinds of device and fits with the size of every screen. Along with the responsiveness, applications performance is also important. Both the responsiveness and performance needs to be stable for the application to work properly on any device. [15]

For the Front-end design we have used XML in our application. XML stands for Extensible Markup Language. As this is not a programming language, it is used to control presentation of data. With XML in android it is not that tough to design but it takes time. XML uses layouts, view and view groups to make the designs. At first, we have to create a root layout and inside the root layout, we can do all the implementations. Implementation with Buttons, Text View to show texts, Edit Text to write texts, Image View to show the images, Web View to show web pages, Fragments and more. To implement the view and view groups, XML uses tags. In XML, we can also write the tags just by drag and drop of the view and view groups [16] Users can see a beautiful interface after doing all of the design in XML.

4.2 Back-end Design

Backend design is referred as the server-side of an application or website. It is actually hidden from the client-side. Even if the users cannot see the backend part of the application but they can interact indirectly with the server-side with the help of the front-end interface. All the data is stored, arranged, managed and updated on the backend. Because all the things happen in a database system.

One of the popular language used for android application development is Java. It is an Object Oriented Programming language. Java is also known as the most used language for backend. It can run on all kind of platforms along with windows, Mac OS and Linux because of the Java Virtual Machine (JVM). This is one of the great advantage of Java and because of this advantage it is called as “Write Once, Run Everywhere”. Java also allows multi-threading. Multi-threading means that, multiple users can perform different task at once in the application. The server becomes receptive and the response of the application is also quick because of multi-threading. [17] The main reason of Java being one of the popular language is it is supported by Google. Java is not so easy to learn and also building complex applications with it can be a problem for the beginners. Yet the developer build most of the applications with Java. [18] We have used Java as back-end in our application.

4.3 Implementation Requirements

Below are the requirements to implement our project,

Hardware specification,

Table 4.3.1 – Hardware specification

Processor	AMD Ryzen 5 2500U with Radeon Vega Mobile Gfx 2.0 GHz
Disk Space	797 GB of Hard Disk and 33 GB of SSD Available
RAM	8 GB
Display	1920*1080
Graphics	NVIDIA GeForce GTX 1050 series 4 GB
Mobile Phone	Realme X

Software specification,

Table 4.3.2 – Software specification

Operating System	Windows 10 64-bit
IDE	Android Studio
Database	Firebase Realtime
Web Browser	Google Chrome

CHAPTER 5

IMPLEMENTATION AND TESTING

5.1 Implementation of Database

In our project, we have used Firebase as our database. It is a Realtime Database and used as a Backend service. Realtime database uses real-time processing because the data changes continuously and the workload is high. As like stock market changes in a regular basis. Realtime database is used in banking, keeping medical records, in reservation systems, keeping scientific data for analysis etc. Because of the real-time database system, the transactions are also faster now. [19] As Firebase is built on the infrastructure of Google, it is also a NoSQL database and stores the data of documents as JSON-like. There are some key features which is used in Firebase database. Authentication, test lab, hosting, notifications are some of the key features of this real-time database. [20]

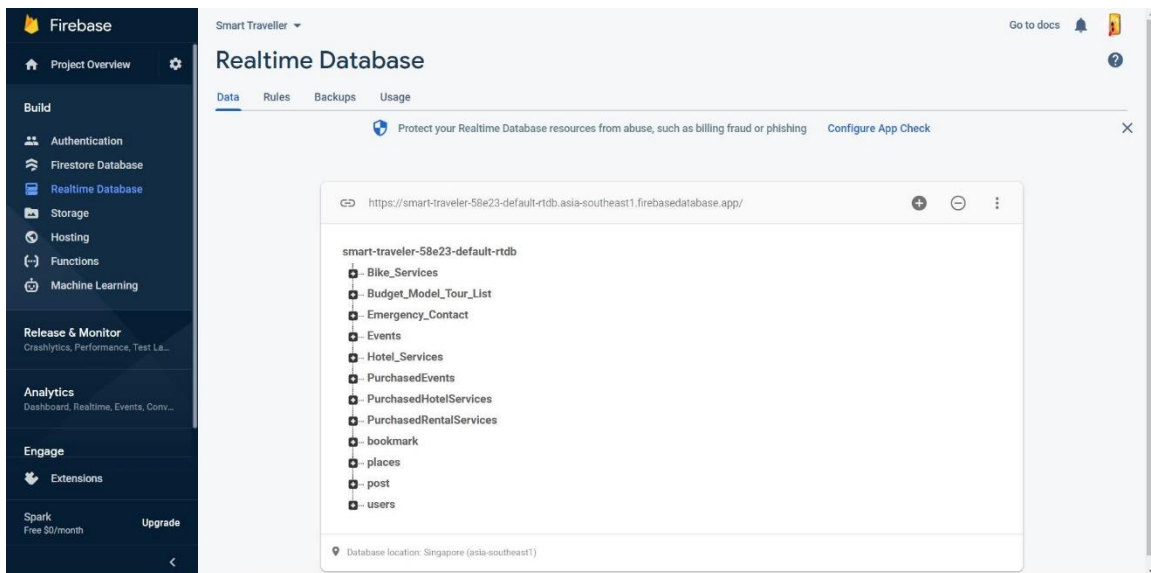


Figure 5.1.1: Firebase Realtime Database

5.2 Implementation of Front-end Design

Below are the UI of our application shown with the descriptions.

5.2.1 Welcome Screen

This is the welcome screen of our application. From this activity, users can do registration for new account or can log in into the application if the user already created an account. Users can also skip both the registration and log in process and go to the home page.

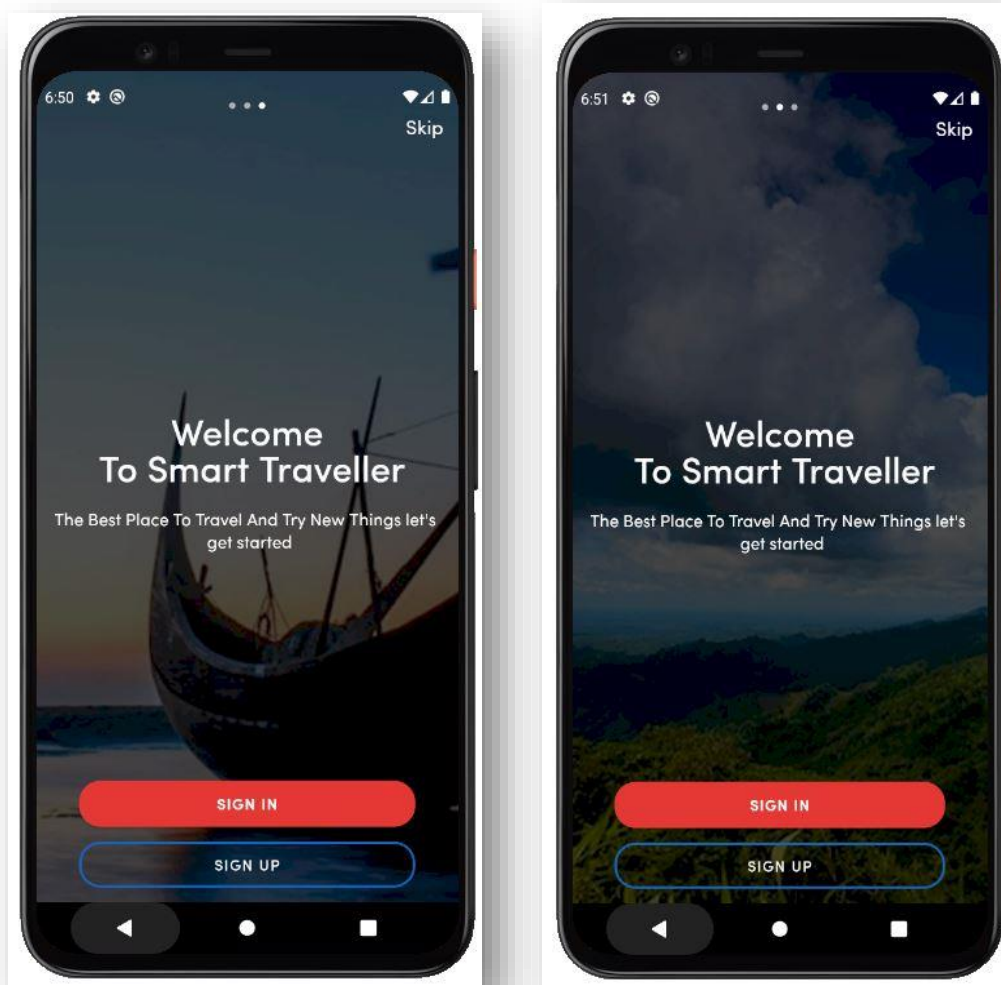


Figure 5.2.1.1: Welcome Screen

5.2.2 Home Screen

This is the Homepage of our application. In the homepage we have many options like Places Of BD, Booking Service, Restaurants, Events, Timeline, Emergency Contact.

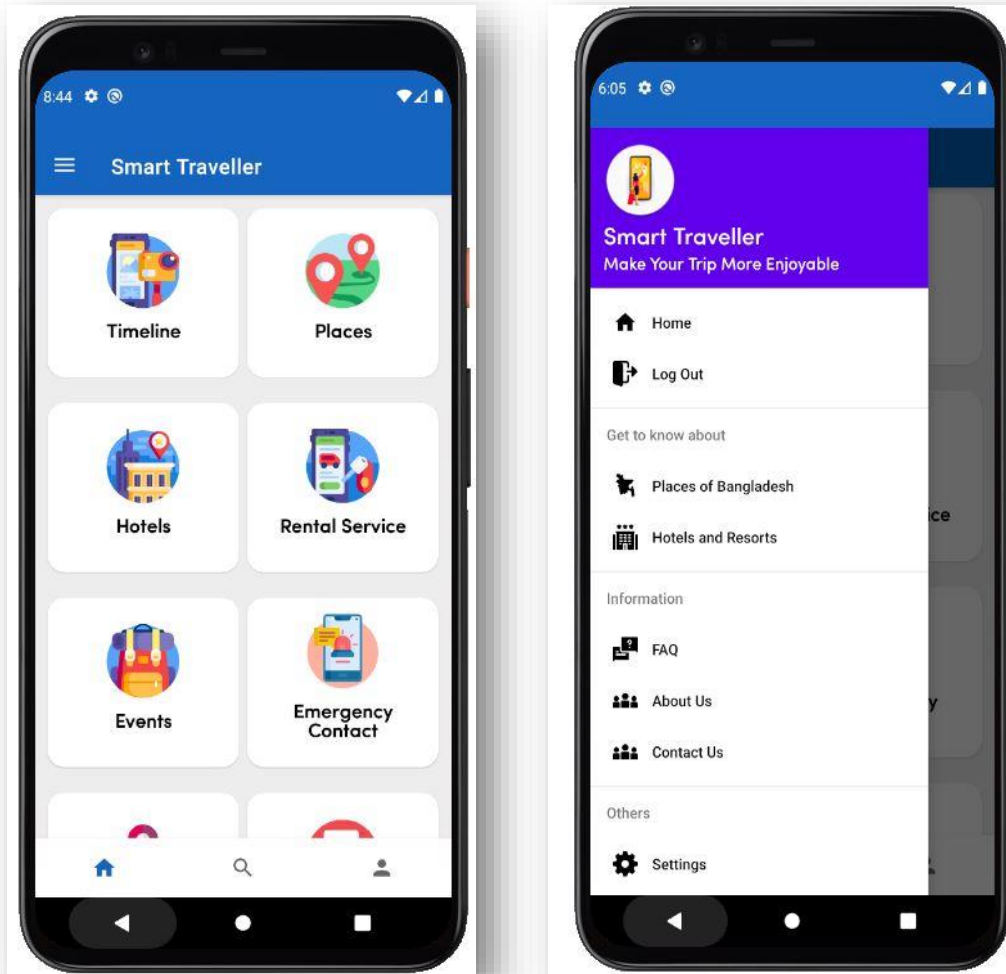


Figure 5.2.2.1 : Home Screen and Navigation Drawer

5.2.3 Authentication

Every android application needs a basic authentication system that specify the user and give access to certain pages. Below we can see an error. Whenever user will input wrong information then this error will appear.

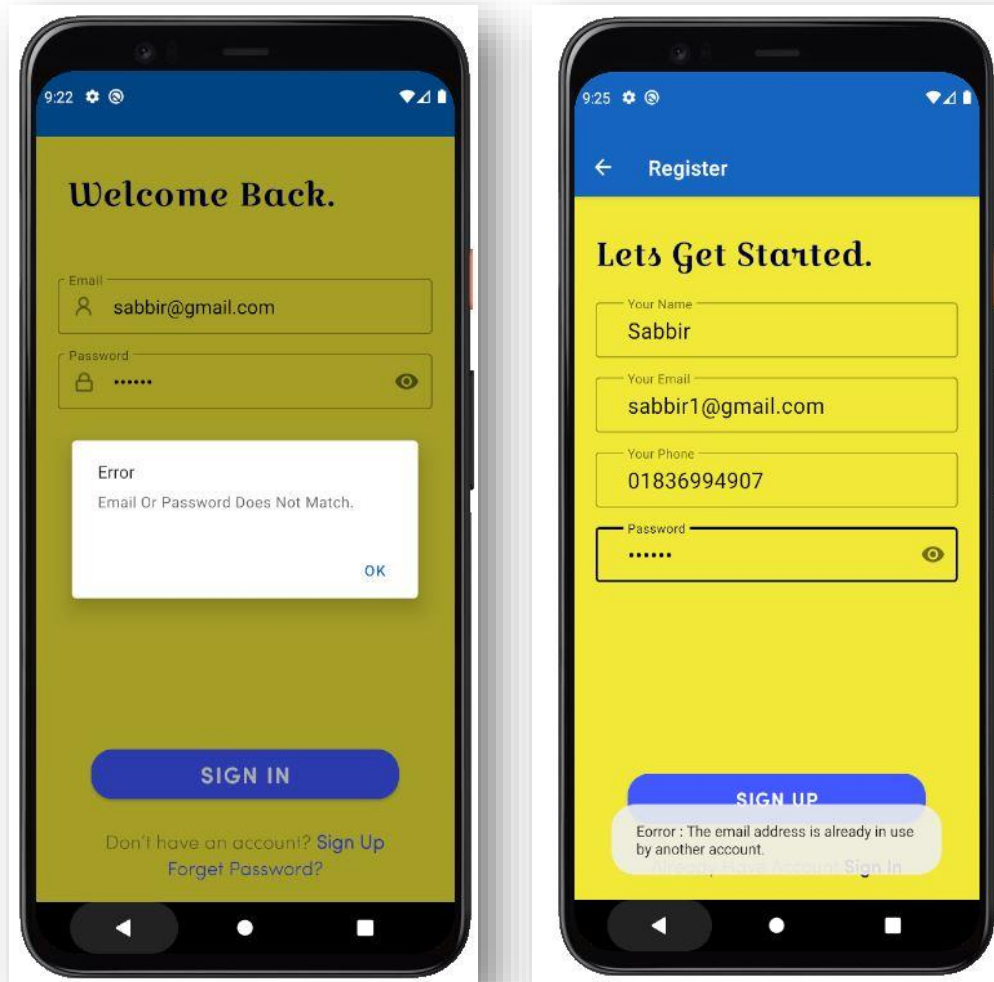


Figure 5.2.3.1 : Authentication

5.2.4 Sign Up

This is the registration screen of our application. To use all the services users must need to create an account.

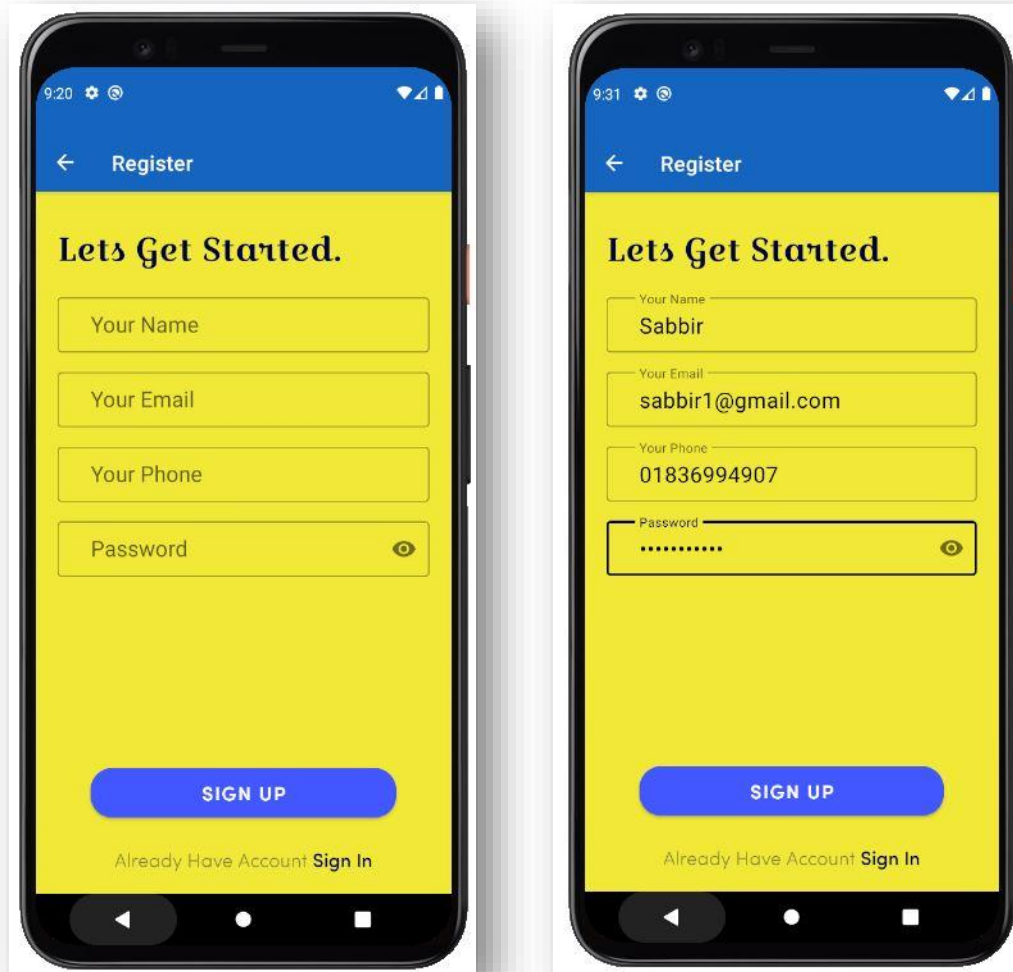


Figure 5.2.4.1: Sign Up

5.2.5 Login

If a user has already an account, he/she can log in into the application. Users will have to input username and password to login application.

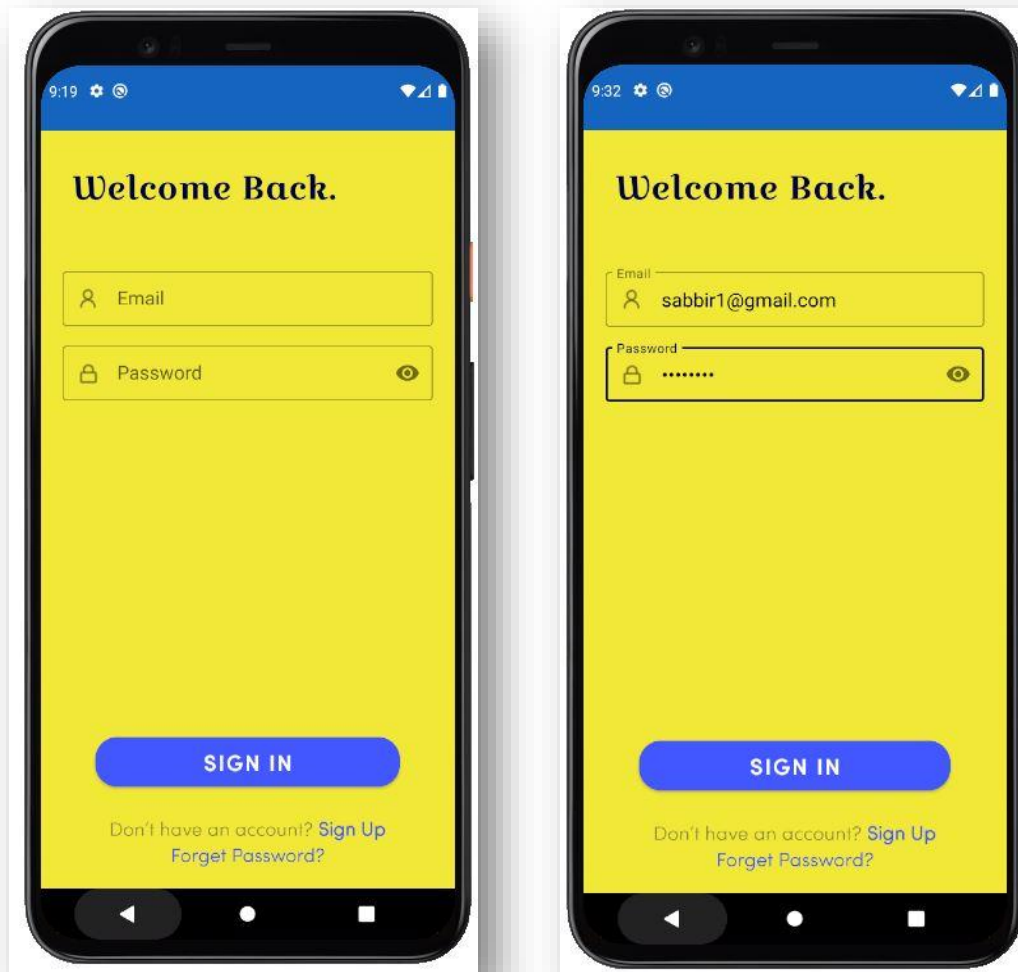


Figure 5.2.5.1: Login

5.2.6 Timeline

In this section, travelers will be able to post or share their travelling experience. They can share their experience with picture and also by writing. Travelers will be able to give react and share the post on other social platforms also.

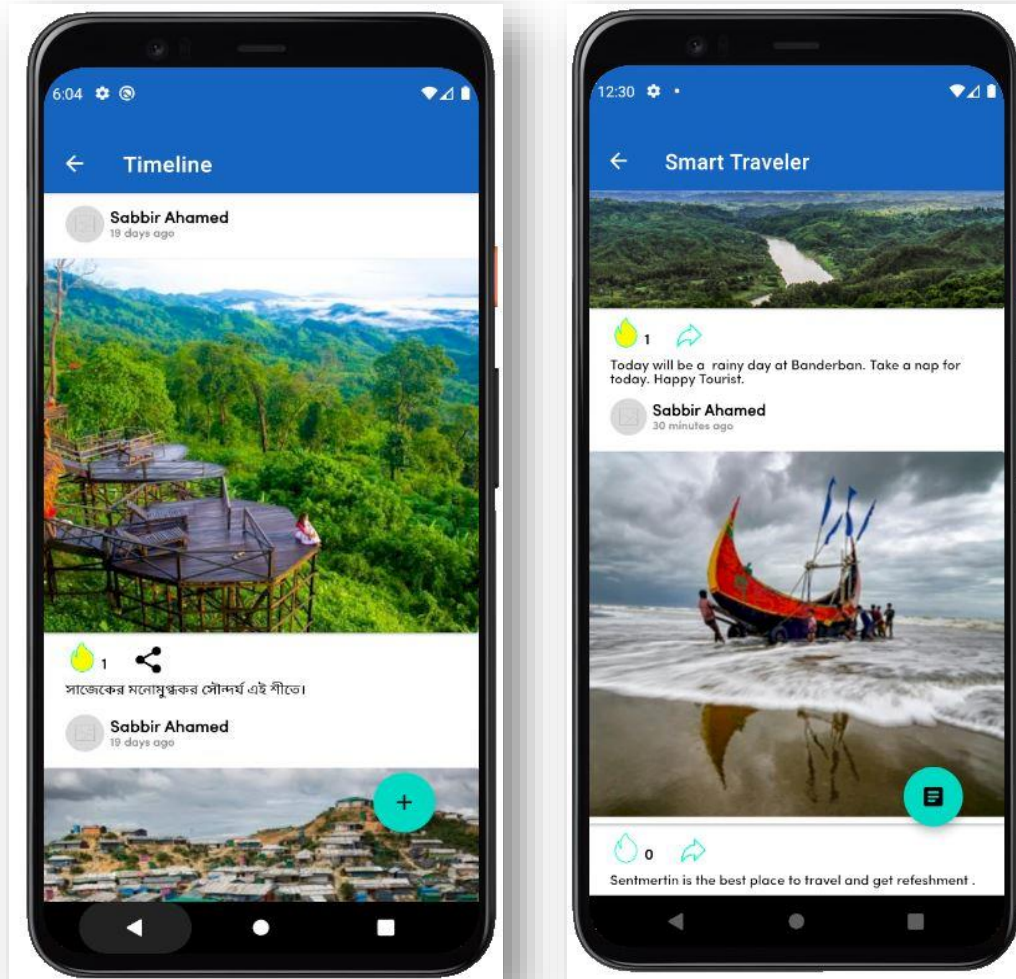


Figure 5.2.6.1: Timeline

5.2.7 Places of Bangladesh

Travelers will be able to get all the necessary information regarding any tourist spot of Bangladesh. Where to go, how to go, when to go etc. information will be available. The places will be rated according to their popularity. Travelers will also get an idea of what could be the cost to travel any place.

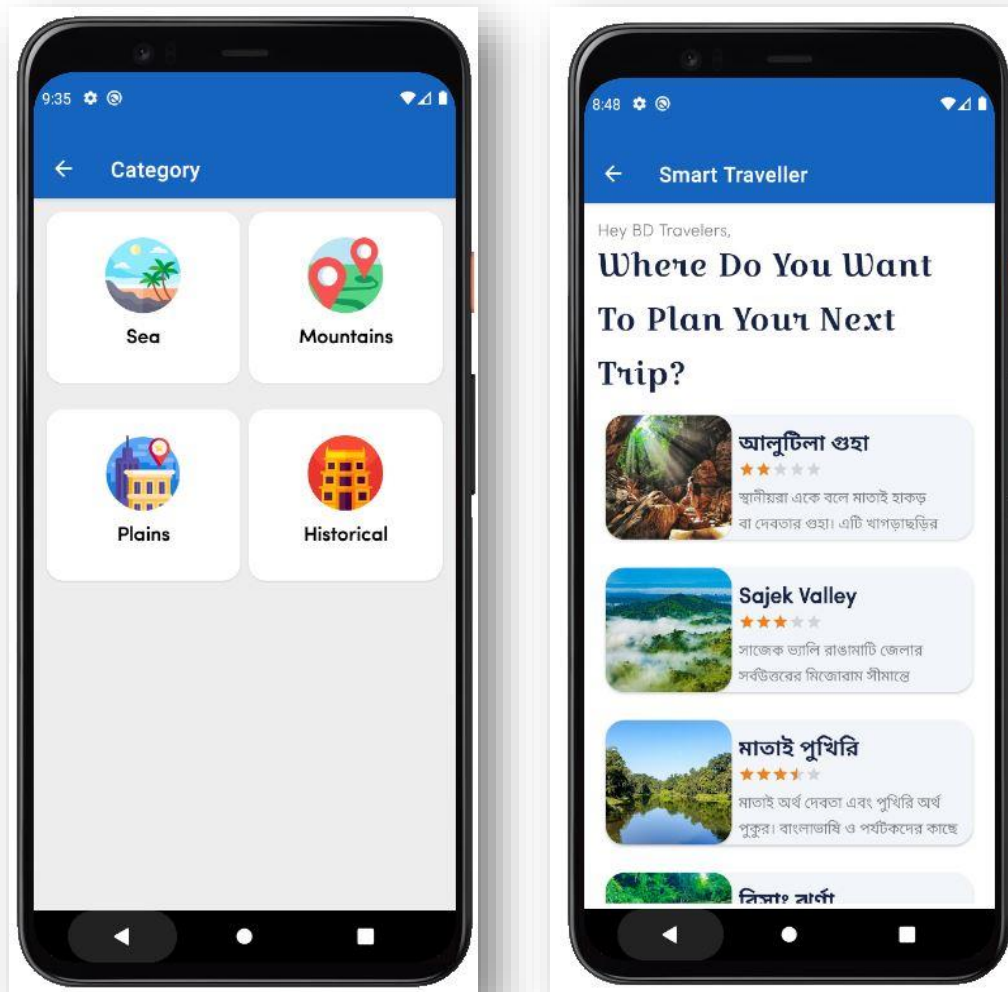


Figure 5.2.7.1: Places of BD

5.2.8 Hotels

This is the hotel's section of our application. Travelers will be able to get information about hotels with room details. They can also book any room of the hotel if they want.

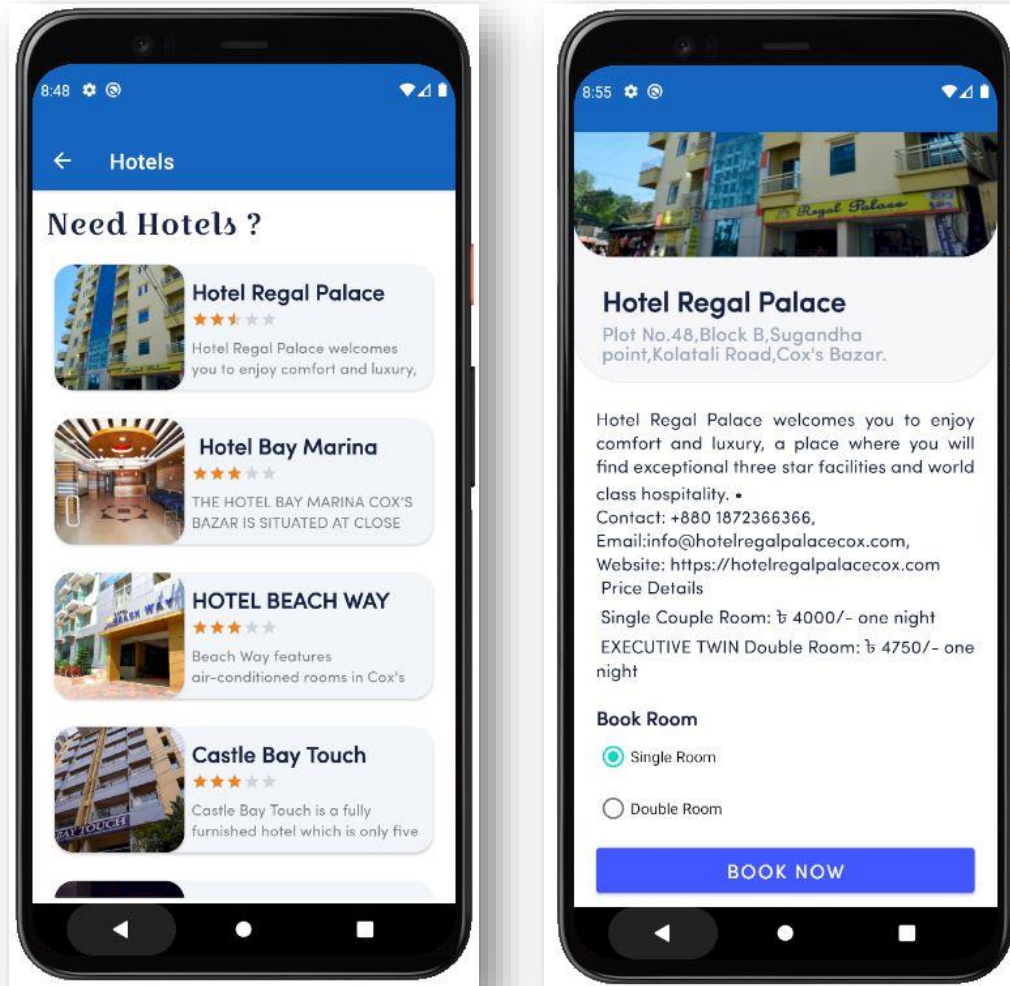


Figure 5.2.8.1: Hotels

5.2.9 Rental Services

In this section, the travelers will be able to rent any vehicle. The price is shown like – cost per hour and cost per day.

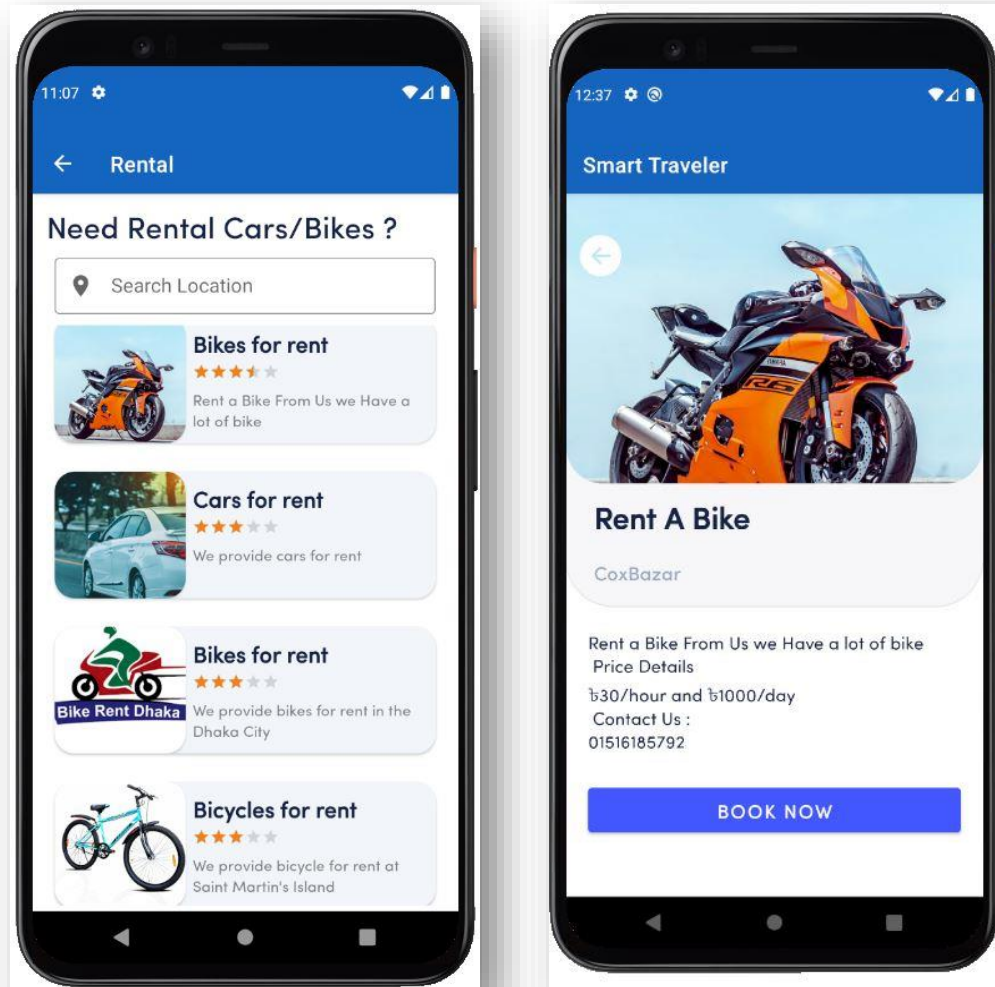


Figure 5.2.9.1: Rental Services

5.2.10 Events

In this section, travelers will be able to create a group or event and gather people or other travelers to go on a trip together. When travelers want to create an event they must include information of destination, cost per person, how many travelers can join, starting and ending date.

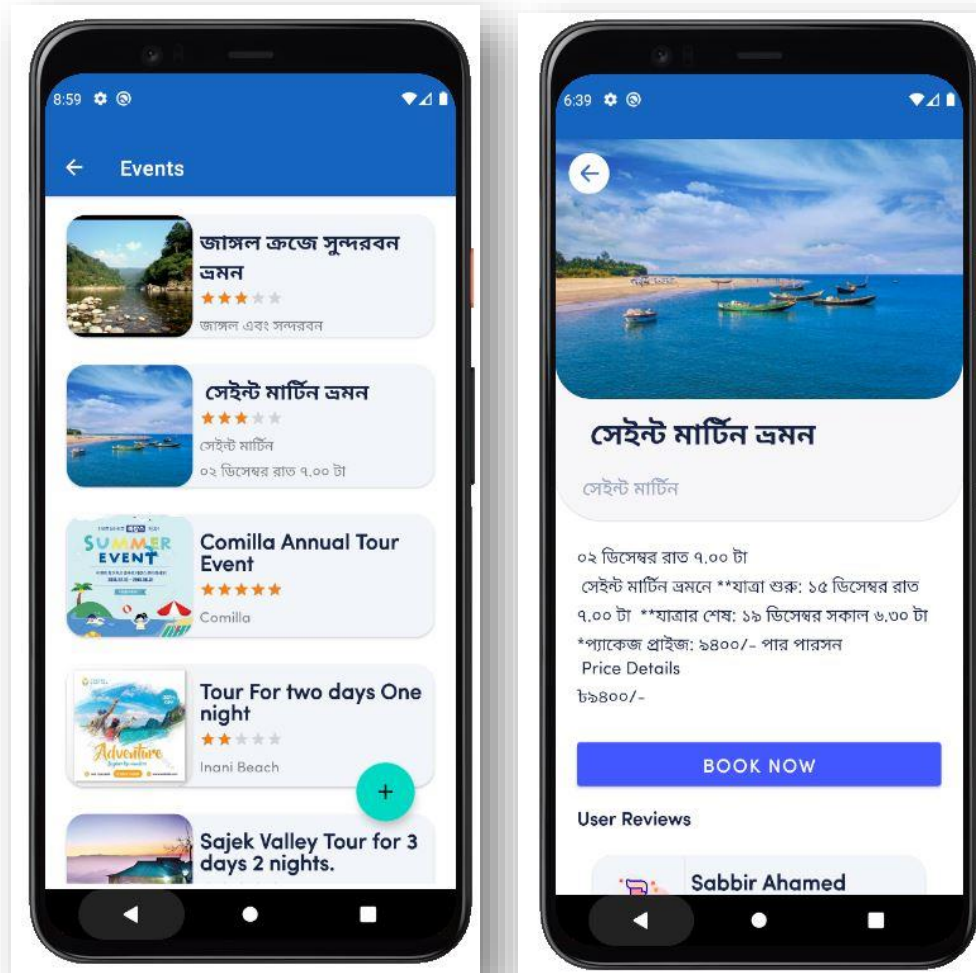


Figure 5.2.10.1: Events

5.2.11 Emergency Contacts

In this section, the travelers will have access to the emergency contacts. If something wrong or bad happens then travelers can make emergency call.

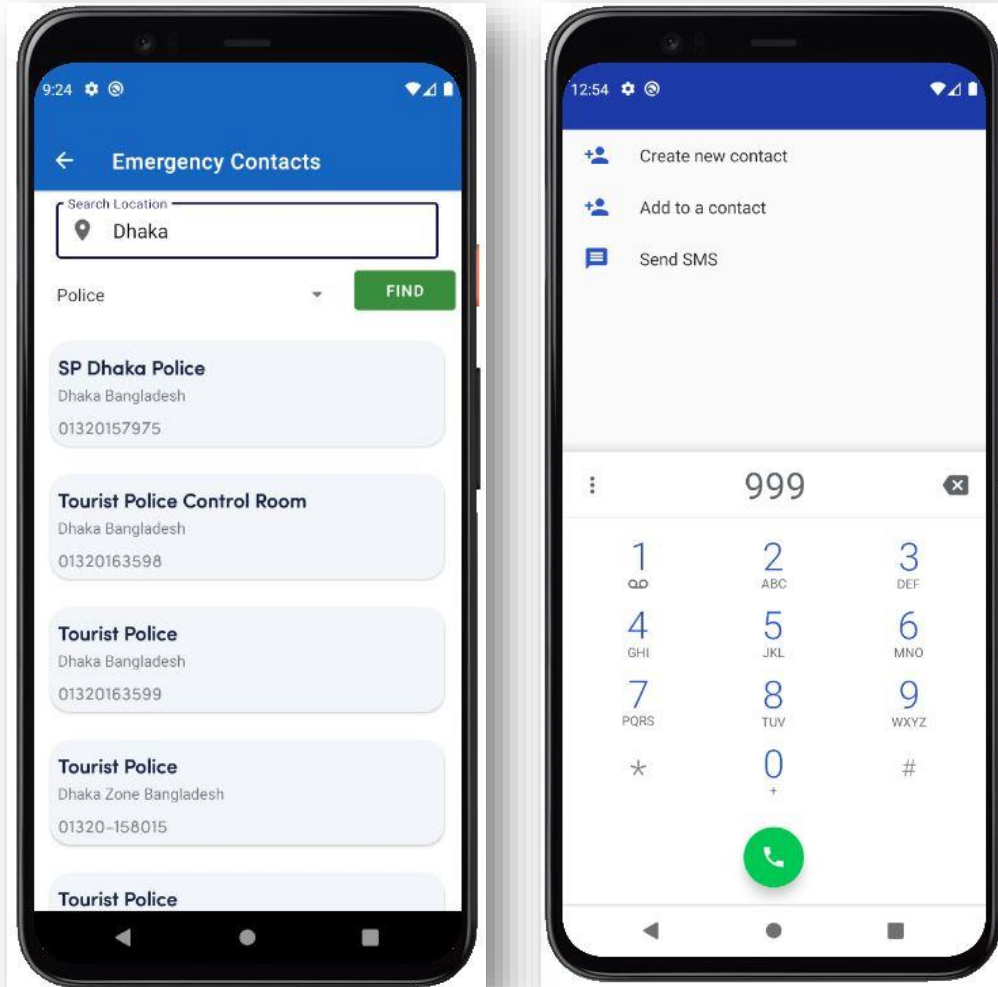


Figure 5.2.11.1: Emergency Contacts

5.2.12 Budget Tour

In this section, traveler will be able to know whether there is any budget available or not within their desired amount. To know about that, they have to select the range of their amount.

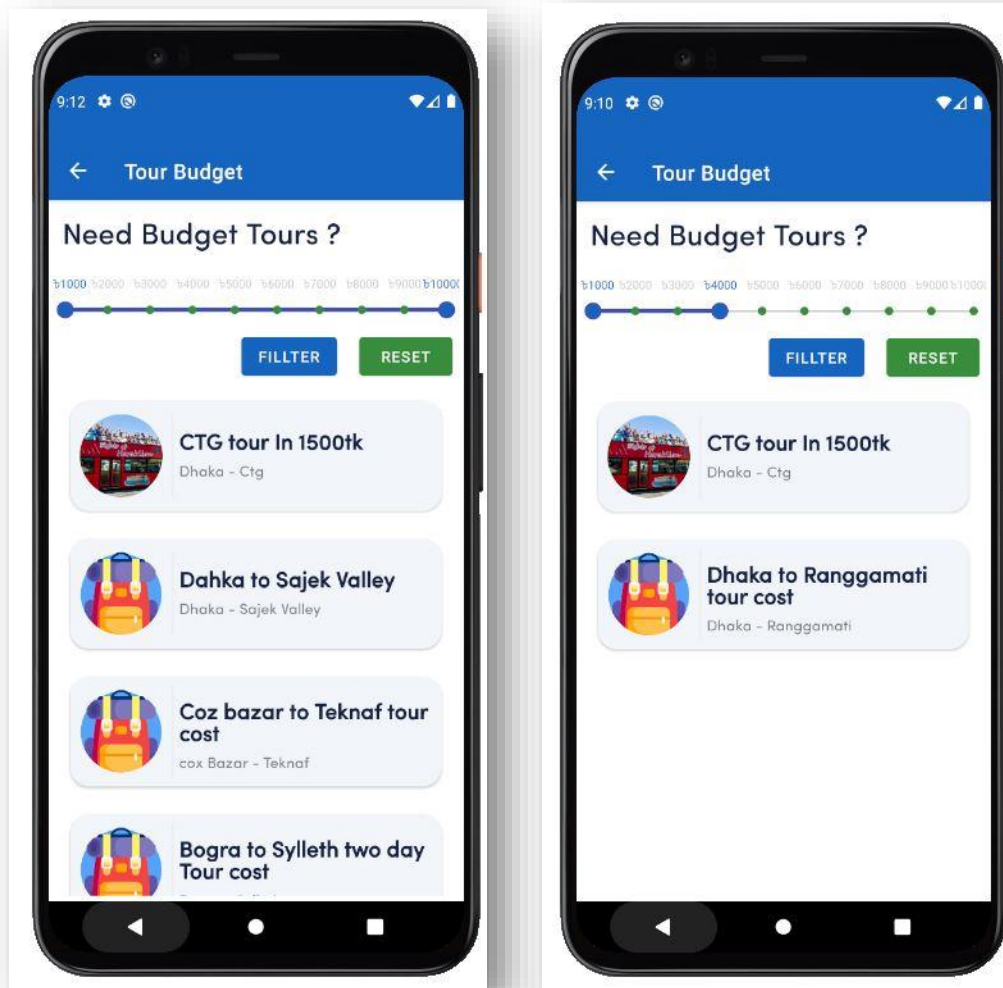


Figure 5.2.12.1: Budget Tour

5.3 Test Results and Reports

Testing an application means whether the application is working properly or not. Depending upon the results we can make the decision. Some test cases of our application with the results are shown below.

Table 5.3.1: Test Cases with Results

Test Case	Test input	Expected Outcome	Actual Outcome	Result
1. Sign up	Enter information without empty field	Successfully created account	Successfully created account	Pass
2. Log in	Authentic information	Successfully logged in	Successfully logged in	Pass
3. Password recovery	Authentic email	Recovery mail sent	Recovery mail sent	Pass
4. Sign up	Empty field	Fields cannot be empty	Fields cannot be empty	Pass
5. Log in	Wrong information	Error! Email or password does not match	Error! Email or password does not match	Pass
6. Password recovery	Wrong email	There is no user registered with this mail	There is no user registered with this mail	Pass

CHAPTER 6

CONCLUSION AND FUTURE SCOPE

6.1 Discussion and Conclusion

There are lots of travel related applications available now on Google Play Store and App Store. Because of the advancement in the technology, we are able to get almost every necessary things in our smartphone with an application format.

As everything is online based, that is why we have also implemented our application based upon online. So that travelers can get everything within the application with the help of the internet. When we implemented our idea, we thought about the travelers comfort. We have implemented a feedback section so that we could know whether the travelers are satisfied or not. Thinking about getting emergency services at an unknown place if something bad or disaster happens we thought to implement it in our application. At last, as a service provider to the people of Bangladesh, we wanted to implement the application so that the Bangladeshi travelers could be satisfied by using our android application.

6.2 Scope for Further Developments

Our further development plan is to develop an website with the name of our application. Nowadays, every company or service provider has their own website, so we also want to develop one. Beside with this, we will continuously update our android application as there are some missing features yet needs to implement. And if our users find any bug in the application then we will solve the issue. Further we want to implement a section for the outside travelers. Our concern is also for the travelers around the world who comes to visit Bangladesh. For them, we want to create a feature like interpreter who will translate language so that the people of Bangladesh and the outside traveler could understand each other. We also want to create a separate application for the service providers where they can easily add their service related information. We also want to implement a section for the vloggers of Bangladesh. Like the above-mentioned ideas, we will continuously update our application according to the travelers need.

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