

SMART TOURIST GUIDE APPLICATION

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Abstract

Bangladesh is a land of natural beauty. She has a flourishing tourism sector for the past few years. Many foreign tourists visit here to explore Bangladesh. Along with the rapid development of internet and mobile devices, tour and travel service apps have become very popular. But there is lack of proper information about tourist attractions of Bangladesh in online. Tourists have to face challenges locating nearby attractions, identifying ideal destinations, and accessing relevant information. This project presents an approachable application created to deal with these problems. It provides proper information and guideline about all possible tourist spots in Bangladesh along with accommodation, tour plan and other necessary information. To make this project more effective, a chatbot is introduced as a virtual tourist guides. However, the main goal of this project is to bring everything about tour at one place. This project helps both foreigner and Bangladeshi to explore Bangladesh easily. It will also help accelerate the contribution of tourism sector in the economy of Bangladesh.

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1 Introduction

Bangladesh offers many tourist attractions, including archaeological sites, historical mosques and monuments, longest natural beach in the world, picturesque landscape, hill forests and wildlife, rolling tea gardens and tribes. Tourists find the rich flora and fauna and colorful tribal life very enchanting. Tourist industry becomes a vital contributor to the national economy and a significant source of employment. Modern technology brings the world in our hand. So, it is a demand of this age to make tourism in Bangladesh explorable easily to the modern world.

1.1 Background

Bangladesh has emerged as a destination of natural beauty, attracting a growing number of foreign tourists eager to explore its diverse landscapes and cultural heritage. There are some tourist sites and mobile apps in online. But there is not proper information about tourism in Bangladesh. Again, all necessary information can't be found at one place. Tourists need to give more time in browsing for getting necessary information. Again, tourism in Bangladesh is growing rapidly and contributing to economy. Research on tourism and economics growth of Bangladesh [7] shows how tourism is growing in Bangladesh. That research shows a graph how tourism contributes on GDP of Bangladesh (1996-2020) which is given below-

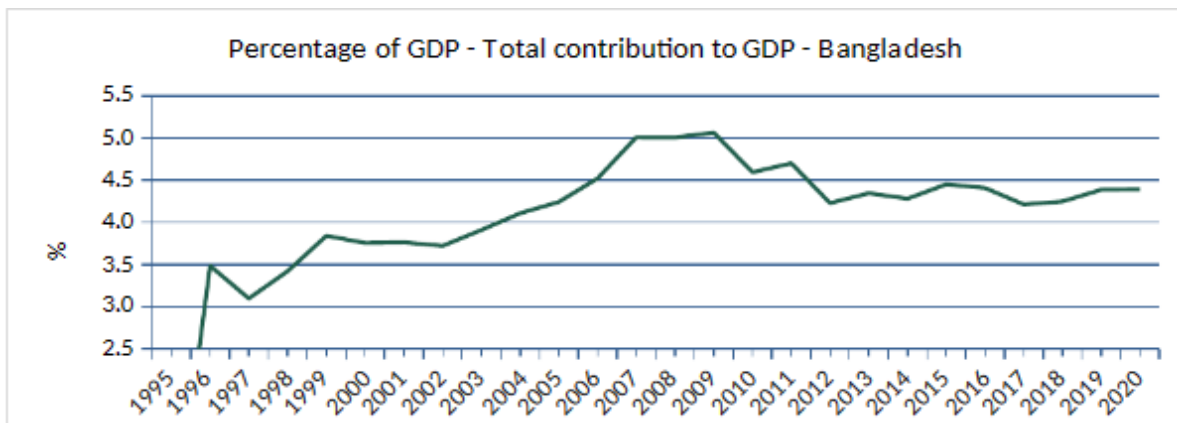


Figure 1.1: Contribution of tourism in economic growth in Bangladesh

To solve existing gap in online information and make tourism more attractive we introduce a smart tourist guide android app named “Ghuraghuri”.

1.2 Objectives

The main objectives of this project are-

- I. To create a comprehensive tourism information platform.
- II. To implement tour booking functionality.
- III. To provide tourists necessary tools.
- IV. To implement virtual tourist guide chatbot.
- V. To centralize everything about tour at one place.
- VI. To explore and introduce the beauty of Bangladesh world-wide.

1.3 Motivation:

Our idea is to develop an android application which contribute in tourism sector in Bangladesh. In Bangladesh there many tourist spots which is not properly explorable in online. So, these attractions remain undiscoverable from people. Again, we need to give a certain amount of time in browsing to collect different information. There is a website named “TripAdvisor” [2] which provide tour guidance. But it also has lack of information about Bangladesh tourism and there are many local tourist spots which are not included there. So, those things inspired us to develop something unique and give centralized tour facilities for tourism in Bangladesh.

1.4 Unfamiliarity of the problem

There are some websites and mobile application which provide tour and travel support. There are also many Facebook pages and other tourist organization which arrange tour for tourists. But different websites have different purposes. Again, it is difficult for getting proper data about Bangladesh from those websites. But as we said before, our main goal is “To Bring Everything about Tour at One place.” The uniqueness of our project are-

- It provides all necessary information about tour at a single platform.
- As various agencies can offer their tour, this app provide a common platform for tour agencies.
- It also provides facilities to buy necessary tools for tour. So, tourists don’t need to go another platform.

- It also provides facilities to write blog and share vlog at the same platform.
- The most interactive unique feature is virtual tourist guide chatbot.

1.5 Project planning

Project planning is shown in the gantt chart below (Figure 1.2)

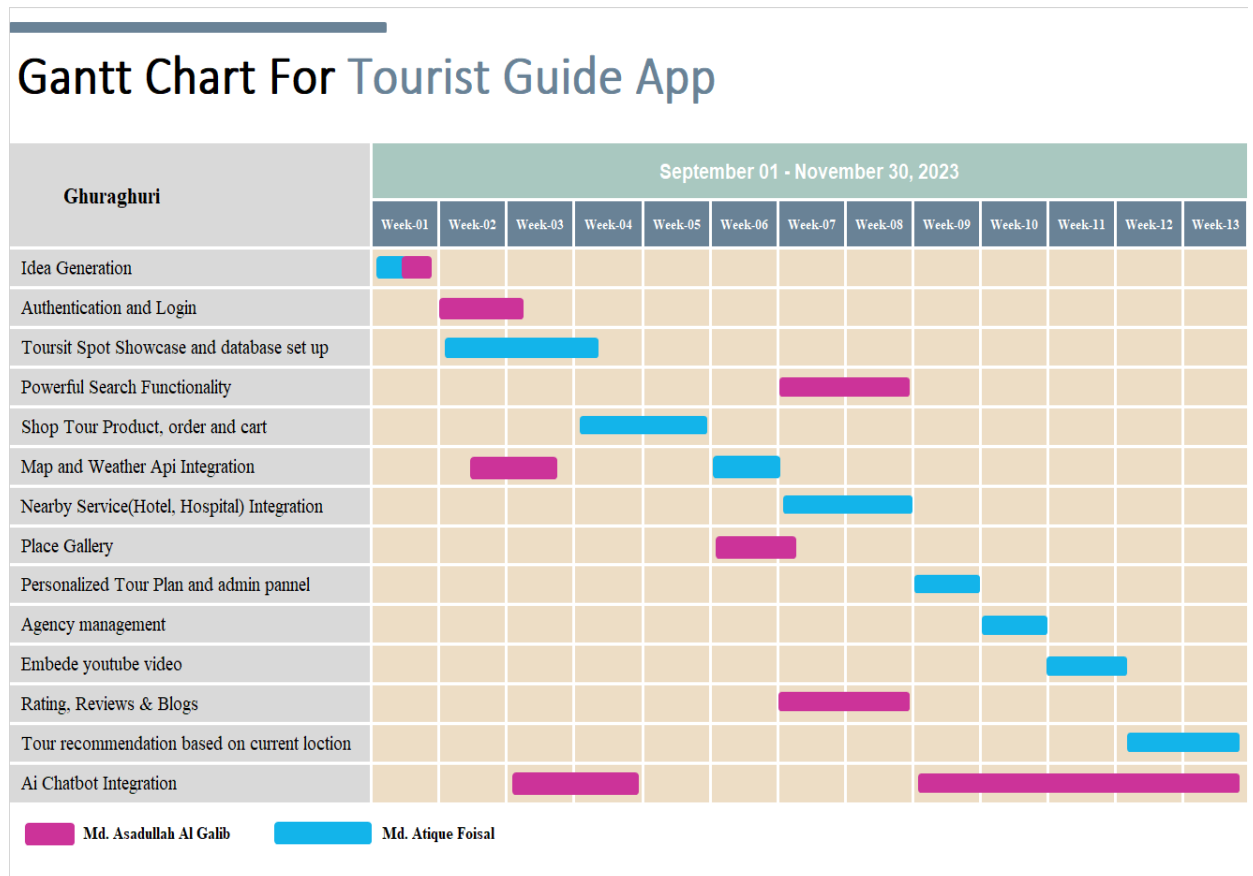


Figure 1.2: Gantt chart of project planning

2 Related Works

There are some related research papers which work on tour guide application. Their work and limitations will be discussed briefly in this chapter.

1. There is a flutter-based application [1] which give related facilities as our project. That focuses on web scrapping, image recognition and finding tour guide online. That is very good idea. But web scrapping is not efficient for our project as there is not proper data about tourism in Bangladesh in online.
2. Another related work found which works on Portugal tourism [3]. That works on only tour recommendation system based on user interest.
3. Based on the technology acceptance model (TAM) a mobile guide app is developed to provide managerial functionalities for travel agencies. [4]
4. Local tourism organizations use online and offline advertising to attract tourists. They provide real-time information through social media platforms like Twitter and Facebook. That study aims to develop a user-participating app to sustain user interest in tourism resources and attract more tourists to regional destinations. [5]
5. University campuses are large, dispersed buildings, causing inconvenience for unfamiliar students, teachers, and foreign office personnel. [6] That study focuses on only university guidance.

3 System Design

We designed our app for 3 types of users – tourist, agency and admin. We design beautiful UI. This app is user friendly. The deep analysis of the system is discussed here.

3.1 Analysis of the system

For tourist:

- ✓ Tourists can discover attractive tourist spots in Bangladesh.
- ✓ They can get necessary information including near-by hotel, restaurant, bank/atm, hospital, police station, main attractions, specialty of tourist spot.
- ✓ They can observe weather condition of tourist spot for arranging tour.
- ✓ Attractive image gallery of tourist spots.
- ✓ They can make custom tour plan.
- ✓ They can share their experience by writing blog and adding YouTube video.
- ✓ They can book tour offered by various agency.
- ✓ They can buy necessary tools for a tour.
- ✓ Virtual tourist guide chatbot helps them to quickly and conveniently get important information.
- ✓ They can give rating and review of any tourist spot.

For agency:

- ✓ Various tourist agencies can offer their tour.
- ✓ Simple dashboard tour management.

For admin:

- ✓ Only authorized person can access admin panel.
- ✓ Add tour and add product.
- ✓ Simple dashboard for managing order of tourist.

Optimized searching:

Tourists can search places by name, place type and city-name. An algorithm is designed that shows search result even if searched text mismatched 30% with actual text. A flow chart is given below to demonstrate this algorithm (Figure 3.1).

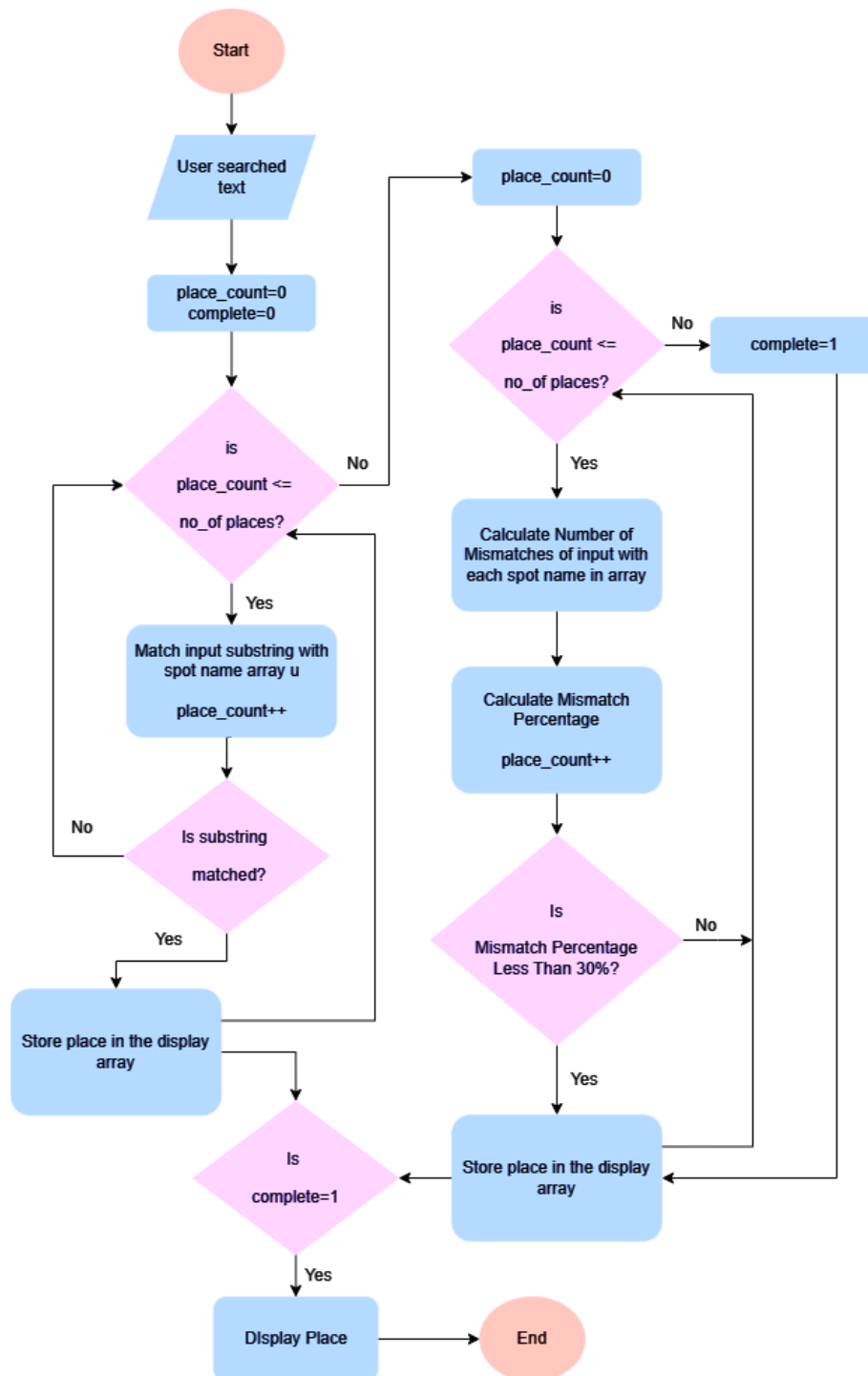


Figure 3.1: Flow chart for optimized searching

Map activity:

Map activity is used for displaying attractions, hotel, restaurant, hospital and police station in map view. Here google map API is used. The name of places are retrieved from database and search in the geocoder class. If the place is found, marker is put on the location at map view. Pseudocode is given below (Figure 3.2).

```

1 for each spot_name in spot_name_list:
2     try:
3         name = spot_name
4         addresses = geocoder.getFromLocationName(name, 1)
5
6         if addresses.size() > 0:
7             address = addresses.get(0)
8             place = Latlng(address.getLatitude(), address.getLongitude())
9
10            markerOptions = MarkerOptions()
11                .position(place)
12                .title(name)
13
14            mMap.addMarker(markerOptions)
15            mMap.animateCamera(CameraUpdateFactory.newLatLngZoom(place, 13))
16        else:
17            showToast("Place not found")
18
19    except IOException as e:
20        e.printStackTrace()
21

```

Figure 3.2: Pseudocode for map activity

Embedding YouTube video:

To embed YouTube video in android we use this [android-youtube-player](#) library. To implement this video id is required. Videos are shown in recycler view. Full screen facility is also included.

Weather information:

We use Open Weather API to get real-time weather information. Here Json parsing is required. So, we use [volley](#) library. Pseudo code is shown here (Figure 3.3)

```

1 url = "https://api.openweathermap.org/data/2.5/weather?zip=" + zipCode + ",
2 BD&appid=9dd5ca196deda19d4cbf43066a21c4f2"
3 queue = new RequestQueue()
4 request = new JsonObjectRequest(
5     method=GET,
6     url=url,
7     jsonRequest=null,
8     responseListener=function(response) {
9         try {
10             object = response.getJSONObject("main")
11             temp = object.getString("temp")
12             feels = object.getString("feels_like")
13             hum = object.getString("humidity")
14             t = int(Double.parseDouble(temp) - 273.15)
15             temp = t + "°C"
16             t = int(Double.parseDouble(feels) - 273.15)
17             feels = "Feels like: " + t + "°C"
18         } catch (Exception e) {
19             e.printStackTrace()
20         }
21     })
22 queue.add(request)

```

Figure 3.3: Pseudocode for weather API.

Tour recommendation:

Based on user's current location tourist spot is recommended from database. To use this facility user needs to give location access.

Chatbot:

A local server is created using python flask. When user gives input message this server processes this message generate response from firebase database. Then dialog-flow handle the response generated by server and convert is to Json response. This Json response is processed in android app and display to the user.

Use case diagrams:

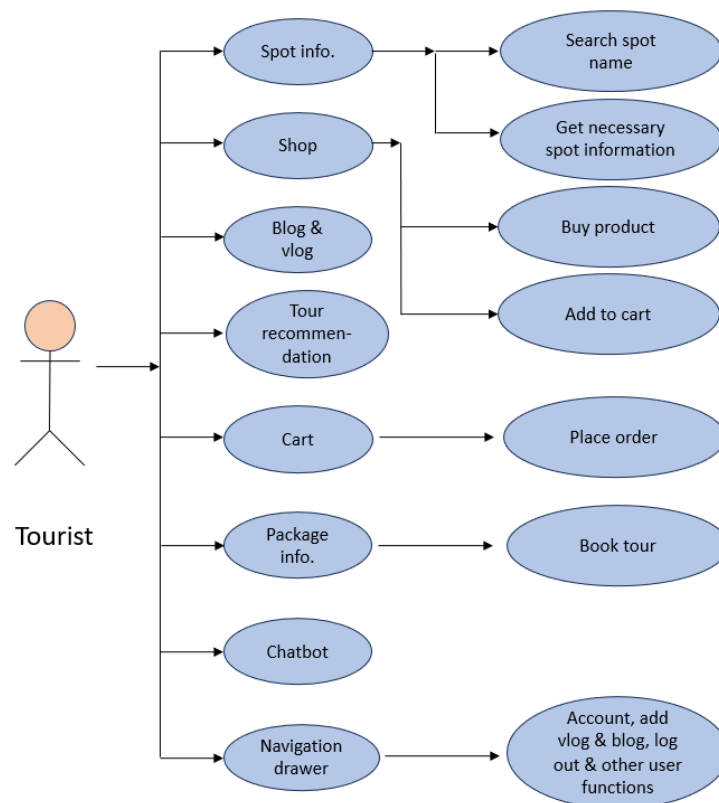


Figure 3.4: Use case diagram for tourist

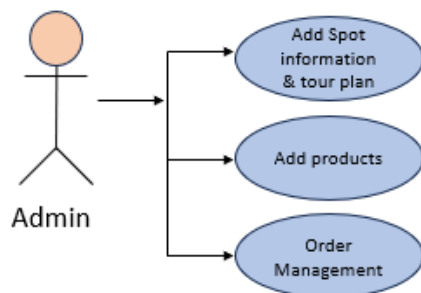


Figure 3.5: Use case diagram for admin

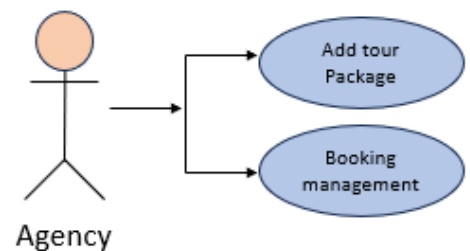


Figure 3.6: Use case diagram for Agency

The diagrams shown in the Figure 3.4, 3.5, 3.6 demonstrate what tourist, agency and admin can do using this application.

3.2 System architecture

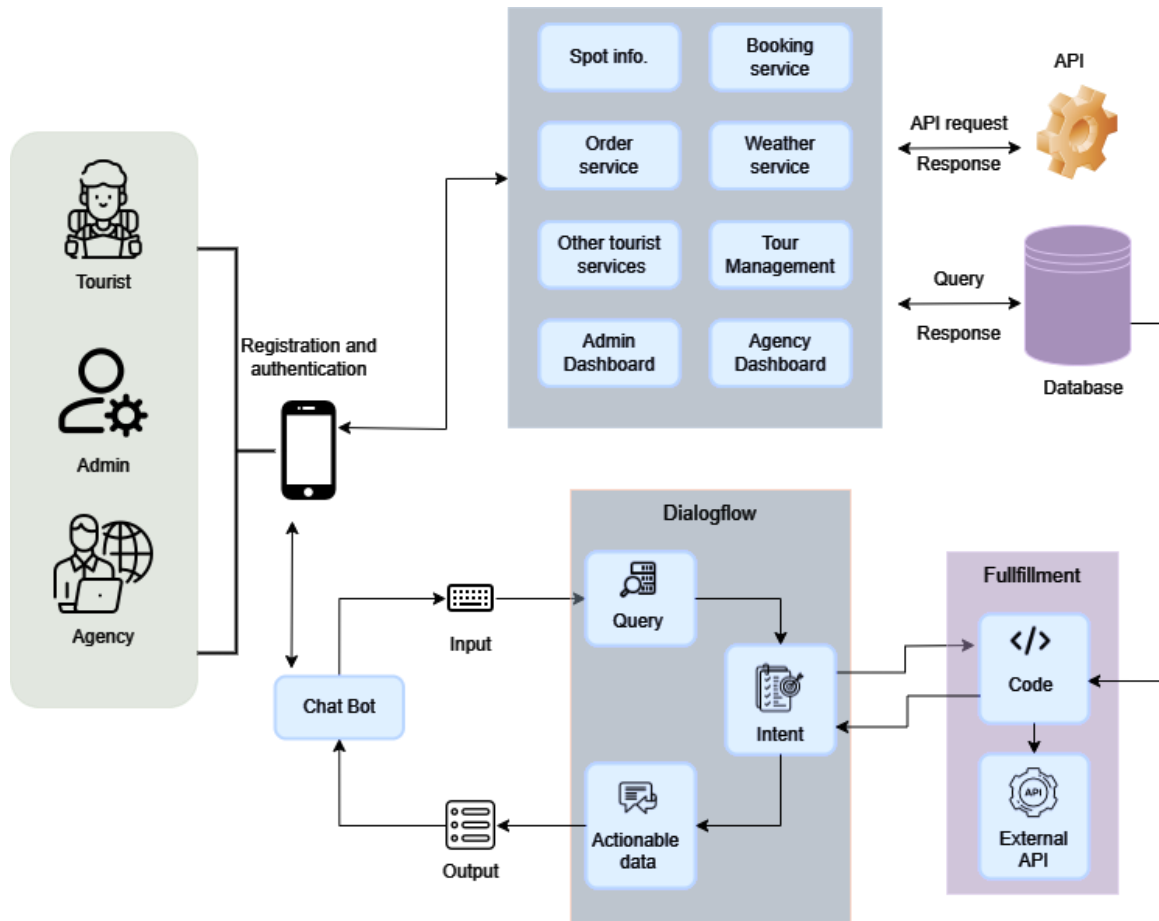


Figure 3.7: System architecture

The complete system is shown in the Figure 3.7. Tourist, agency and admin manage their work using only single app. System will work according to their role defined at the time of sign in. Dialog flow service is used to implement chatbot. When user give input, a request is sent to dialog flow through server and then it fetched data from database and response according to the request.

3.3 Tools used

This is an android application. Some libraries, IDE and other necessary tools are required for this project. The tools required for this project are described below.

3.3.1 Android Studio

Android Studio is the official integrated development environment (IDE) for Android app development. Based on the powerful code editor and developer tools from IntelliJ IDEA, it has a fast and feature-rich emulator. It gives powerful suggestions. It has extensive testing tools and frameworks.

3.3.2 Java

This project is fully built using java programming language.

3.3.3 Firebase

Firebase is used for online database. The services used from firebase are-

1. Authentication -> It is used for sign up and sign in.
2. Realtime database -> To store all necessary information in database.
3. Storage -> To store images.

3.3.4 API

The API used for this project-

1. Google map API -> To access google map service.
2. Open weather API -> To implement weather forecast.

3.3.5 Libraries

Other libraries used for this project is –

1. [Glide](#) -> It is used for image management.
2. [Android-Image-Slider](#) -> It is used for image slider.
3. [volley](#) -> It is an HTTP library that makes networking for Android apps easier and, most importantly, faster.

4. [android-youtube-player](#) -> It is used for embedding YouTube video in android app.

3.3.6 Dialog flow

Dialog flow is a comprehensive platform for developing chatbots, voice bots, and virtual agents using natural language understanding and Google AI. It is used in this project to implement chatbot.

3.3.7 Python flask

Flask is a micro web framework written in Python. It is classified as a microframework because it does not require particular tools or libraries. It has no database abstraction layer, form validation, or any other components where pre-existing third-party libraries provide common functions. We use this tool for making a local server for the chatbot.

4 Project Implementation

The step-by-step project implementation will be shown here

4.1 System implementation

In this section, we discuss how features of this system can be accessed and how user can interact with this application.

For tourist:

Access spot information: All information is saved in firebase real-time database. To store images firebase storage service is used. When users are looking for spot information, data will be retrieved from firebase database and displayed in recycler-view or another respective field in android UI. How to access information is shown in the Figure 4.1.

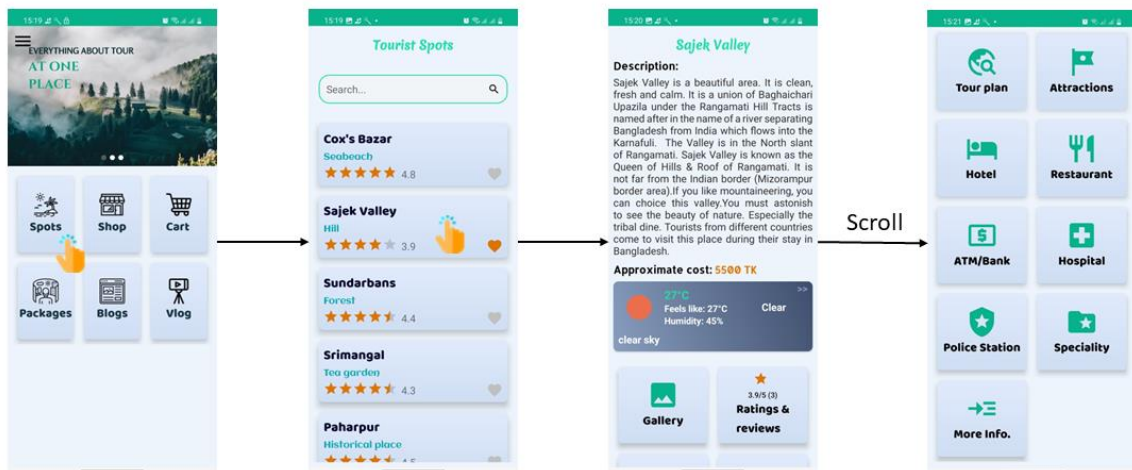


Figure 4.1: How to get spot information.

Adding videos: Users can share their experience by uploading videos. They can embed you-tube videos in this application by using id. To handle you-tube videos functionality a dependency 'com.pierfrancescosoffritti.androidyoutubeplayer:core:12.1.0'. All the video information is saved in firebase rea-time database. A custom adapter class is used to set videos in recycler-view. How a user can save videos is shown in Figure 4.2.

You can find video id from the video link. Example-
https://www.youtube.com/watch?v=DGOOFY2p_M0

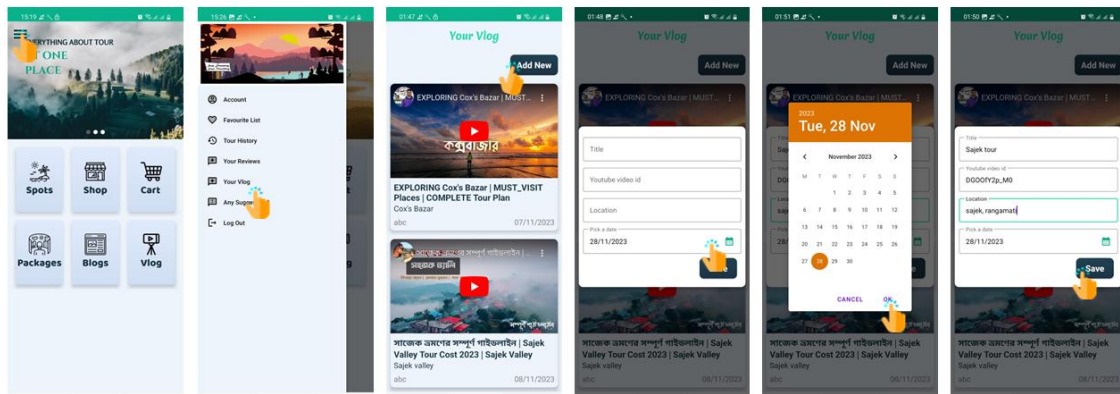


Figure 4.2: Adding you tube videos.

Writing blog: Users can also share their experience by writing blogs. Their blogs are saved in real-time database. A custom adapter class is used to set blogs in recycler-view. How a user can write blog is shown in Figure 4.3.

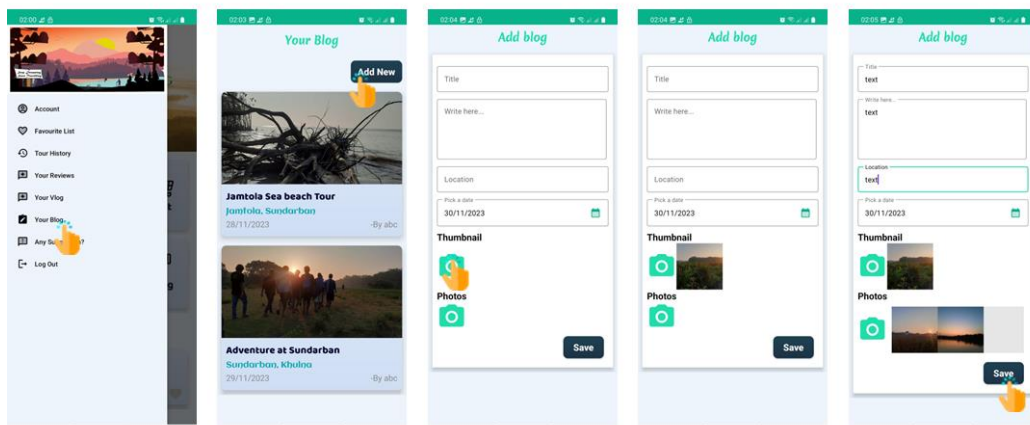


Figure 4.3: Blog writing.

Buy product and add to cart: This project also provides a feature to buy necessary tools for going to a tour. It's like an e-commerce application feature. Product information, customer orders, cart management and all related data are saved in firebase real-time database. Admin can handle order process. Figure 4.4 shows how a user can order something and add product to cart.

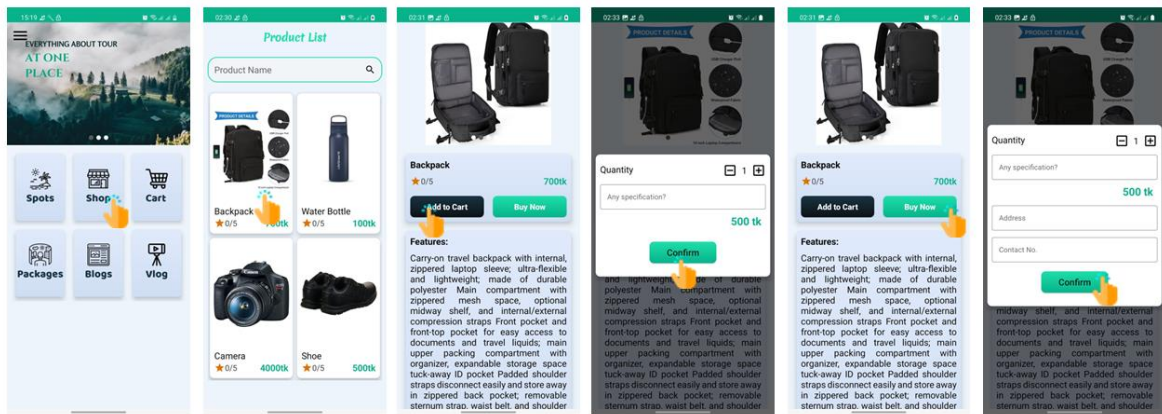


Figure 4.4: Product buying and adding to cart.

Book tour: Users can book their preferred tour package. Each information is saved in firebase database. Custom recycler-view adapter is used to show packages in a list. Respective agency can handle tour booking. Figure 4.5 shows how a user can book tour.

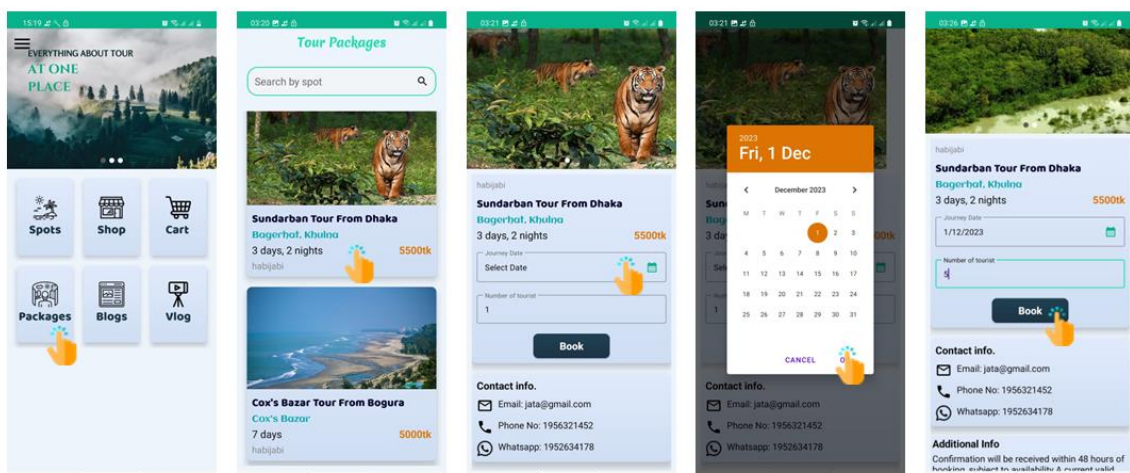


Figure 4.5: Tour booking.

For Agency:

Add Package: There are edit-text fields where an authorized person of the agency can give necessary information. There is image picker to pick images from device. All the information is saved in firebase database. Figure 4.6 shows, how a user can add tour packages.

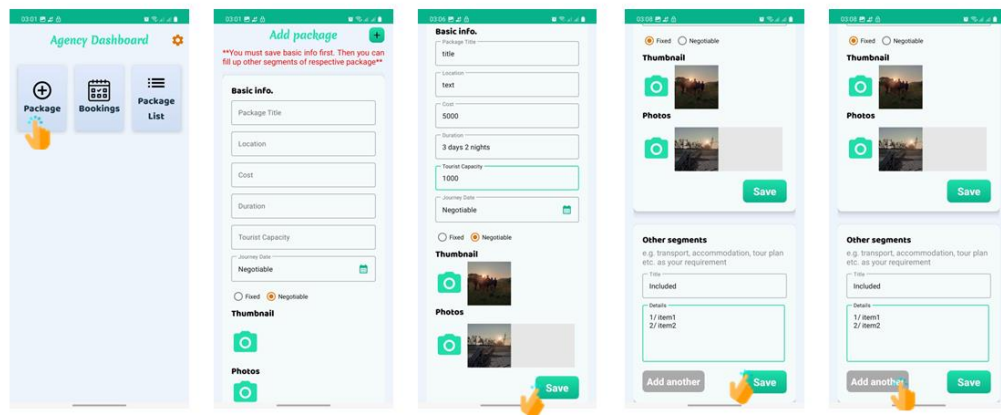


Figure 4.6: Adding tour package.

For Admin

Add spot info: Only admin has access to store tourist spot information. At first, he needs to fill up basic information. He can select images using image picker and add other segment. After saving basic information he can save tour information. Figure 4.7 shows how an admin can save store information and tour plan.

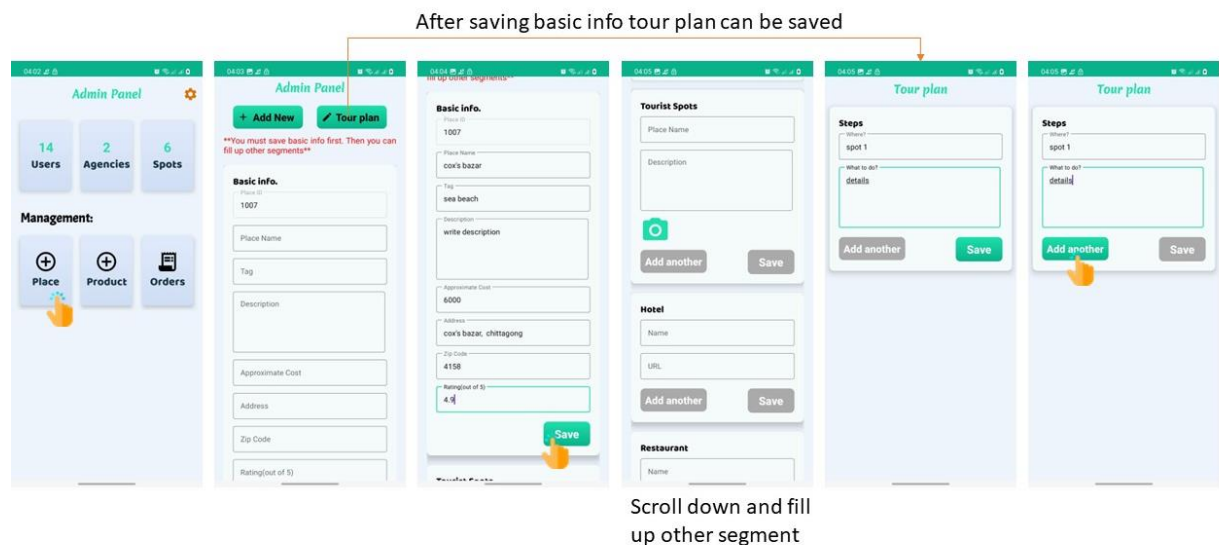


Figure 4.7: Adding spot Information and tour plan.

4.2 Morality and ethical issue

The references used here is properly cited. This report is free from plagiarism. We don't use any third-party API to collect data and enrich our database. Tourist spot information is added manually. As this project uses firebase authentication user data is secured.

4.3 Socio-economic impact and sustainability

- ❖ **Boost economies:** This project gives facilities tourist to discover and explore new destination. It increases tourism which leads to greater revenue for local business as well as national economy.
- ❖ **Community engagement:** It provides facilities to share user-generated content such as, blogs and videos which attracts more tourist. This creates sense of community among tourists as well as encourages individuals to share their experiences and insights.
- ❖ **Engage tourist agencies:** This project creates a market place for various tourist agencies to offer their tours. It creates a healthy competition among agencies to support tourists for making tour more enjoyable.
- ❖ **Safety and security:** This platform provides information about location of hospitals, police station and other essential services that enhance the safety and security of tourists.
- ❖ **Modern technology adoption:** The inclusion of virtual tourist guide chatbot encourages tourist to adopt modern technology and increases efficiency of work.
- ❖ **Job facilities:** As this project contributes in growth of tourism, it creates job facilities in various sectors. Again, this project needs man power to gather actual data and management. So, it may create job opportunities for tourist guides.

4.4 Financial analyses and budget

This project uses free API and libraries. That's why we can't be able to implement some attractive and more dynamic features. For cost estimation only elapsed time can be come into consideration. It Takes around 3 months to complete this project. If any company or Government take initiative to implement this project, an approximate cost estimation shown in the Table 4.1, will help them in budget management.

Table 4.1: Financial analysis and budget of this project

Types of cost	Budget(tk)
Developer Cost	5,00,000 – 10,00,000
Database Management	1,00,000 – 2,00,000
UI Design	80,000 – 1,00,000
Data Collection & Chatbot Training	15,00,000 – 20,00,000
Development Tools & API	50,000 – 75,000
Marketing Cost	10,000 – 20,000
Project management tools	50,000 – 1,00,000
Miscellaneous	5,000 – 8,000
Total:	22,95,000 – 35,03,000

5 Conclusion

This project helps tourists to explore Bangladesh easily. It also helps people who want to know some information about any tourist spot Bangladesh. It centralizes diverse needs of tourist at one place. Proper marketing policy and investment can make this project more efficient, attractive and introduce Bangladesh all over the world. However, it takes a lot of hard work and we faced some challenges to execute this project and this is not the final version. We have some plan to do some update in future.

5.1 Conclusion and challenges faced

As we don't use any third-party API to gather tourist spot information, we need to gather information manually. This is very difficult to gather huge information. So, we collect few spot information for project showcase. To implement chatbot we need to face some difficulties. We can't find any proper dataset to train chatbot. To integrate it with android project we need to face some errors.

5.2 Future work

- Now our database is limited. We need to gather more information to represent proper information. We will work on it in future.
- Our chatbot is now in basic level. It can be updated further.
- A virtual assistant can be implemented which can communicate with tourists to support real-time guide facilities.
- Real time transportation information can be implemented from which tourist can know how to go desired destination from any location.
- As we use free google map API, the paid map services can't be accessed such as nearby location.
- Now our database is limited. We need to gather more information to represent proper information. We will work on it in future.

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