MOBILE APP - DHAKA CITY GUIDE

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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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DHAKA, BANGLADESH

DECEMBER 2019

APPROVAL

This Project titled **"DHAKA CITY GUIDE"**, submitted by Saniyat Al Ahmed, Tanvir Parvez and Priya Rani Dey 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 11/12/2018.

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DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Dr. Syed Akhter Hossain, Professor and Head, Department of Computer Science and Engineering**, 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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ACKNOWLEDGEMENT

First we express our heartiest thanks and gratefulness to almighty God for His divine blessing makes us possible to complete the final year project successfully.

We really grateful and wish our profound our indebtedness to **Dr. Syed Akhter Hossain, Professor and Head**, Department of CSE Daffodil International University, Dhaka. Deep Knowledge and keen interest of our supervisor in the field of Android Mobile Application Development to carry out this project. His endless patience ,scholarly guidance, continual encouragement, constant and energetic supervision, constructive criticism, valuable advice ,reading many inferior draft and correcting them at all stage have made it possible to complete this project.

We would like to express our heartiest gratitude to the Almighty Allah and **Dr. Sheak Rashed Haider Noori, Associate Professor and Associate Head**, Department of CSE, for his kind help to finish our project and also to other faculty member and the staff of CSE department of Daffodil International University.

We would like to thank our entire course mate in Daffodil International University, who took part in this discuss while completing the course work.

Finally, we must acknowledge with due respect the constant support and patients of our parents.

ABSTRACT

With the development of time and information technology, it has become more practiced to use mobile apps for discovering cities. This project **"Dhaka City Guide"** an Android based mobile application is developed for the greater support of the mass people, tourists and others. They will have a proper guideline to roam around our beloved Dhaka city. All the important places, hospitals, government offices, educational institutions, hotels and restaurants, amusement parks etc. are enlisted in the application along with brief information and embedded google map for easier navigation. The detailed contact info, emails, websites is also included for each place. The application has a user friendly user interface. Mass people will be easily able to navigate through the application and get the precise information they need. The project is developed with the help of Android Studio and Firebase has been used as the core database for the application. With this application, we hope the people will be much benefitted and find their destination very easily. They don't have to ask people again and again for a particular location or roaming in the same place repeatedly and not finding what they are looking for.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Dhaka is a city of historical place with natural beauty which is visited by many travellers from different countries. The reason of travellers visit this place is diverse. One of the most dominant reason is tourism and also have other reasons to travel the country such as educational purpose, business purpose, political reason, official and so many. In his time of their stay, they face some problem such as understanding the language and transport information. By this android application we want to give them an online solution for this problem. With this application they can find all the necessary information about various places of the city.

1.2 Motivation

Day by day the numbers of tourist are increasing. They travel Dhaka for many reasons such as religious, job, business, travel, and research etc. The global economy of this industry increase strongly, generating an estimated 11% of the GDP and employing 300 million of people and serving 800 million visitors worldwide which is increase every single year. For serving people with the general information concerning various places over the internet we made this application. Basically this application is helping the newcomers and visitors.

1.3 Objectives

- Navigate travellers to the tourist site, hotels, restaurants, hospital, amusement parks, institutions, police stations etc. easily.
- Serve list of service with their information like short description and their address, contact number, website.
- Save effort and time for searching.
- Use Google maps for navigation to places, which is one of the main feature in the implementation of this project.

1.4 Expected Outcome

This app will have a wealth of knowledge about the areas where the travellers want to visit. It will make the users able to find any place with a short time and effort. We will discuss here what features or goals we have. A lot of information will be added on this project. This time it's only made for Dhaka after that we would like to add whole Bangladesh in our application. Users can use the app and access all its features. While the admins can add their new places and their important information. We divide our next features into some groups:

- Information guide
- Navigation guide

1.5 Report Layout

Chapter 1: Introduction

In this chapter we have discuss about the objective, motivation and expected outcome of our project. Next follows the report layout.

Chapter 2: Background

Here we also discuss about the state of our project, related work, similarity the other candidate system and the challenges of the project.

Chapter 3: Requirement specification

Here we discuss about the functional requirement and non-functional requirement which was used in our project.

Chapter 4: Design Specification

Here we discuss about all the design of our project like front-end design, back-end design, Interaction design, UX and the implementation of our requirement.

Chapter 5: Implementation and Testing

Here we discuss about the database and its implementation, front-end design and interactions, test result of that project.

Chapter 6: Conclusion and Future Scope

Future development is discussed in this section which is more important to make government commitment to the vision "DIGITAL BANGLADESH".

CHAPTER 2

BACKGROUND

2.1 Introduction

One of the most important things of a project is background. If we want to finish a project properly we have to learn about the background issues. We have to study more and more about related or not related topic and research articles. Background information of a project has the relevant and related tropics of a project. It also discusses all of the problem and explanation. It helps that person who read that paper with all the logical idea.

2.2 Related Work

There are some applications we found which are created on the basis of our project but not same as ours. Some examples are, GPS Navigator City Guide [1], Guides by Lonely Planet [2], Visit a City [3], City Guides Offline [4], Foursquare City Guide [5], City Guide Demo [6]. Here are the front views of their apps:

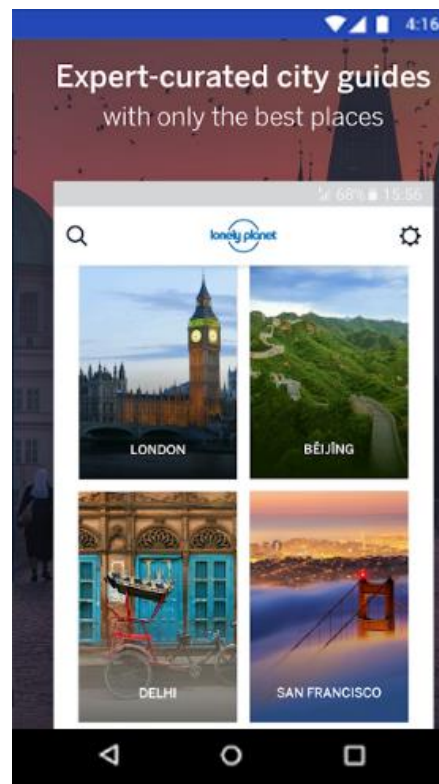
Figure 2.2.1: GPS Navigator City Guide   Figure 2.2.2: Guides by Lonely Planet
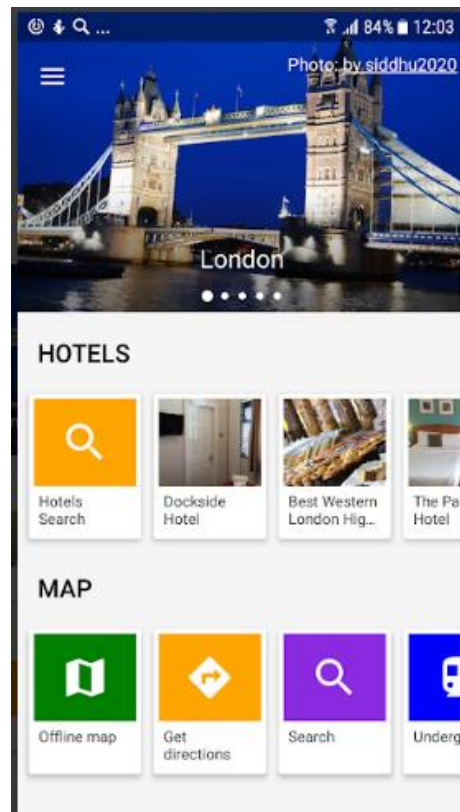
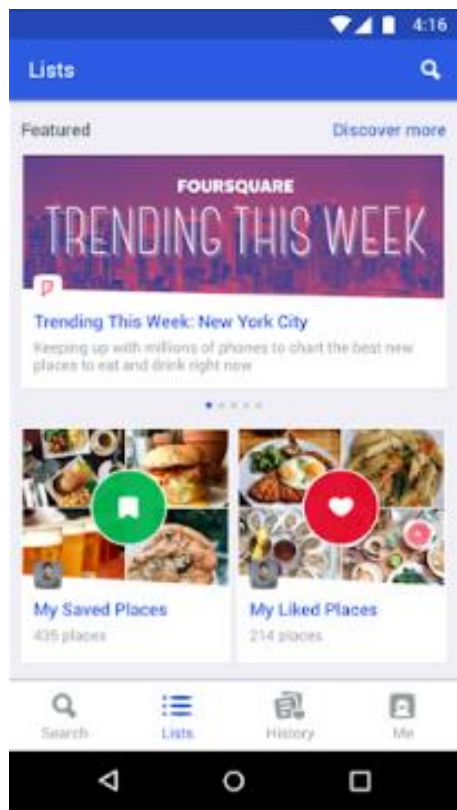Figure 2.2.3: Visit A City

Figure 2.2.4: City Guides Offline

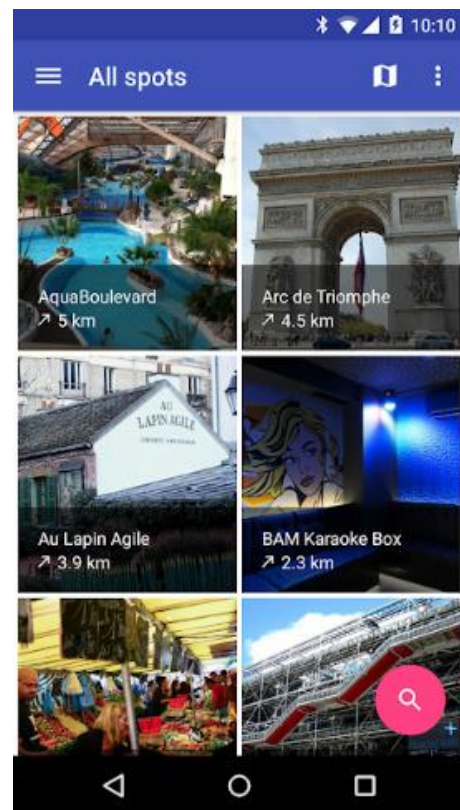Figure 2.2.5: Foursquare City Guide

Figure 2.2.6: City Guide Demo

2.3 Comparative Studies

The other applications of city guide are too helpful for new comers but in our country we have nothing like this. The complexities of finding a place with Google map are so hard. We modified that for everyone. We make a systematic framework which is more comfortable for new comers. We made a simple solution for major problem. But there have no security issue in our application. We want to improve our system with a huge number of resource-allocation. The visitors can find more specific result when they want to go any place inside Dhaka. Our system is fully controlled by admin but in future we make some user efficiency for improving more.

2.4 Scope of problem

We faced some problem when we want to complete our project. Some problems are too difficult while others are so easy for solving. After solving all kinds of problem finally we got the proper system. Here some problem which we are faced to improve this system:

- To know the actual demand of new comers, what they look for
- To talk with the travellers for collecting their demand information
- To adjust Google map with our application
- To collect all the data for our database
- To verify our application on play store which was a big challenge for us
- To make something special so that people get interested in our application and enjoy the interface

2.5 Challenges

To provide a best solution of city insider we have faced some challenges. Those are mentioned bellow:

- The feature and the UI design
- User friendly process
- Make ensure users security
- Adding embedded Google map to it
- Giving all useful information
- Giving a multi-authentication system

CHAPTER 3

REQUIREMENT SPECIFICATION

3.1 Business Process Modeling

Business process model (BPM) is a tool for building a flowing diagram. It creates a model that demonstrates the appropriate flow of data from the start to end. The capability of the project can be described by BPM. Basically all the engineering projects possess a business process model. Before starting the work of implementation of the project, a properly developed business process model helps to boost the speed of work. A business process model flexibly present the project to both the user and developer.

In our project the places are the entity. All the necessary information of various places of Dhaka city are categorized in the application. The application will bring the desired place in front of the user after a proper search. Regardless, the user can navigate through different sections of the application and get the required information by themselves.

3.2 Requirement Collection and Analysis

In all the real life projects, the first and foremost task is to specify the necessary requirements. Without the requirement of a project, a clear graphical views can't be drawn. And it is very important for the smooth conduct of work for any project. The work can go hazy in the midway if the requirements are not analyzed properly. And in turns, all the work and efforts can go in vein. So to build a successful project, a successful requirement collection and analysis is a must.

On our project, requirement collection was a major part. We had to interact with the common people, foreigners and visitors to collect the requirements. We had to find out the information they want and frequently need in a city guiding application. We divided our project into several parts as we have various places categorized in several sections. We also had to get in contact with some particular places in person to find out the exact information. After gathering the requirements we analyzed them. And got a proper walkthrough for starting the implementation of the project.

3.3 Use Case Modeling and Description

A use case is a list of actions or event steps that defines the interactions between and actor and a system to achieve a goal. In software and systems engineering it is basically

called use case modeling. As per the Unified Modeling Language, the user is called an actor, which can be either a human or another external system. [7] In this application, the users (local people, visitors, foreigners) and the admins will be the actor and the system will provide all the necessary information of various places as they access.
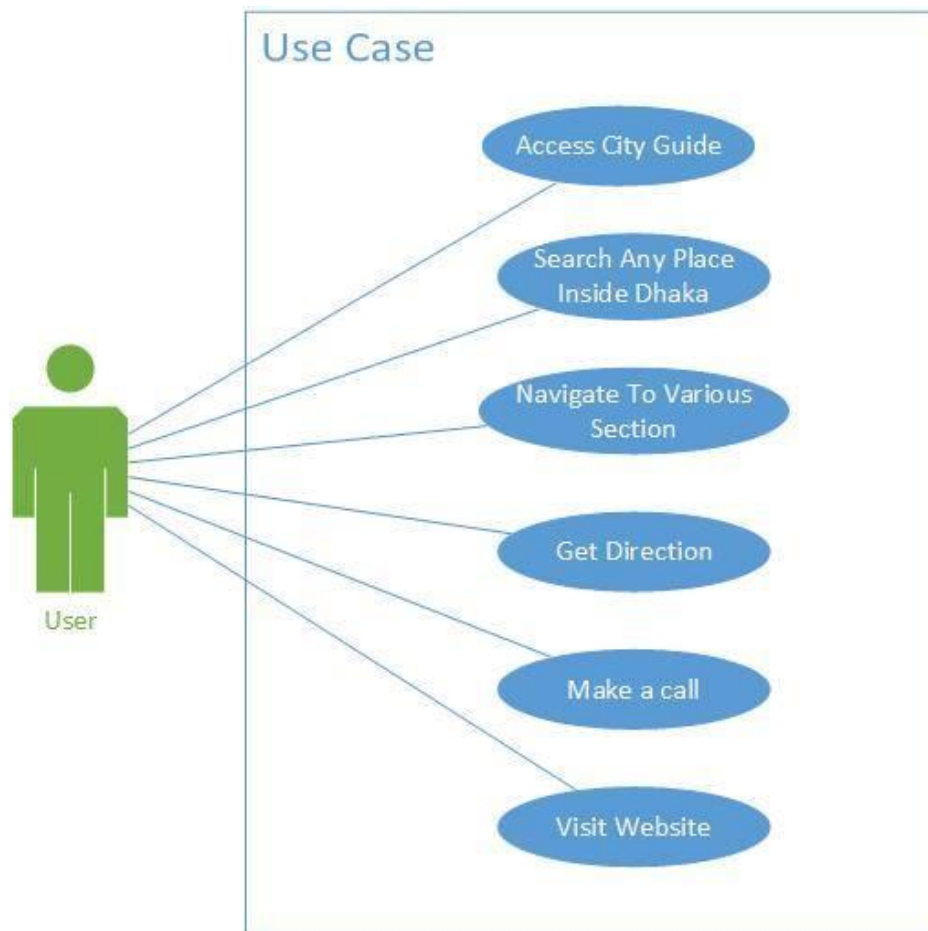

Figure 3.3.1: Use case diagram - User

Use Case Description:

Use case 01: Access City Guide

Primary Actor: Users

Precondition: Internet connection

Entry Condition: Click or tap the city guide app icon and wait until load

Event Flow: Click on various sections of the city guide app

Exit Condition: Click the back arrow in the bottom part

Use case 02: Search Any Place in Dhaka

Primary Actor: Users

Precondition: Internet connection, search the place

Entry Condition: Click or tap the search button

Event Flow:

> The user search any place in the Dhaka city
> Click on the result page to view the place

Exit Condition: Click the back arrow in the bottom part

Use case 03: Get Direction

Primary Actor: Users

Precondition: Internet connection

Entry Condition: View the place direction in the map

Event Flow: Click on the embedded map section

Exit Condition: Click the back arrow in the bottom part

Use Case 04: Make a call

Primary Actor: Users

Precondition: Internet connection, Permission to make a call

Entry Condition: Click or tap call button

Event Flow: Dialed automatically with the given number

Exit Condition: Click the call end button

Use Case 05: Visit Website

Primary Actor: Users

Precondition: Internet connection

Entry Condition: Click the website icon

Event Flow: User is redirected to the desired website

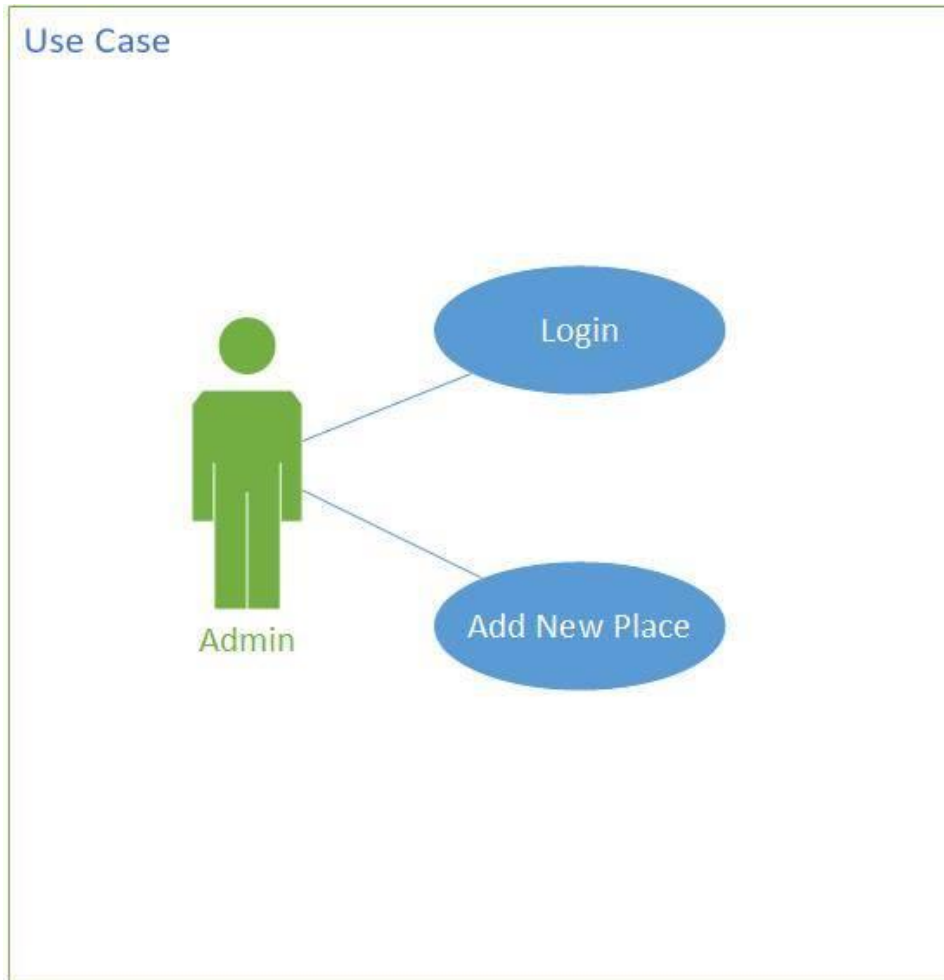**Exit Condition:** Click the back arrow in the bottom part or close the browser

Figure 3.3.2: Use case diagram – Admin

Use case 01: Login

Primary Actor: Admin

Precondition: Internet connection, entering user name and password

Entry Condition: Click or tap the Login button

Event Flow: The admin will give the email and password correctly to log in the portal

Exit Condition: Click the logout button

Use case 02: Add New Place

Primary Actor: Admin

Precondition: Internet connection

Entry Condition: Click or tap the add new button

Event Flow: The admin will fill up all the fields required and click on save button

Exit Condition: Click the cross button on the top

3.4 Logical Data Model

An entity relationship diagram (ERD) shows the relationships of entity sets stored in a database. An entity in this context is a component of data. In other words, ER diagrams illustrate the logical structure of databases [8].

The relationship of the entity sets of the database is shown by the entity relationship diagram (ERD). It can be said that, the logical structure of a database is illustrated by the ER diagram. It goes deep to the database as much as possible and describes the data model. All the entities and relationship among them are included in the diagram. All the attributes of the entities are specified here along with the primary key [9] and foreign key [10]. In the following figure we have given the ER diagram of the application.
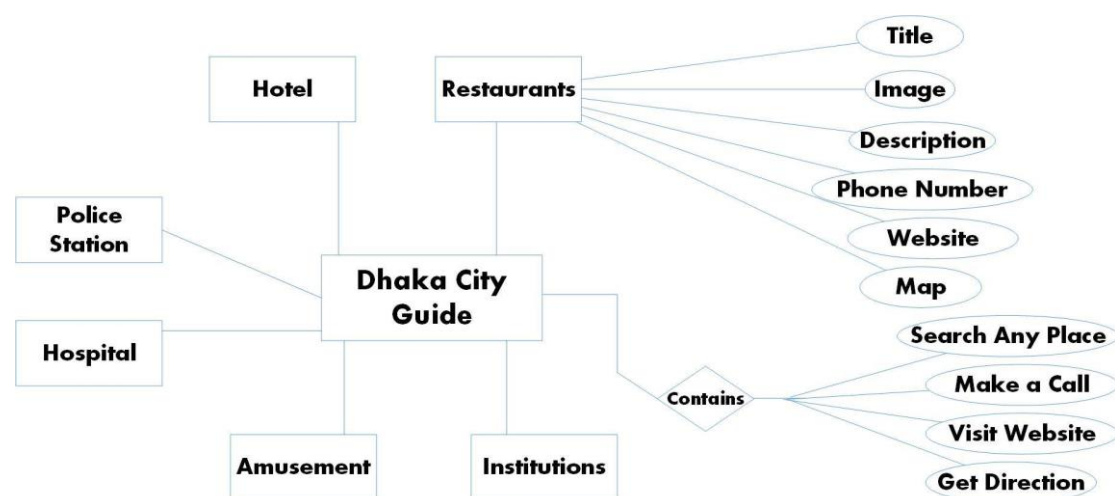

Figure 3.3.3: ER diagram

3.5 Design Requirements

To run a system smoothly, the front end and the back end design play a vital role. The following points should be kept in mind while designing the requirements:

Efficient: The application should be lightweight. The mass users have different type of device which will lead to different type of performance. So bearing that, the application should be built such a way that it runs on all the devices without any lag or delay.

Compatible to various Android version: Till this time, there has been developed lots of android SDK (Software Development Kit) versions. The current SDK running in the market is Pie which has been released on August 6, 2018 [11]. So the application has been developed accordingly to support android SDK from 18-28.

User Friendly: The application has a user friendly interface. The users can easily navigate to different sections of the application. A search bar has been integrated to search for any specific place. And there has been use of direct call, check website buttons and embedded google maps for the better convenience of the users.

- There will be two type of user in this system.
- The places will be sorted chronologically in their own categories.
- Users will navigate the application through category.
- Users will search for places in the search bar located in the side menu.
- Users can click the phone icon to make a call.
- Users can click the website icon to directly visit the website of the particular place.
- Users can use the embedded map directly on the screen.
- There is no need for a user to login, they just install the application and good to go.
- Admins have to log in to the interface using proper user name and password
- Admins can add new places from the front end of the app
- Admins can delete, update, modify the information of the database from the backend of the app

CHAPTER 4

DESIGN SPECIFICATION

Design specification of a system shows how the development process will go for a particular system and how the developments are being done. A design specification is a detailed document providing information about the born of a project to set criteria the developers will need to meet. Its use is called for where a structure or product has to be specially made to meet a need [12]. In the following section I will provide the front end and back end design of our application along with the tools and platforms used to develop the application.

4.1 Front-end Design

The front end of the android application Dhaka City Guide has been developed with Android Studio (3.2.1). The design has been kept plain so that the user get a user friendly interface to surf around the application. The users need and active internet connection to use the app as it's developed based on the real time database concept.
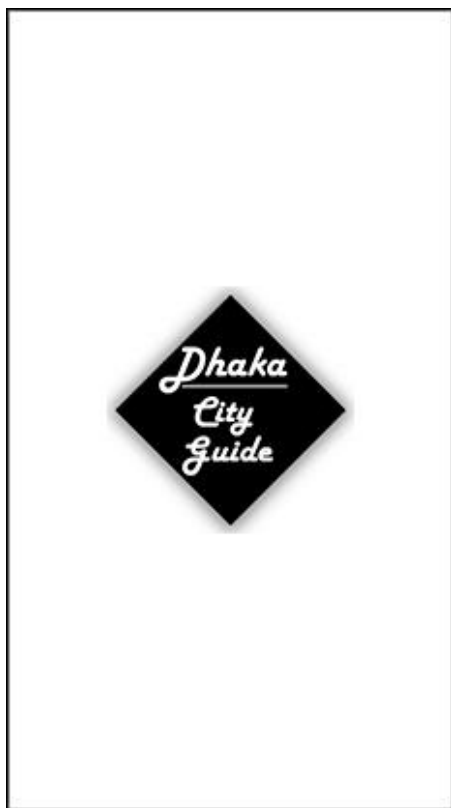
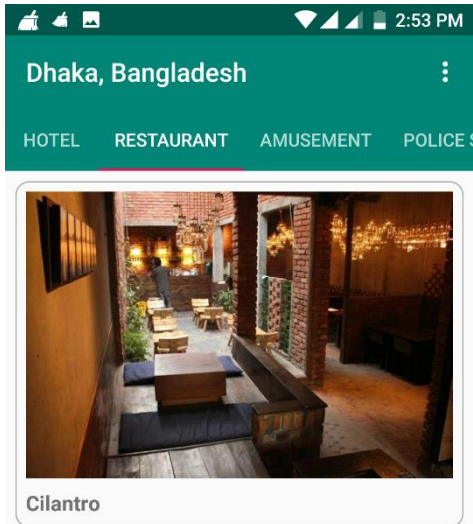Figure 4.1.1: Splash Screen
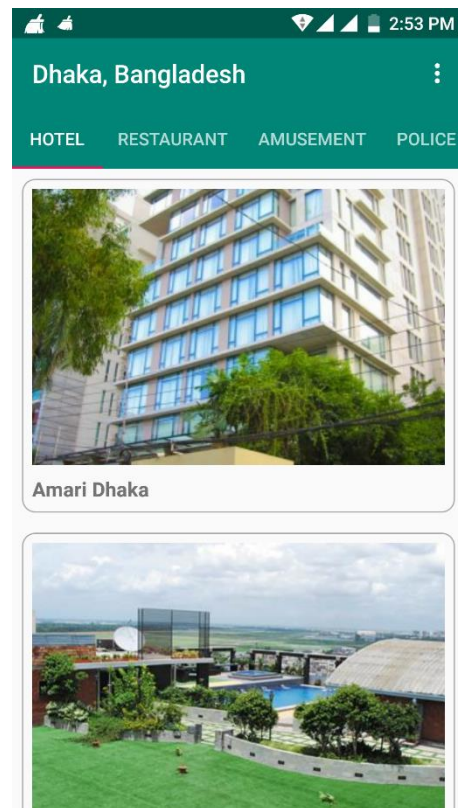
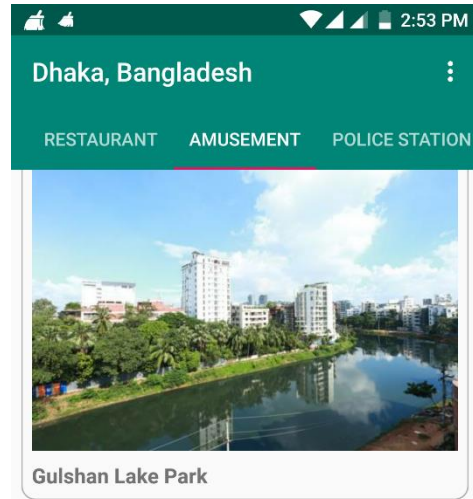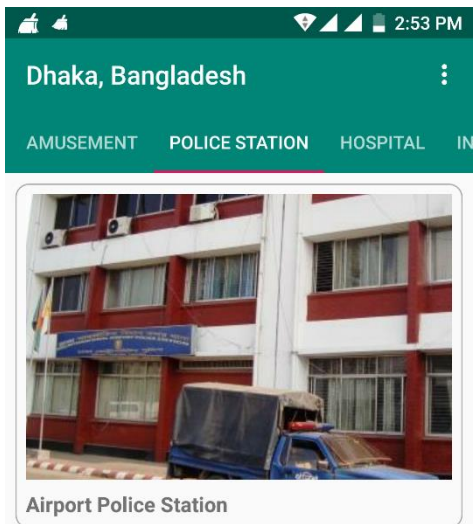Figure 4.1.2: Hotels

Figure 4.1.3: Restaurants

Figure 4.1.4: Amusement

Figure 4.1.5: Police Stations
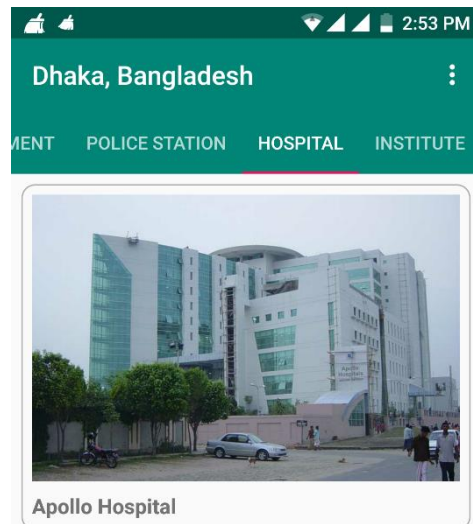
Figure 4.1.6: Hospitals
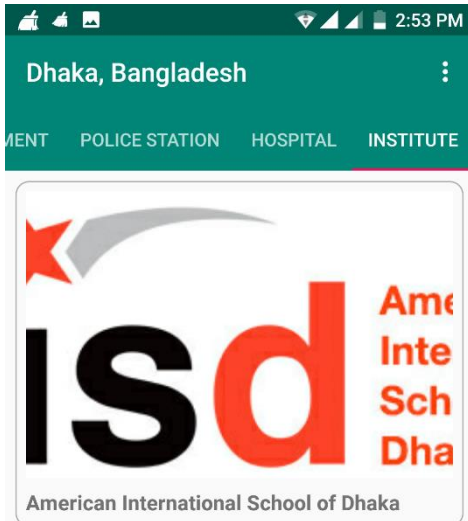
Figure 4.1.7: Institutions

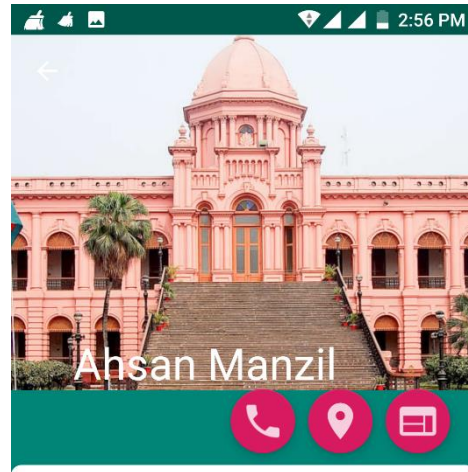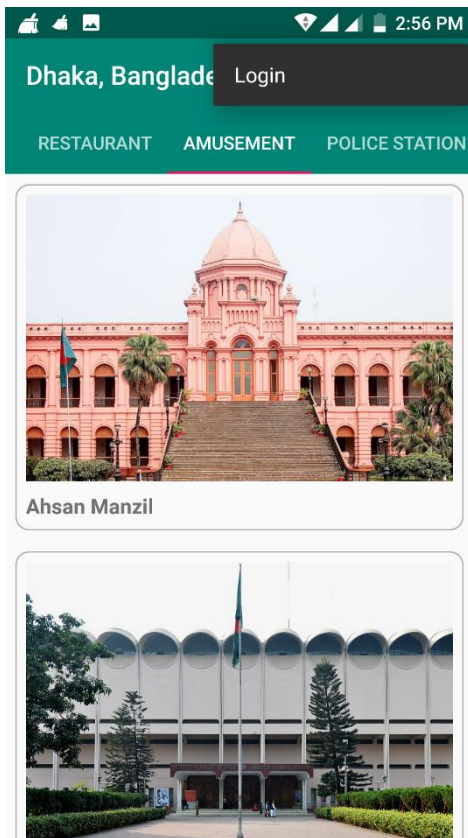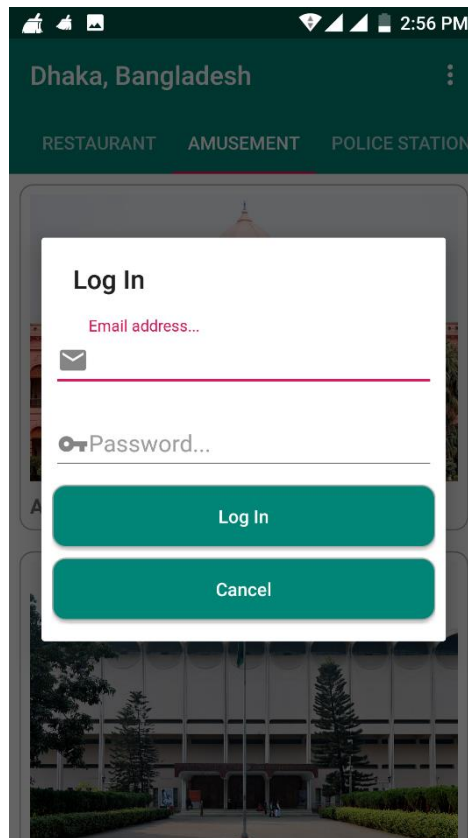Figure 4.1.8: Details Page

Figure 4.1.9: Login Side Bar

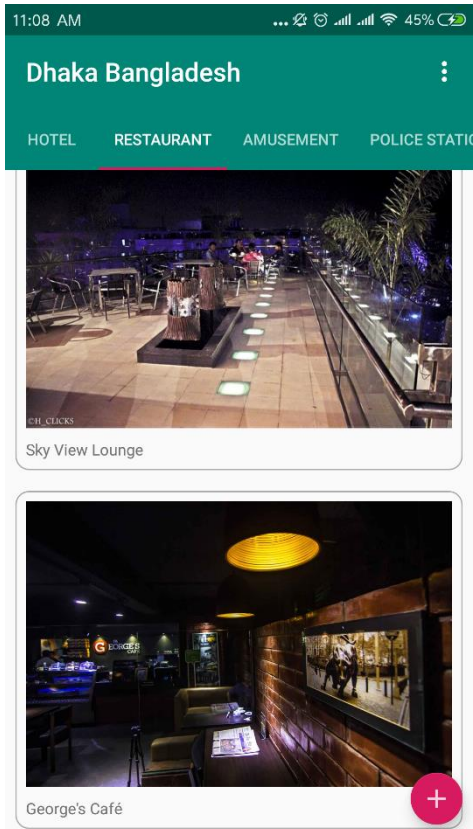Figure 4.1.10: Login Screen

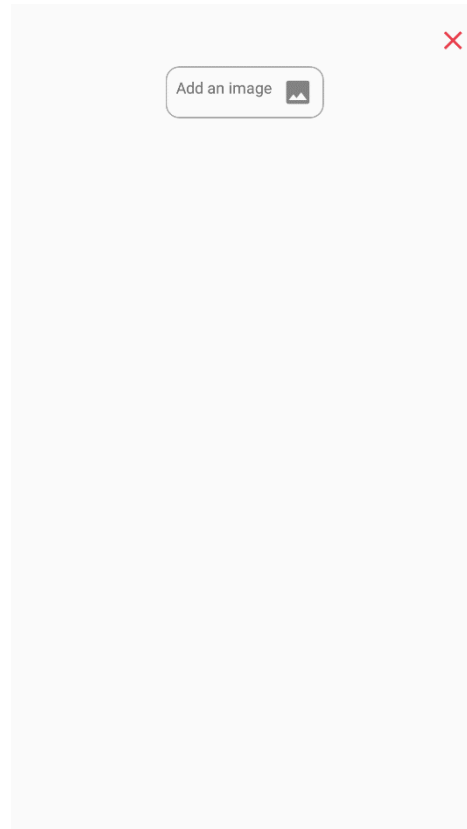Figure 4.1.11: Logged In Screen

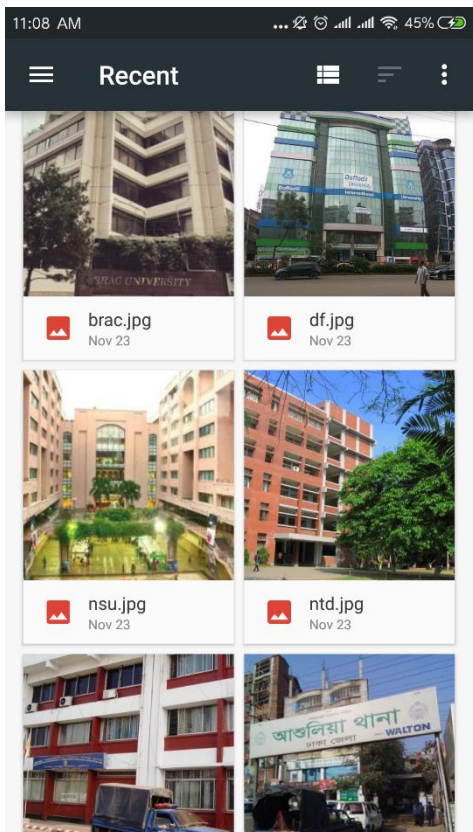Figure 4.1.12: Add Image

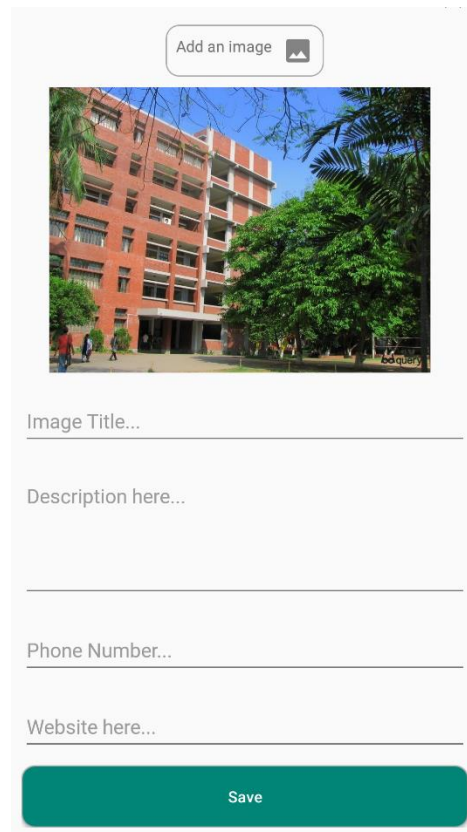Figure 4.1.13: Select Image for upload

Figure 4.1.14: Add New Place

Here, the figure 4.1.1 is the splash screen. After that comes the screen on figure 4.1.2. It's the main activity page. All the places are categorized and sorted in this page. The first page is about hotels. Then the figure 4.1.3 contains the restaurants. Then figure 4.1.4 is about amusement. Then the figure 4.1.5 consists of police stations, figure 4.1.6 consists of hospitals and figure 4.1.7 contains institutions. Figure 4.1.8 displays the detailed information of a particular place with the embedded google map at the bottom. Figure 4.1.9 shows the login and search side bar. Figure 4.1.10 shows the login page for the admin. Here the admin can put the username and password to log in to the application. Figure 4.1.11 shows the logged in screen with a plus icon at the bottom to add new places. Figure 4.1.12 shows the add image section. Figure 4.1.13 shows the screen for selecting image for upload. Figure 4.1.14 shows add new place screen. Here the admin can put the title and other information about the new place and click on the save button bellow to add the place to the database.

4.2 Back-end Design

The backend of an application is the most important part. All the logical things happen here. How the interface will be, how the actions will work, how things will be represented to the user, in fact all the aspects of the application depends on the back end of the application. The languages used, the database, the security of the app, authentication, authorization and all other settings are related to the back end. In this application. Android Studio has been used for the development of the project. XML and Java are the core languages used. Firebase has been used for the data repository which provides a real time database [13].
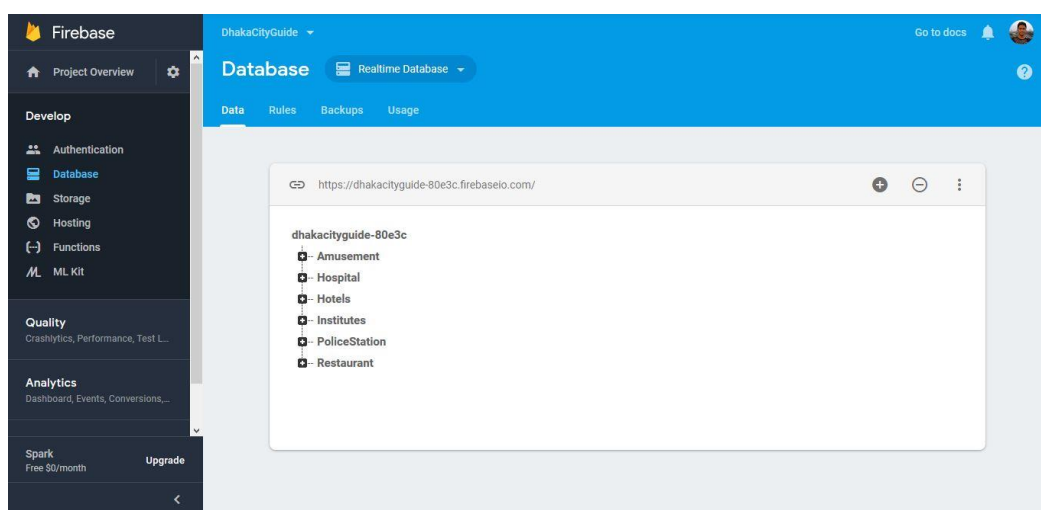

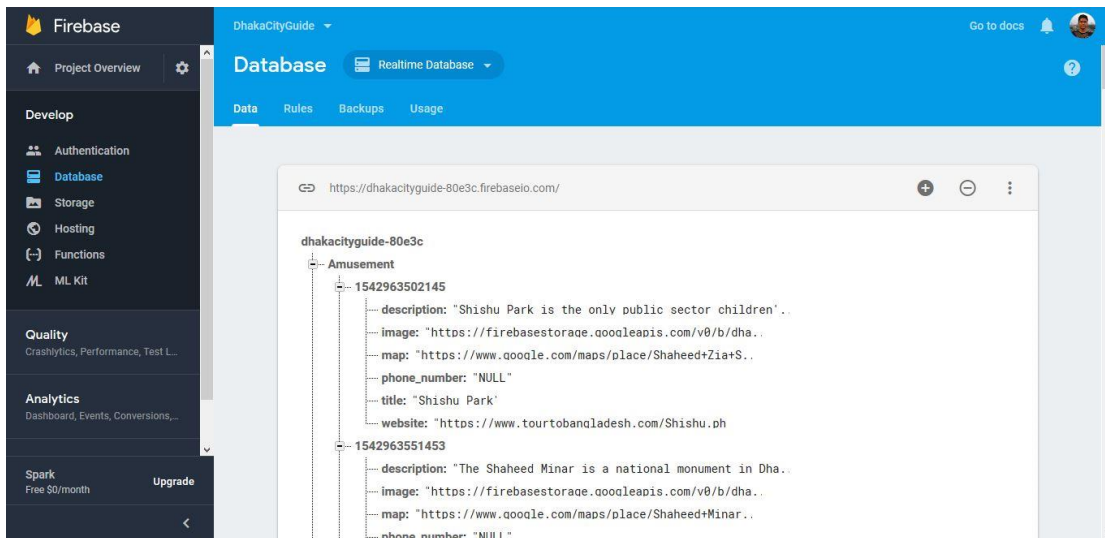Figure 4.2.1: Database page on Firebase

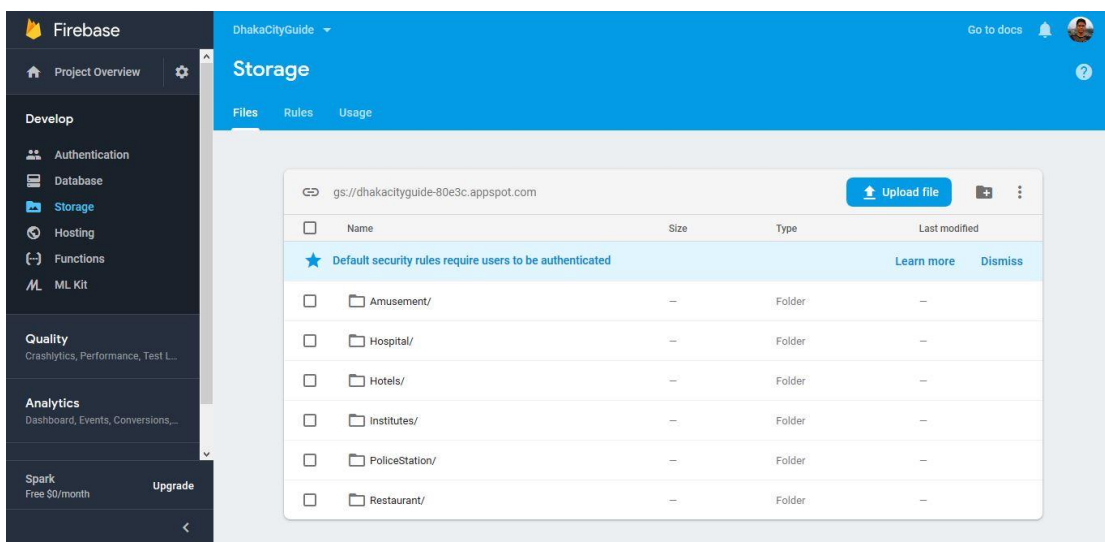Figure 4.2.2: Details of entities on database

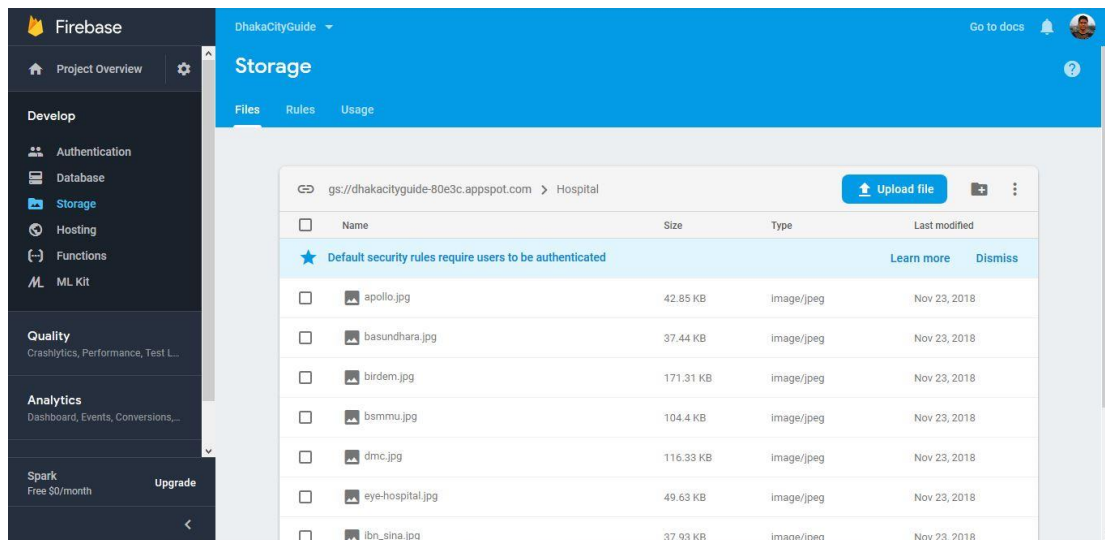Figure 4.2.3: Categorized storage page on database

Figure 4.2.4: Images uploaded in categories

Here, the figure 4.2.1 shows the categories of data in the firebase real-time database. Figure 4.2.2 shows the details of a particular place. The table fields are: title, description, map, phone-number, image and website. Figure 4.2.3 shows the categorized storage page where the images will be stored. Figure 4.2.1 shows the uploaded images in one single category.

4.2 Interaction Design and UX

Interaction design, often abbreviated as IxD, is "the practice of designing interactive digital products, environments, systems, and services." While the digital side of this statement is true, interaction design is also useful when creating physical (non-digital) products, exploring how a user might interact with it [14]. Interaction design observes the interaction between a user and a system. It helps to identify the problems faced by the users so that the issues can be sorted out and processed for a better experience.

The overall success rate of an application depends on the interaction design. It is a very crucial part for any project. For UX of our application Dhaka City Guide, we have asked about 10 persons to use the application. They all said that the interface is quite user friendly. They have also given some suggestions to improve the application. But initially they became satisfied with the interaction and recommended the application.

4.2 Implementation of Requirements

To implement the project Dhaka City Guide the first thing needed is Android Studio along with Java and XML coding. To design the UI/UX, Adobe Photoshop and Illustrator is needed. Microsoft Excel is also needed to properly gather and sort the data for the database. Again the data has to be stored in the online real time database. So and active internet connection is also required. All the mentioned components above are the requirements for the implementation of the project.

CHAPTER 5

IMPLEMENTATION AND TESTING

5.1 Implementation of Database

The implementation phase is where you install the DBMS on the required hardware, optimize the database to run best on that hardware and software platform, and create the database and load the data. [15] The implementation includes the installation of the database, optimize it, link it to the application, create new database to store the data and the process of retrieving the data.

5.2 Implementation of Front-end Design

Login page for admin: The following is the login page for admins of the application. Here in the provided field the admin can put the user name and password to log in to the application, which will enable him to add new places to the database.
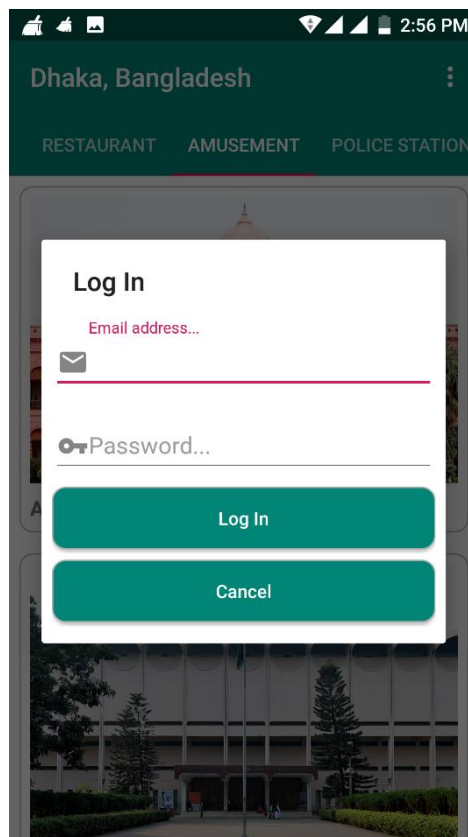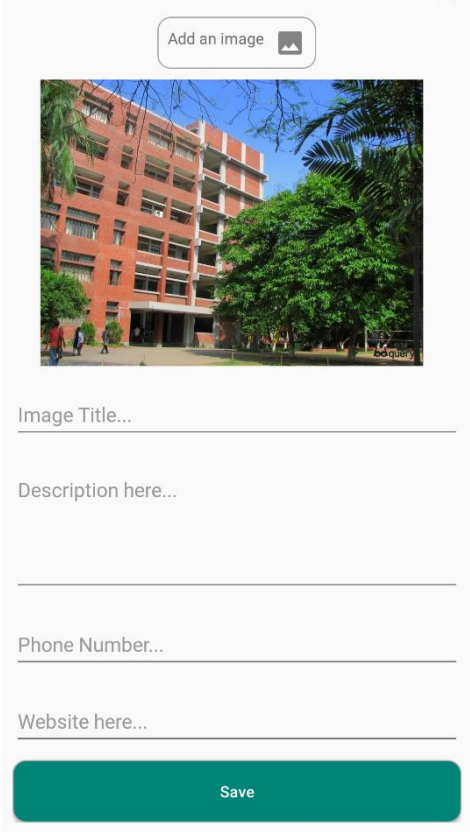
Figure 5.2.1: Login Screen

Add new Item page for admin: In the following page the admin can put information of a new page to be added in the database. Filling up all the fields is mandatory to add a place. After that, the admin has to click on the save button to upload the data into the database.

Figure 5.2.2: Add New Place

Login bar for the users: The following screen shows the login bar for the users. From here the users can login to the application and add new places to the application by starting with uploading and image of the place.
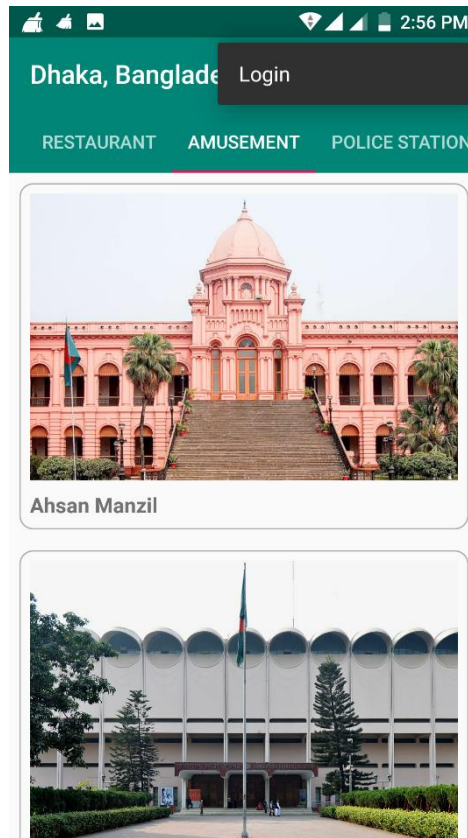
Figure 5.2.3: Login bar in the side menu

5.3 Implementation of Interactions

To make the application more interactive, responsive UI has been used. We know that individual buttons which call to actions are better for the mass user rather than text information. Based on that quick buttons has been added in the application for making a call and visiting the website of the particular place. The admins has the login option through which they can log in to add new places to the database.

5.4 Testing Implementation

System Testing is a level of the software testing where a complete and integrated software is tested. The purpose of this test is to evaluate the system's compliance with the specified requirements. Definition by ISTQB. System testing: The process of testing an integrated system to verify that it meets specified [16]. The testing of the implemented system is a mandatory process to develop any application. The bugs and inconveniences are found through proper testing. The tester will identify the issues found with the application which leads the developer to detect the bugs and resolve the issues. Throughout the development process of the application "Dhaka City Guide" it has been tested several times by different users. The test case evaluation of the application is given below:

Table 5.4.1: Test case evaluation

Sl.	Test Case	Input	Expected Outcome	Obtained Outcome	Pass/Fail	Testing Date
1	Login	Login for different admins	Successful Login	Successful Login	Pass	13-11-2018
2	Add New Place	Data for input as a new entry	New place added successfully	New place added successfully	Pass	13-11-2018
3	Interface	Deployment in various types of android device	Support every device	Support every device	Pass	13-11-2018
4	SDK	Run on SDK version from 11 to 28	Support in all version	Support in all version	Pass	13-11-2018
5	Data Store and Load	Data will store and load through JSON parsing	Data stored and loaded successfully	Data stored and loaded successfully	Pass	13-11-2018
6	ANR (Application not responding)	Application is responding on various device	Very low percentage of not responding	Very low percentage of not responding	Pass	19-11-2018
7	Admin Logout	Click on log out button	Logged out successfully	Logged out successfully	Pass	13-11-2018

5.5 Test Results and Reports

The results of the testing of the application are gathered together to prepare the test report. The report describes the reflection of the testing formally. It records the data obtained from the evaluation of the application and help to overcome the problems. It is a great help to achieve the objectives of the development project. There are various types of testing:

- Functionality
- Regression
- Security
- Performance
- Localization
- Scalability
- Usability
- UI Interaction

In the previous chapter the test cases with the test results has been shown. From the test report we can determine that the developed application is a better one which can satisfy its' users. It has a great user friendly interface and better UI design. And the application is vastly accepted by the users.

CHAPTER 6

CONCLUSION AND FUTURE SCOPE

6.1 Discussion and Conclusion

It was a great journey to develop the application and implement all the aspects of it. We are very glad to make something that will help the common people very much. The determination, dedication and good will have made us successful in developing such an application. The city guide app will be very handy to the users of all classes and levels. And we think this application will achieve great success.

All thanks goes to the Almighty to bless us with the determination to complete the project. We also cordially thank our supervisor who has helped us in every possible way to finish our job.

6.2 Scope for Further Developments

In the future, the application can be updated to add more places. It can also be updated to cover other places of the country. Some future development can be as follows:

- Can be developed for iOS platform
- The database can be developed more precisely
- More and more places can be enlisted in the app
- Additional features can be added to the app, like giving ratings, save places, add to visit list etc.
- The admin section can be developed to make it easy to add new places

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