

Development of Android Application for Security Guard

“Smart Guard”

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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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APPROVAL

This Project titled **Development of Android Application “Smart Guard”**, submitted by Saidur Rahman 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 12/07/2020.

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We hereby declare that, this project has been done by us under the supervision of **Mr.Ohidujjaman,Senior Lecturer, 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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ABSTRACT

At present social context of Bangladesh, it is most important part to ensure proper protection of our assets. The security guard plays an important role in protecting the assets of the people from the evildoer. Now a days Lots of Security Guards agencies are providing professional protection for our assets. But most of the agencies are not well managed there service system for security guards. So, I want to build a mobile application that have the solution of this problem. Development of Android Application “**Smart Guard**” is an Android application where I figure out quite a good solution of managing and Collaborating for individual guard’s safety problem. When I research about my project then I can not found any security guard related mobile applications for our country. Very few of applications are developed by other countries and they didn’t developed urgent needed part of Security Guard sector. Some of security guard related android applications are: “**Guardso Security Guard System, Security Guard App, Guard Patrolling System**”. Even they cannot give a popper solution for managing and individual guard’s safety problem.

So that, i wants to develop an Android Application “Smart Guard”. Here I try to provide a proper solution of Security Guard related problem. In this application a security guard can use an emergency button to seek help from other on duty guards. When a guard press the emergency button, an automatic emergency notification will be generate with the name of the guard and a help massage to all other on duty guard’s phone. If other on duty guards tap on the notification, they can see the exact geo location of the guard in danger. By using this mobile application a guard can easily give his attendance.

Security Guards can easily see there on duty and off duty colleague’s profile. Guards can call their colleagues from this application and also see their current duty location on map. Guards can see duty post in category (Normal,Urgent,Regular) which was given by the admin. Guards can be used lots of interesting services like see their duty shift, pre generate

meals reminder, Torch light tools, setting duty shift, changing language, received notification with vibration/music.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

In this new world human life with the usage of digital technologies has become quite convenient. But there are still some areas in our country that aren't blessed by new technologies. Such as Sector of Human Resource. One of our main needs is to protecting our assets. For this purpose we have to hire Security Guards but for managing them we cannot get a proper solution. Very few people developed Human Resource related managerial android application worldwide, for that Security Guard provider agencies can easily manage their Guards. But they developed small part of Human Resource sector. Some of security guard related android applications are: “**Guardso Security Guard System, Security Guard App, Guard Patrolling System**”. Even now they cannot give a proper solution for Security Guards.

So that, I want to develop an Android Application “**Smart Guard**”. Here I try to provide a proper solution of Security Guard managerial related problems. In this application a security guard can use some useful features and admin can give instruction to all the security guards. When a guard install the app, he automatically connected with his colleagues and property owner.

1.2 Motivation

I often see some security guards are working at night here in model town. However, they are not altogether all the time. Then I think about some issues, if any of them are in danger who will help them and how other people know about it? As we know these guys have been guarding the property of Model Town all night, wasting their sleep but who cares there personal safety?

They faces many problems every day. Such as personal safety in emergency case, Proper timely handling of meals, strong connectivity with colleagues, not remembering the duty shift, communication gap with admin, don't know all the notices/news's in right time, not keep in touch with emergency notice etc. then i research about how to reduces this problems

and I figure out there is none of mobile application for Bangladeshi Security Guards. But very few application are in google play store for other countries and also not get overall solution of those problem. That's why i want to build an Android mobile application to give them the full advantages of technologies and also try to do something for them by reducing described problems.

1.3 Objectives

The main objective of my project is to give a smart way to manage security guards and to ensure their safety. For this I want to make an android application to make guards profession more secure and enjoyable. Here's some main key goal of my project:

- i. Ensure Guards Safety: “Smart Guard”** will ensure guards personal safety in working time. If any guard feel unsecured for any reasons at working time, the guard can ask for help to others by pressing emergency button.
- ii. Strong connectivity with fellow members:** By born human loved to connect with others. If we think about guards mentally health then we can feel their lonely duty time. For this guards can use calling function in this application. By calling function guards can easily call their fellow members when they are in online.
- iii. Way to help others:** Guards can see their fellow members live location on map.by this feature guards can help other guards. When a guard press emergency button a push notification will send to others device with name and geo location. Guards also can see shortest path to reach and help other.
- iv. Ensure property owner satisfaction:** By admin panel property owner can add individual guard with all information and user login credentials, delete guards, assign task for security guards.

- v. **My advantage:** To demand some money from Security Guard provider Agencies or Companies (who have lots of security guards) by providing service for my business purpose.

1.4 Expected Outcome

- ✓ Service will be provided to Security Guards Agencies or Company or Organizations or Individual person.
- ✓ Ensuring to Guards more of the safety aspect.
- ✓ Ensuring easy to use application for Admin and Guards.
- ✓ Application User Interface will be more user friendly
- ✓ Securing all data's provided by user.

1.5 Report Layout

Chapter 1: Introduction

Among this segment, I looked at the motivation, the destination and the usual outcome of the mission. Then looked at the structure of the report.

Chapter 2: Background

I'm talking about the basic conditions of my work. I shall also discuss the relevant work, the connection with other applicant systems, the nature of the problem and the difficulties of the undertaking.

Chapter 3: Requirement Specification

This section concerns preconditions, business process modeling, requirement selection and analysis, use case modeling and definition, logical data modeling, design requirements

Chapter 4: Design Specification

I designed the project in this portion. Front-end setup, back-end strategy, outline link and UX, and Specifications for implementation.

Chapter 5: Implementation and Testing

This portion involves the execution of database, front-end plans, connections as well as the task's test after-effects.

Chapter 6: Conclusion and Future Scope

I examined about the conclusion and also the extension for advance improvements which essentially infer about the project.

CHAPTER 2 BACKGROUND

2.1 Preliminary

At present, to solve problems by using tools is a modern way. In current challenging world our country becoming digital day by day and also able to achieve stability financially. Peoples care about security of their property that's why they hire security guards from different types of Security guard provider agencies. Before starting to make this project “**Smart Guard**” I did an in-depth study and research on its background. After complete the research I found very few security guard related application. The developers solved small part of a little human resource problems but they did not give an overall solution. That's why, I take the responsibility to build “**Smart Guard**” application to give a proper solution.

2.2 Related Works

I found very few human resource related mobile applications in the google play store. Their frameworks have some similarities to my project

- i. **Guardso Security Guard System:** In this application guards can set scheduling, complete task with in timeframe and update notifies.
- ii. **Security Guard App:** Their main feature is communication for guards and clients with app messaging system. An application that can keep track of all the guards checked-in on all client site. They focused on receive Live notifications for quick decision making. They also add custom reports to help capture client site data for relevant work.
- iii. **Guard Patrolling System:** They make an application that have some security guard related features with checkpoint scanning and shift duration feature.

2.3 Comparative Studies

To complete this project, I am researching security guard related mobile application and most of the applications are not equipped with overall security guard solutions. But in my submission, I'm presenting all the security guard solution related issues that I've already addressed. other applications features are:

- i. Registration via OTP or email.
- ii. Scheduling, Task assign.
- iii. Shift duration, app messaging system.
- iv. Managing appointment, add custom reports, torch light, Daily alarm notification and location tracker.

But my app features are:

- i. **Emergency Service:** There are three service in this emergency section:
 - a) Emergency Help Service (Guards can request for help to others by pressing Emergency button)
 - b) Emergency call Service (Guards can call his fellow members)

- c) Torch Light Service (Guards can use this feature for extra advantage)
- ii. **All Guard:** Here guards can see all other guards with online or offline status. Guards also can watch their profile with respected information. In here Guards are allowed to watch their fellow member's current position.
 - iii. **Auto updated time with Calendar:** Auto time update and calendar features always show top of the apps.
 - iv. **Duty:** In this portion Security Guards are follow their task which was assigned by the property owner. Task are assigned by the admin in three category basis they are general represents with green tick mark, emergency represents with red tick mark and regular represents with yellow tick mark.
 - v. **Automatic Remainder:** Sometimes Security Guards are forgot to manage their time schedule. So, here is an option name alert where a Security Guards will automatically notify about their daily time management by alarm and security guards easily see how much time is fixed for work.
 - vi. **Calling System:** For an emergency situation a security guards have not ability to go to hospital or anywhere. So that they can call anybody from this app.
 - vii. **View Location on Map:** In this area security guards can view their fellow member's location on map to reach them.
 - viii. **Help Notification with exact location on Map:** This feature is for security guards get live notification when other security guard request for emergency help. Notification will generate with guards name and geo location on map to reach them

2.4 Scope of the Problem

The apps provide real-time online offline status, emergency help request service, automatic reminder, push notification, live geo location by google map but for this I have to pay money. I also need to examine my application in real life environment, that's why I need lots of people. I also have to ensure my application accuracy. I have to ensure that Security Guard provider or agencies are willing to use my application for their company.

2.5 Challenges

To implement this application, I need huge amount of hosting space and virtual server. For this I need to purchase that. In this case, if I don't use any kinds of server or hosting then admin or security guards are cannot access to the application or any kind of services

CHAPTER 3

SOFTWARE REQUIREMENTS SPECIFICATION

3.1 Business Process Modeling

Business process model is a company-type analytical image or digital wire-frame. It has carried out a certain operation, a beginning and an image, a condition like a stream outline. In my market process model, I suggest that two clients have completed the project at each stage. The guards are signed in to complete the operation.

In my business procedure model, I show that at any rate two clients have completed the procedure. The client must register and can log in to complete the procedure.

In my project, business process modeling has two users (1. Admin 2. Guard). Guard will be able to access this after login and will then be able to easily access all the features. And the admin can still do this after signing in

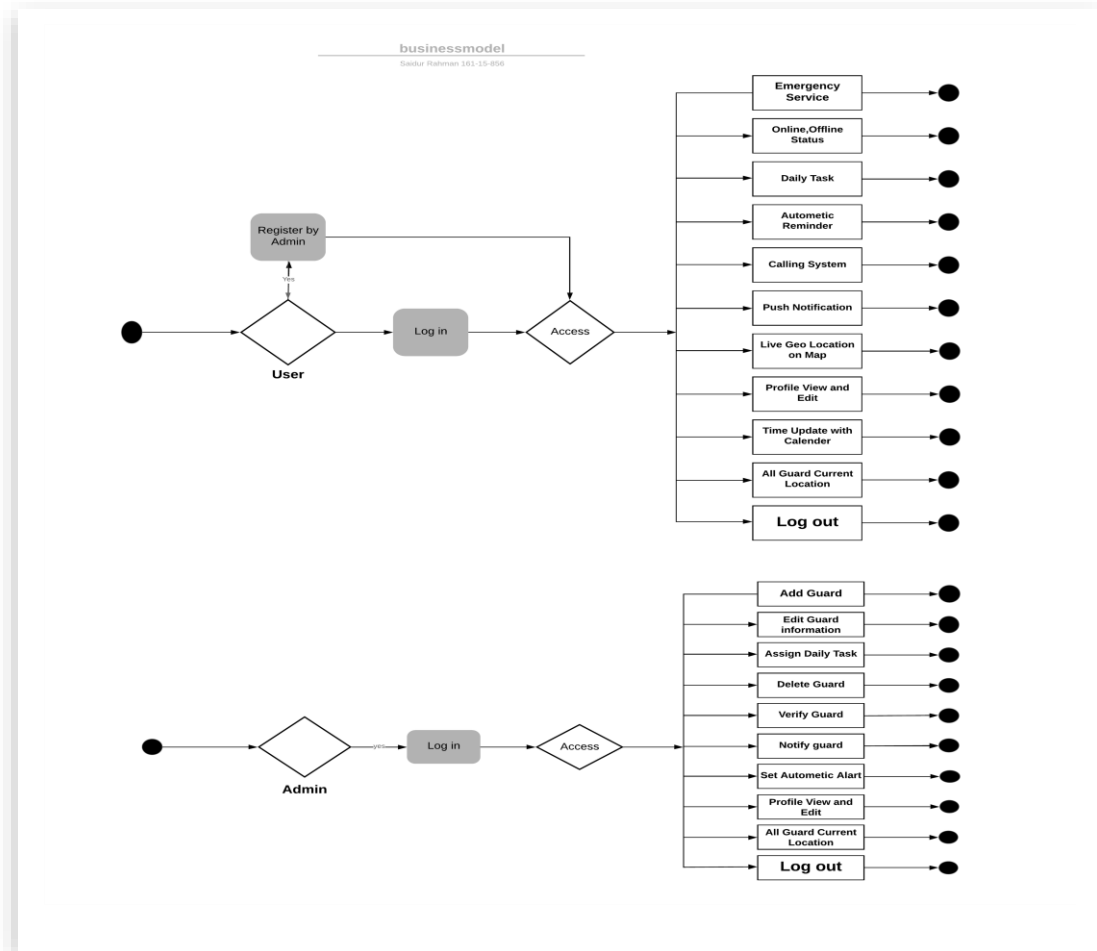


Figure 3.1.1: Business Process Model

3.2 Requirement Collection and Analysis

Collecting and evaluating specifications is a very important concept for the development of a device or any form of android application. The main users of our application are property owners or security guards and security officers. It is also very necessary to obtain the requirements of agencies and property owners. The requirement for my project to be collected is provided below:

- i. To use the application, registration must be required for Security Guards and Admins.
- ii. Security Guards are able to sign up this app through unique id and password provided by admin.
- iii. Must need to verify security guards personal data.
- iv. Security Guards are must be provide their valid information in order to use this application.
- v. Guards will be able to communicate through audio call.

Tools requirements to develop the projects:

- vi. Android Studio IDE to develop the project.
- vii. I use native SDK and java programming language.
- viii. Firebase real-time database.
- ix. Claude messaging.
- x. Google Map Api.
- xi. Android devices to testing the application.

3.3 Use Case Modeling and Description

A Use Case is a discreet unit of user (human or machine) engagement with the process. Usage Cases are typically linked to 'actors'. An actor is a human or computer agent that performs significant work communicating with the system. In Figure 1.1, here is my Use Case Model



Figure 3.3.1: Use case Diagram

3.4 Design Requirements

At first Security Guards must log in to the system using the required username and password provided by the owner of the property.

After this step has been completed, Security Guards can access the home page and all features. Through using this application, Security Guards can contact their fellow member, admin, and get emergency services and schedules.

CHAPTER 4

DESIGN SPECIFICATION

4.1 Front-end Design

The front-end design is a user interface (UI) design. It reflects the overall visual design of any kind of project. UI architecture Attract consumer to use the program. So, this is a very necessary part of any kind of project. A good User Interface is very appealing to the user, and the User Interface should be very simple and clean, which is why the user can easily understand the overall concept. I am trying the utmost to develop a convenient user interface for the user and make my application smoother.

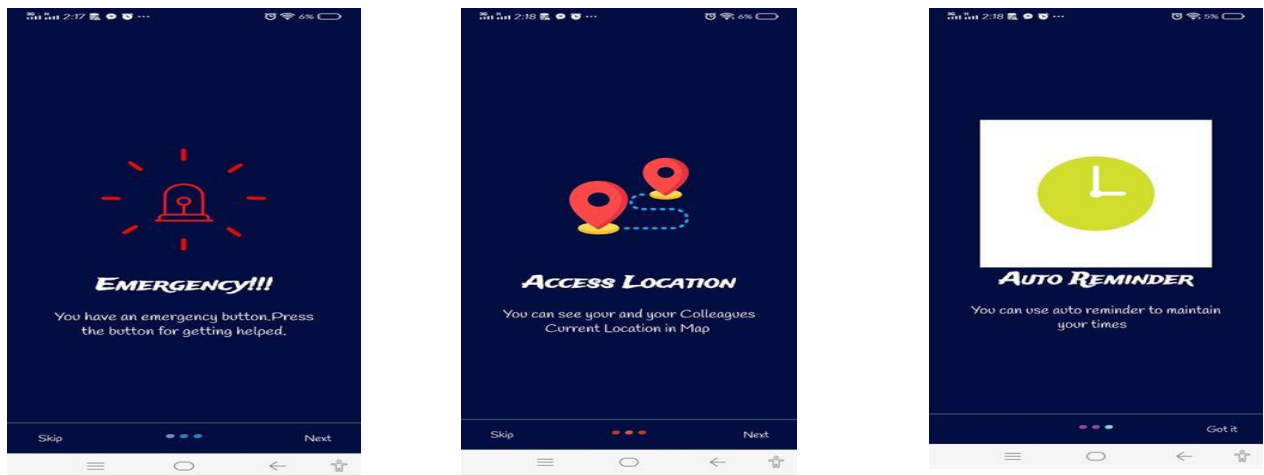


Figure 4.1.1: On Boarding Page

Here in an On Boarding page Security Guards have a clear concept about “Smart Guard” application. The main purpose is to keep on boarding page is for appealing and do more interacting User Interface.

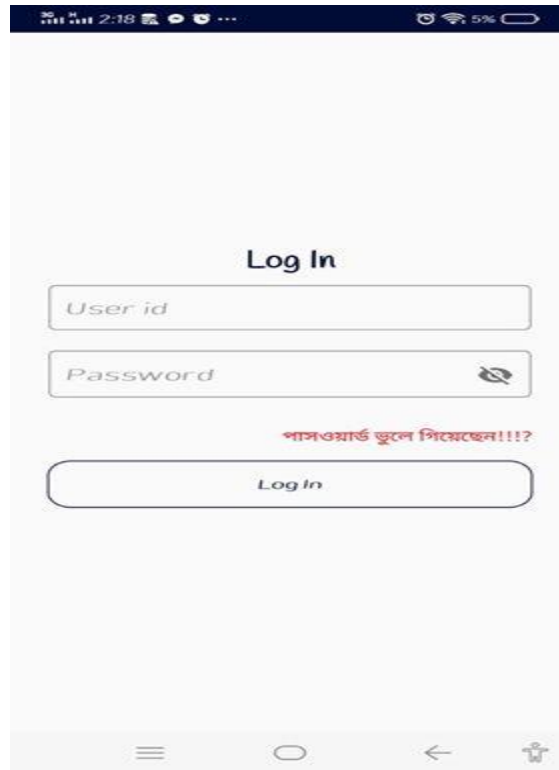


Figure 4.1.2: Login Page

To accessing the system every security guards need to login first. If security guards are log in then they can use the application and get all functionality open. In Login page Security guards don't need to put their email or phone number, they can simply log in by using their unique user id and password which was provided from property owner or admin.

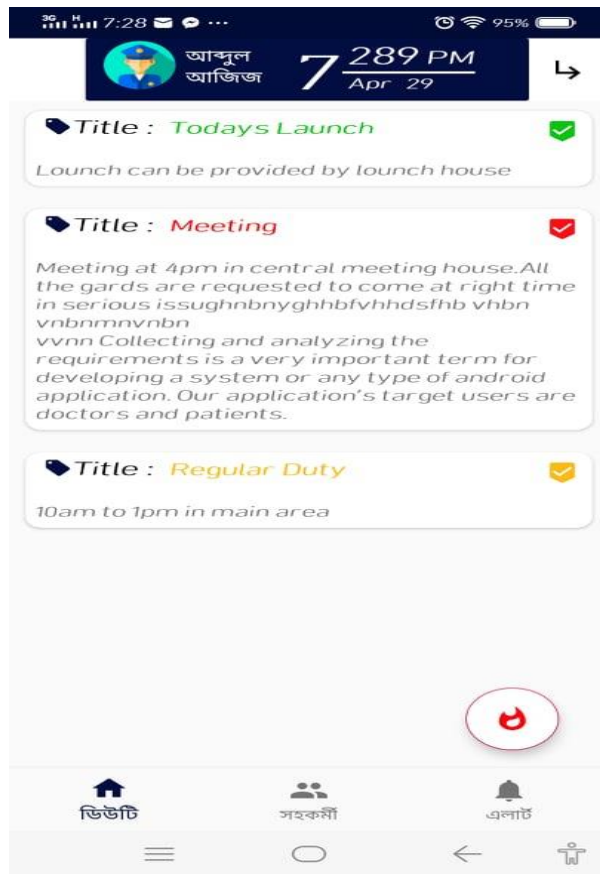


Figure 4.1.3: Home Page

Security guards can access all the features of this program on this home page. By defaults in home page duty or task functionality is opened, where security guards are can see the task which is assigned by admin for them.

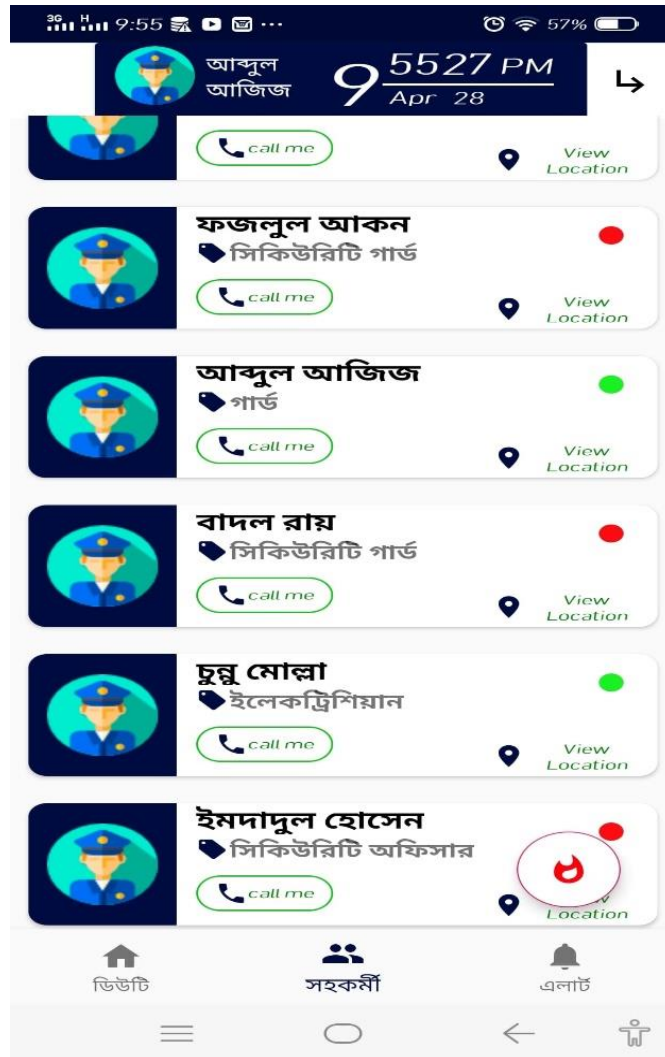


Figure 4.1.4: All guard Page

In all guard page security guards can see all the available guards. In here there are two types of sign present one is green and another is red. Here green circle is represents the online status and red circle represents offline status. Security guards can see all guards location if there are in online.



Figure 4.1.4 & 4.1.5: All guard Page

Security guards can call other security guards from this application. For this calling operation they have to give the permission to the application and the call rate will be based on their sim operator. If their balance is 0 then call operation will be called but cannot able to call others.

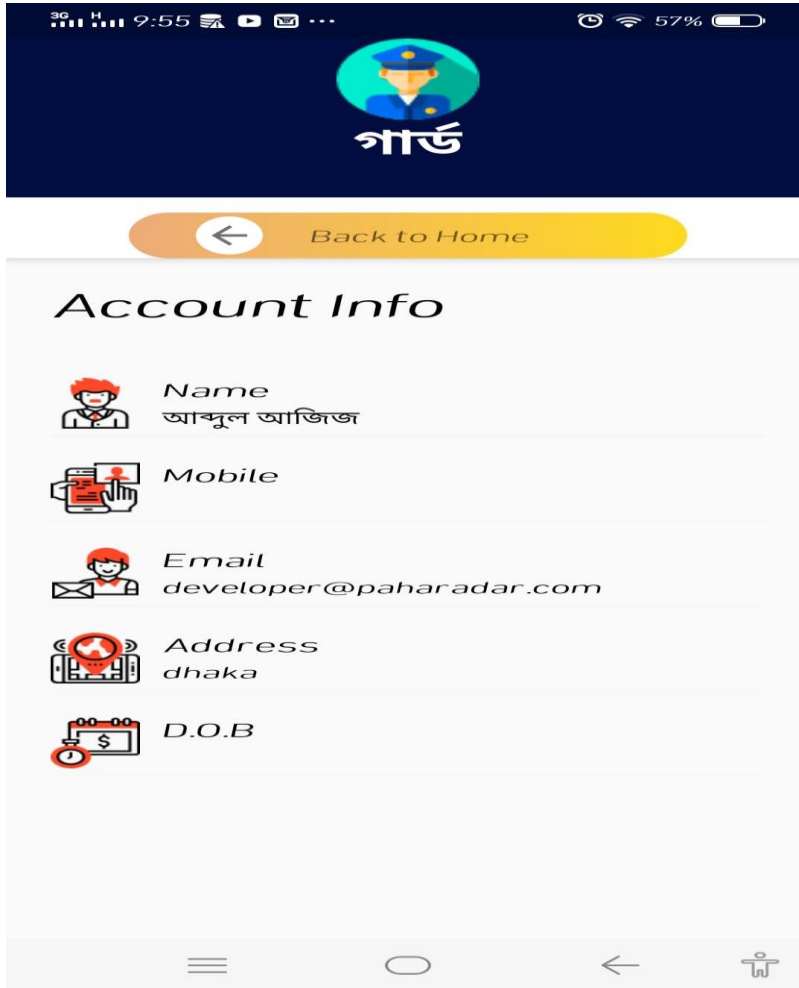


Figure 4.1.6 : Profile Page

In profile segment security guards can see others profile by clicking their model from all guards option. In here they can see others some of available information like name, designation, date of birth, mobile number, email address and living address. Security guards can change their individual information from profile but, some information is cannot be changed because those information only can changed by Admin or property owner.

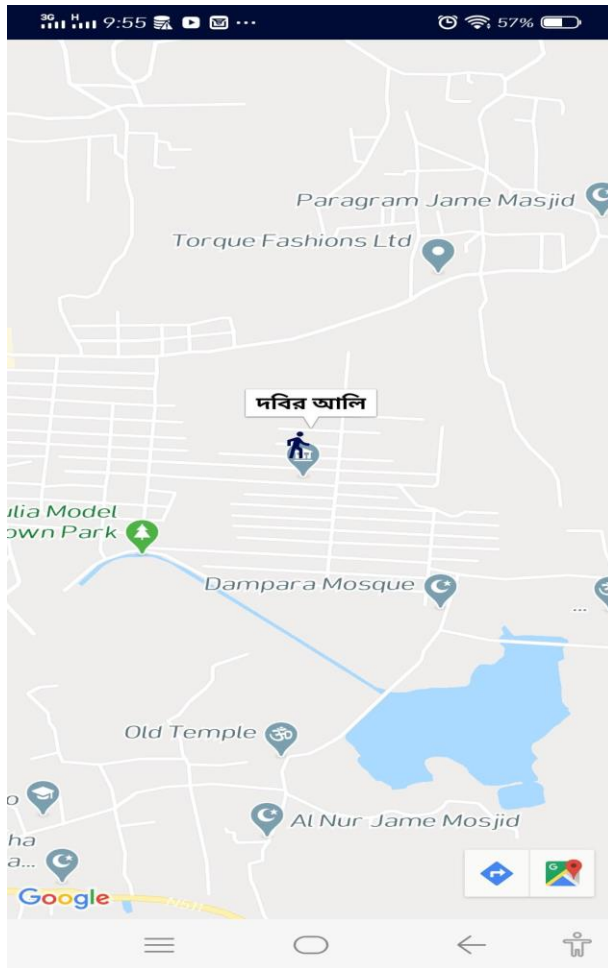


Figure 4.1.7 & 4.1.8: Real-time Location Page

For this functionality security guards must need the internet permission and must need to turn on their gps system. From google map security guards are able to see their fellow member's current position. When a security guard send the help request, a notification is generate to all available guards in online. Then they can see the sender of help request guards location on google map.

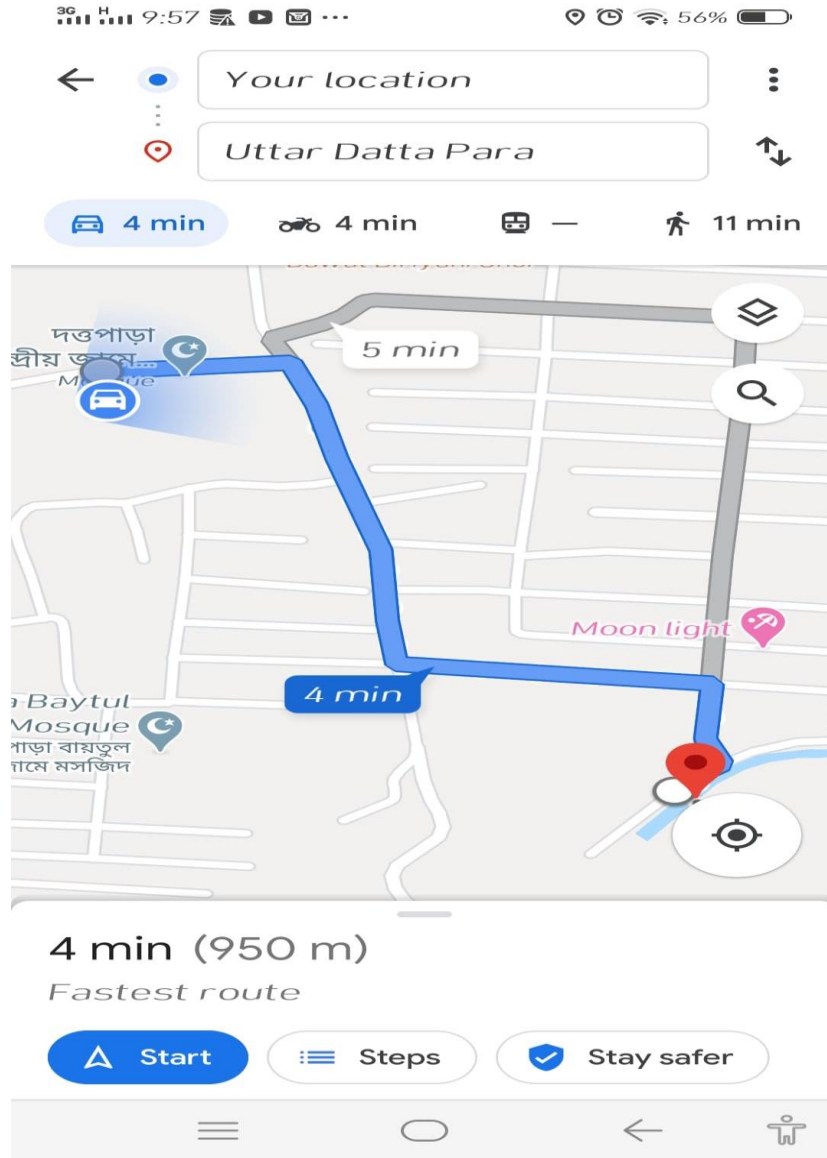


Figure 4.1.7 & 4.1.8 & 4.1.9: Real-time Location Page(Shortest path)

If any security want to reach to the sender of help requester, then they can see the shortest path also with the approximate time and with distance. It is called fastest route also.

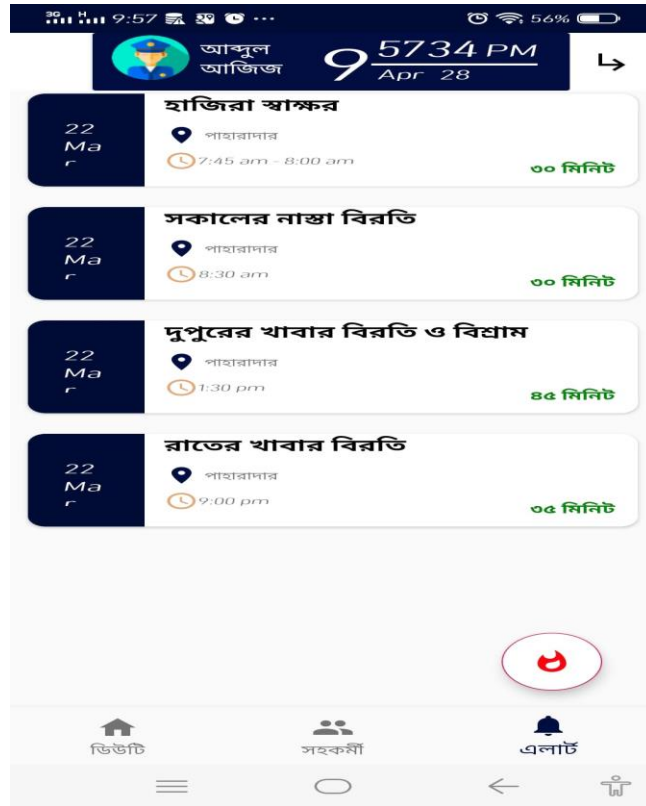


Figure 4.1.10: Auto scheduling Reminder Page

Auto scheduling reminder page is construct for reminding the security guards of their leisure time and other free time. In here guards can see their daily basis free time for work with description. Every day the alarm will fire at before One minute of scheduling time. The alarm will ringing with vibration and also with a ringtone.

Alarms are set in a backend part of the project by defaults. But a property owner or admin have the control to set scheduling alarm. Unfortunately Security guards cannot set alarm by manually from this application.

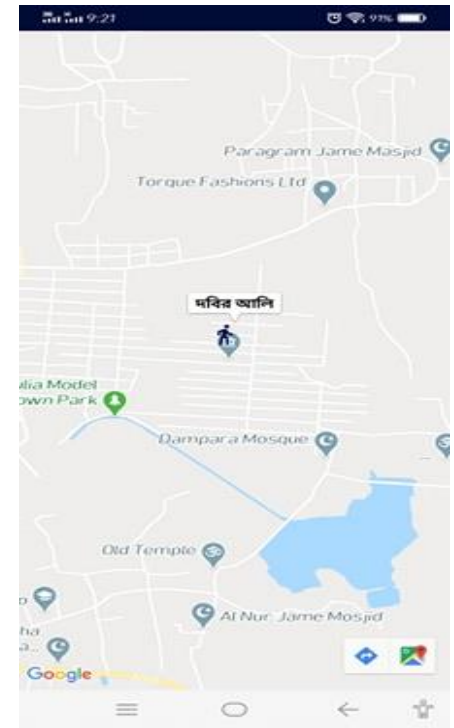
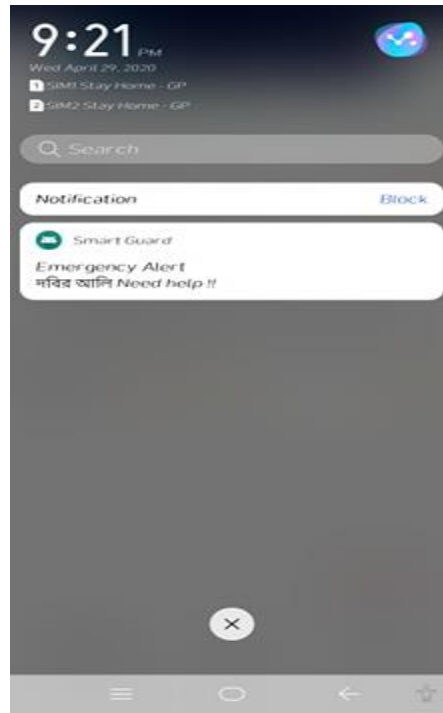
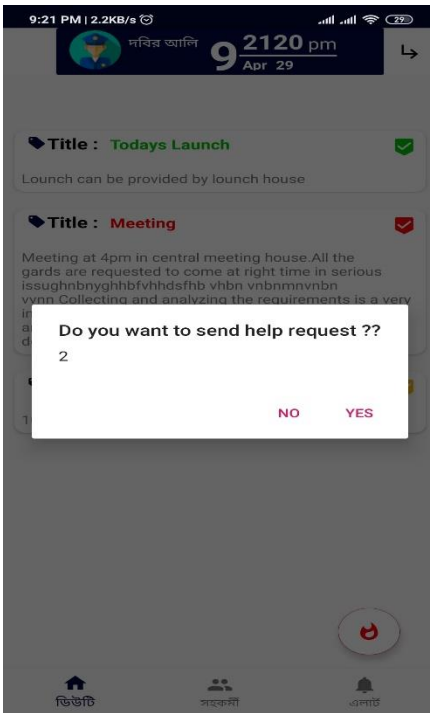


Figure 4.1.11, 4.1.12 & 4.1.13: Emergency request process Pages

At last in my “Smart Guard” application the most important and vital feature is emergency help request process. As you can see from left side of the figure one security guard name Dobir Ali is request for help from his mobile phone. Instantly an emergency alert help notification is passed on all guards phone who are already in online. Another guard named Abdul Aziz received the alert in at middle part of the figure. When Abdul Aziz click the notification he automatically go to the google map and he can see Dobir ali’s current geo location on the map at the right most side of the figure. This helpful feature is the main target of my entire project which I already have done.

4.2 Back-end Design

The back end can be interfaced with the software engineers. No one but software engineers can see and adjust the details. The client cannot interact with the back-end system. I have

a lot of knowledge to store for our venture purpose. In this way, I'm making a database for our business. We have selected "Firebase" for the database. Firebase is essentially a continuous database and easy to use. I use validation, constant database and firebase administration power management. Firebase provides a special opportunity for each client. Also, I saved all the client's details under one of the client's keys.

I use firebase storage administration to put away images.

4.3 Interaction Design and UX

Interaction design defines the interaction between the framework and the client, as it is just the way the system and the customer function together. Client Experience (UX) is a must to make any applications or platform, because we will understand from our client experience what the client needs / what would be suitable for them.

I'm doing my best to build a simple and uncomplicated lightweight framework for the best user experience (UX) method. My application is unreasonably central to a superior client experience, comfort and execution. I use the component to make my application smoother and quicker. I expected the client to be assured and complemented by my structure details.

4.4 Implementation Requirements

I use a range of tools to carry out our undertaking. This gives us a lot of emphasis on change. I use the Android Studio to build up my Android product. Android Studio is currently the most commonly used IDE for Android advancement. I use java as a programming language and as a native SDK. Android Studio is an exceptional android IDE

update. It's showing us increasingly formative highlights. I can write code in the Android Studio easily and efficiently. Google is developing Android Workshop, and they're doing it as an open source. Using it makes things simpler in this way. I'm using the new version of Android 3.6.2. What's more, the API level for my project is API-29. For the test reason, I could use the simulator or any android phone as a genuine gadget. [3]I can use the simulator to improve different kinds of android gadgets. Be that as it may, I use some genuine gadgets for testing here. Some of the time in various gadgets, the code appears in an unexpected way. In this way, it is important to check my application in a variety of gadgets. Here, I'm using some android dependency that makes my application easier to construct.

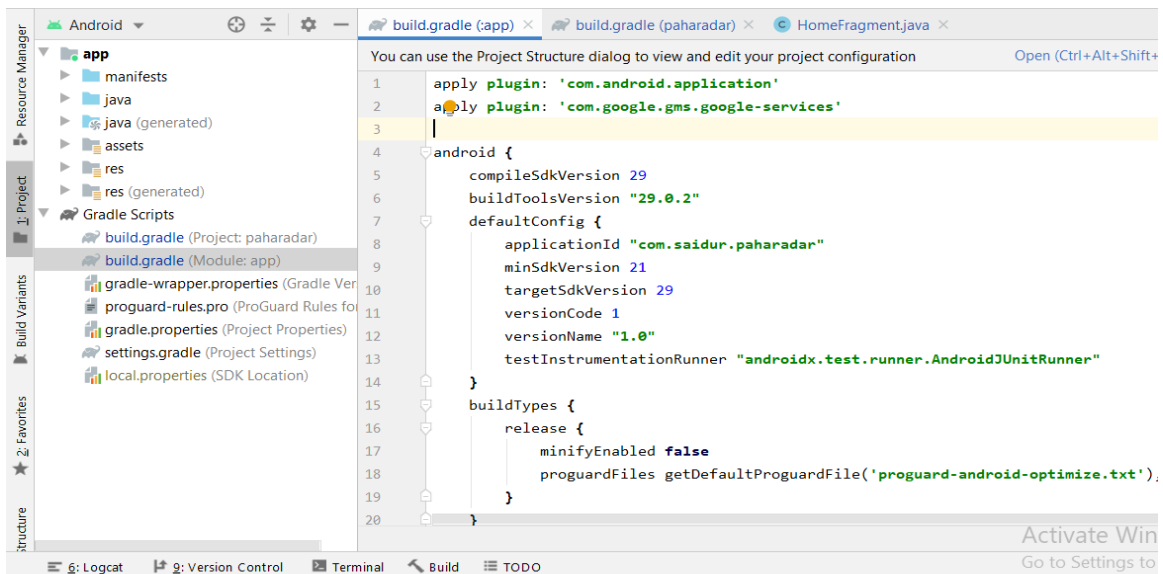


Figure 4.4.1: Dependency.

CHAPTER 5

IMPLEMENTATION AND TESTING

5.1 Implementation of Database

In this area, I am presenting the database of my project. The database is an efficient collection of knowledge. Database support the collection and control of information. I use a firebase for the sector database. Firebase is a set of constants. Information is stored as JSON in the firebase database and continuously updated to each associated customer. At a time when I am creating cross-stage applications with Android and JavaScript SDKs, all of our customers share a single case of a constant database and, as a result, get refreshes with the latest details.

There are eight substances in our sample. Linked with one another in a coordinated or multiple way to a various or distinctive kind of association. This partnership makes it possible for my application to work. A client will include several posts in my project. One post has numerous alerts, additionally numerous reactions, only one client may make one response. Various clients are given numerous warnings. One client will follow a large number of clients. One client has a lot of talk list bits, and one client will visit a lot of choices.

ER Diagram

Saidur Rahman 161-15-856 |

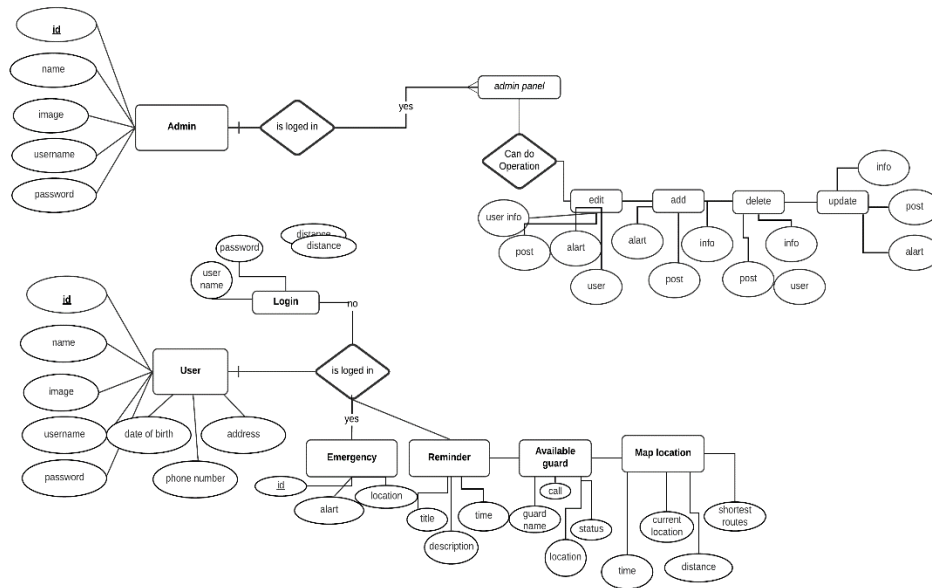


Figure 5.1.1: ER Diagram

The screenshot shows the Firebase Authentication console. On the left is a dark sidebar with navigation options: Project Overview, Develop (Authentication, Database, Storage, Hosting, Functions, ML Kit), Quality (Crashlytics, Extensions), and a settings gear icon. The main content area is titled 'Authentication' and has tabs for Users, Sign-in method (selected), Templates, and Usage. Below the tabs is a 'Sign-in providers' section containing a table with two columns: Provider and Status.

Provider	Status
Email/Password	Enabled
Phone	Enabled
Google	Enabled
Play Games	Disabled
Game Center Beta	Disabled
Facebook	Disabled

Figure 5.1.2: Firebase Sign-up providers.

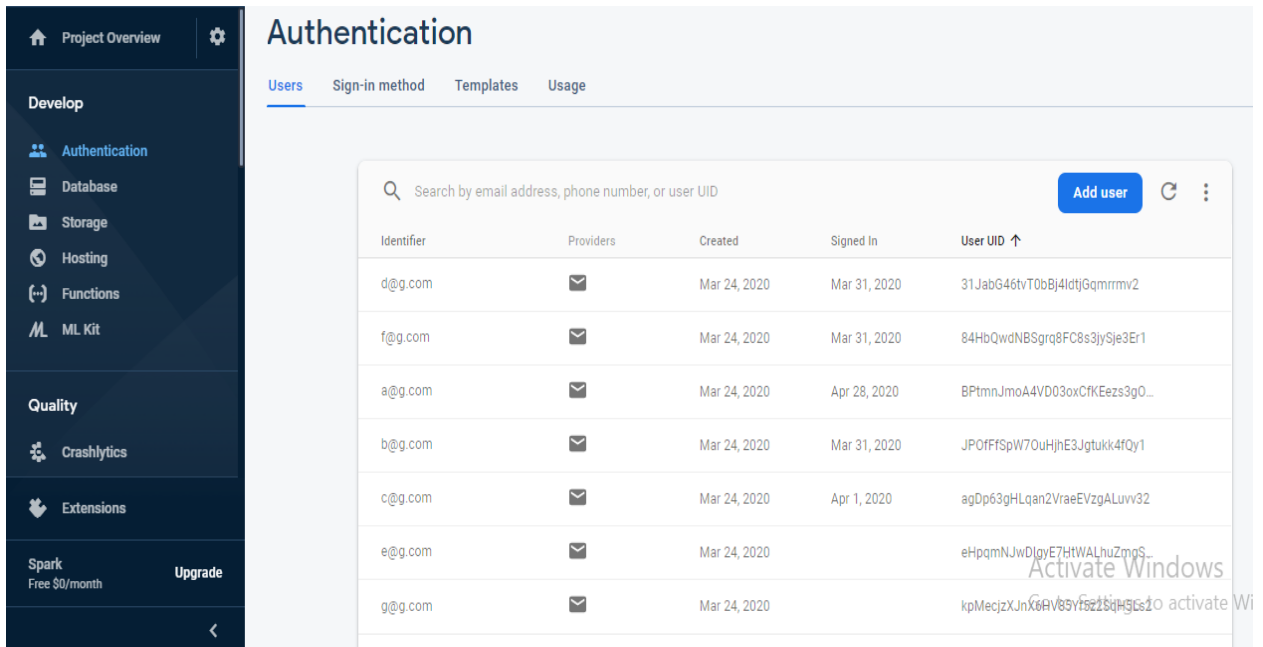


Figure 5.1.3: Registered guards from Firebase Real-time database.

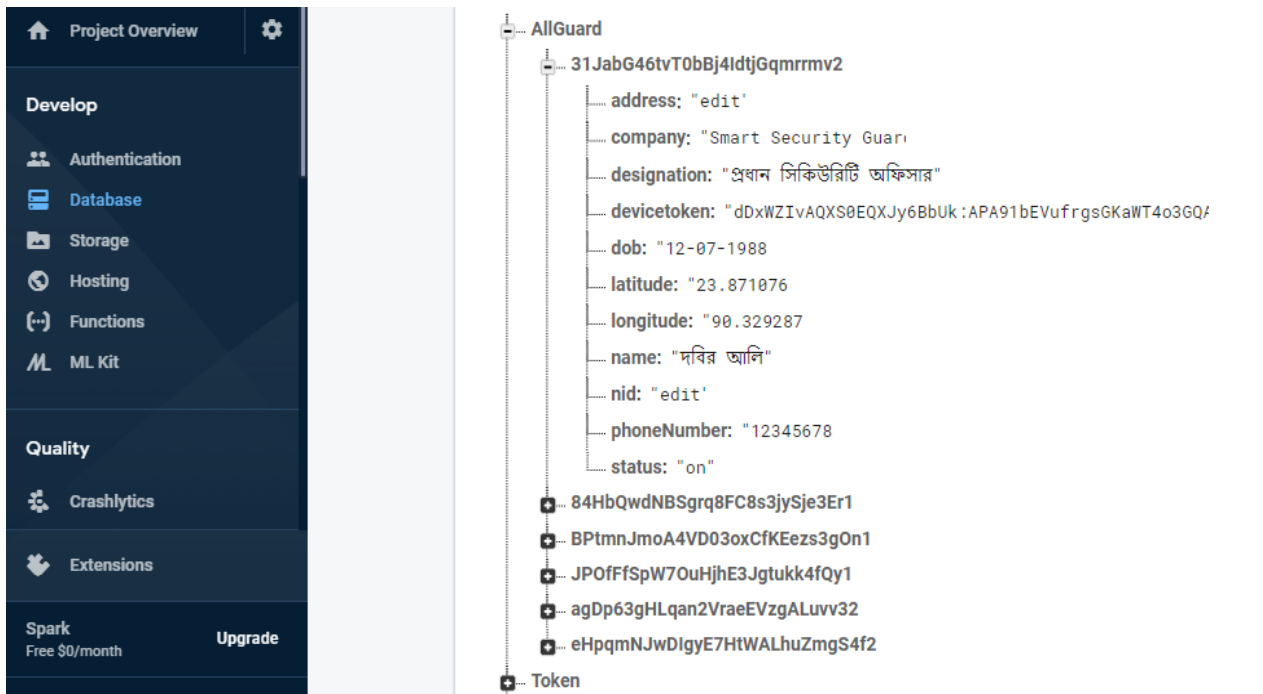


Figure 5.1.4: Data from Firebase Realtime database.

5.2 Implementation of Front-end design

The user engages primarily with the front-end interface. So, it's important to make the front end design attractive. I am trying to make the front end interface user-friendly so that the application can be used easily by the customer.

Through logging in, the user can see all the functionality on the home page and quickly access the options that they may need. They can edit their profile and log out of this program.

5.3 Implement of Interaction

I am designing an application in order to enhance the program. Security guards Companies and security officers are my key target customers. We're working to make our application user-friendly. I'm trying to simplify and smooth the application so that the application can react quickly. I used the native platform to build Android Application easily.

5.4 Testing Implementation and Results

When I complete the mobile application. Then, for the purpose of testing, I provide this application to some users, and they send me useful feedback, and finally, they told me to show this application to security guard agencies for a good dealings.

CHAPTER 6

FUTUTRE SCOPE AND CONCLUSION

6.1 Discussion and Conclusion

My Smart Guard software has been successfully implemented. After connecting to the database through the firebase server, the overall features and functionality work fine. I trust my application would be of assistance to the user / admins. Guards can solve their own security problems by using the program. I try my best to make the front-end interface good for the client to use the application with ease. The purpose of this project is to explain all the features and procedures followed during the creation of the application. I explain all of the features and details in the paper that we used in the applications.

6.2 Scope for Future Development

In the future, Chat bot and video calling for communication, Medical and Police connection to make emergency services more complete, wallet payment for guard's salary, Payment for different bills such as current bills, gas bills, water bills, etc. will be incorporated into my project. I'm going to patch all the bugs in my application and I'm going to make sure that all the information from the guards and other resources is saved in the hosting database.

REFERENCE

References

- [1] Kiran, UV & nisha,. (2015). Occupational stress among security guards. Journal for studies in management and planning. 1. 21-31.
- [2] [Online]. Available: <https://securityguard.app>
- [3] [Online]. Available: https://play.google.com/store/apps/details?id=com.guardso_new&hl

APPENDICES

APPENDIX A: PROJECT REFLECTION

1. Java language and Native Framework(Android Studio):

```

29
30 public class HomeFragment extends Fragment {
31
32     private HomeViewModel homeViewModel;
33     private RecyclerView recyclerView;
34
35     private List<Post> posts;
36     private PostAdapter adapter;
37
38     public View onCreateView(@NonNull LayoutInflater inflater,
39                             ViewGroup container, Bundle savedInstanceState) {
40         homeViewModel =
41             ViewModelProviders.of(fragment: this).get(HomeViewModel.class);
42         View root = inflater.inflate(R.layout.fragment_home, container, attachToRoot: false);
43
44
45         recyclerView = root.findViewById(R.id.rv_home_post_show_id);
46         recyclerView.setLayoutManager(new LinearLayoutManager(getActivity()));
47
48         posts = new ArrayList<>();
49

```

Figure A.1: Home Page Code

```

1 package com.saidur.paharadar.ui.gurd_location;
2
3 import ...
4
24
25 public class GurdMapsActivity extends FragmentActivity implements OnMapReadyCallback {
26
27     private GoogleMap mMap;
28     private Double lat, lon;
29     private String name;
30
31     @Override
32     protected void onCreate(Bundle savedInstanceState) {
33         super.onCreate(savedInstanceState);
34         setContentView(R.layout.activity_gurd_maps);
35         lat = Double.parseDouble(getIntent().getStringExtra( name: "lat"));
36         lon = Double.parseDouble(getIntent().getStringExtra( name: "lon"));
37         name = getIntent().getStringExtra( name: "name");
38         // Obtain the SupportMapFragment and get notified when the map is ready to be u
39         SupportMapFragment mapFragment = (SupportMapFragment) getSupportFragmentManager
40             .findFragmentById(R.id.map);
41         mapFragment.getMapAsync( onMapReadyCallback: this);

```

Figure A.2: Map page Code

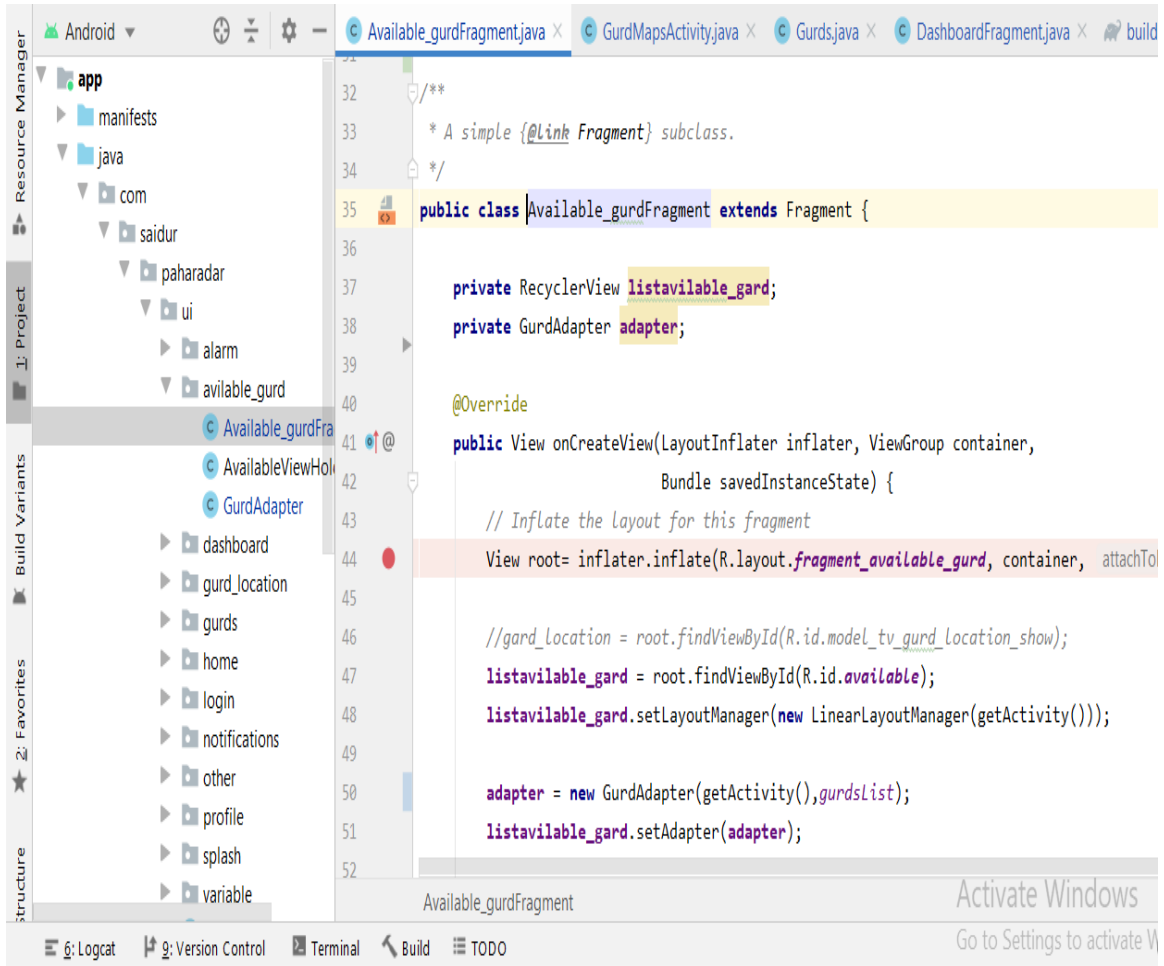


Figure A.3: Available guards page Code

APPENDIX B: RELATED DIAGRAM

Figure B.1 Shows Admin and Security Guards Connectivity.

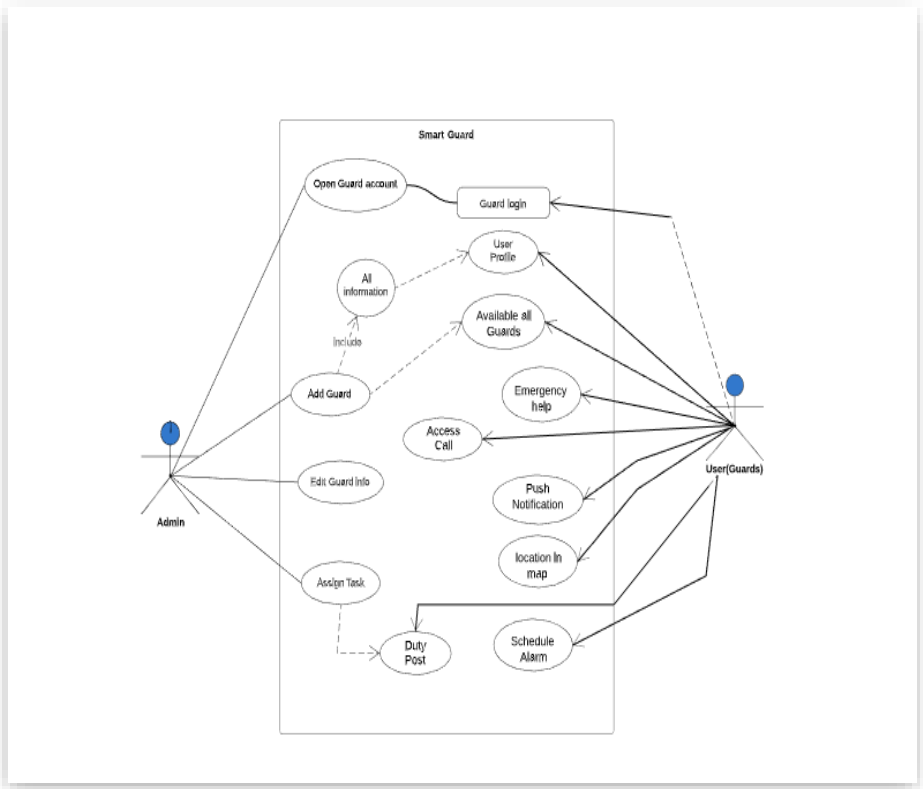


Figure B.1: Security Guards and Admin operation

UML class diagram

Saidur Rahman 161-15-856 |

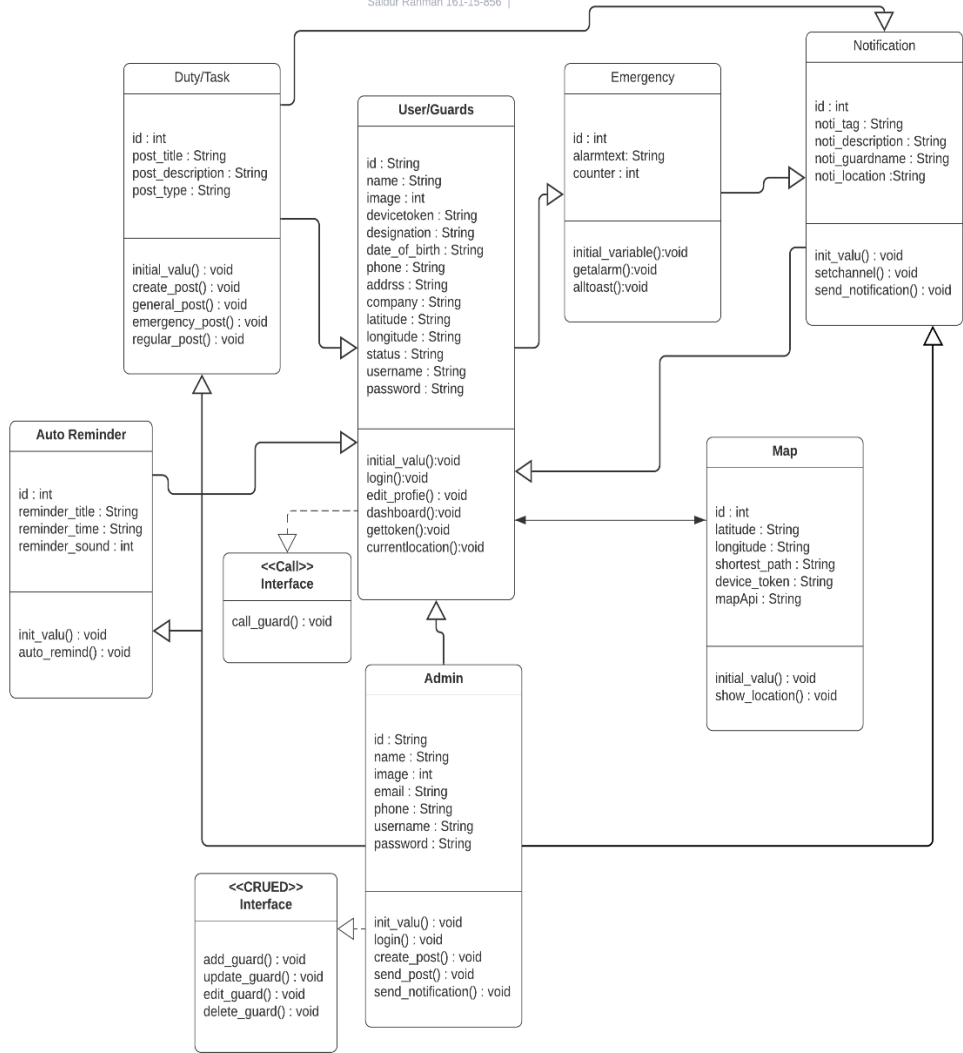


Figure B.2: UML diagrams