DESIGNING AND DEVELOPING AN ANDROID APPLICATION FOR TREE DISEASES (GARDIAN)

SUBMITTED BY

ASSRAFUZZAMAN NUR
ID: 172-15-9588
ABU SAYEM ARMAN
ID: 172-15-9587
TANVIR AHMED
ID: 172-15-9909

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

SUPERVISED BY
MS. FARAH SHARMIN
Senior Lecturer
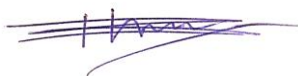Department of CSE
Daffodil International University

DAFFODIL INTERNATIONAL UNIVERSITY
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APPROVAL

This Project/internship titled "Designing and developing of an android application for Tree Diseases (Gardian)", submitted by "Assrafuzzaman Nur (ID: 172-15-9588)" , "Abu Sayem Arman (ID:172-15-9587)" and "Tanvir Ahmed (ID: 172-15-9909)" 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 01.06.2021
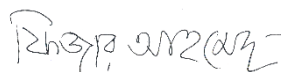
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Daffodil International University

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Internal Examiner

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Senior Lecturer
Department of Computer Science and Engineering
Faculty of Science & Information Technology
Daffodil International University

Dr. Mohammad Shorif Uddin
Professor
Department of Computer Science and Engineering
Jahangirnagar University

DECLARATION

We hereby declare that this project is done by us under the supervision of **Ms. Farah Sharmin, Senior Lecturer, Department of CSE** at Daffodil International University. I also declared that neither this project nor any part of the project has been submitted elsewhere for the award of any degree or diploma.

Supervised By:

Farah Sharmin

Ms. Farah Sharmin
Senior Lecturer
Department of Computer Science and Engineering
Faculty of Science and Information Technology
Daffodil International University

Submitted By:

Assrafuzzaman Nur

Assrafuzzaman Nur
ID:172-15-9588
Department of Computer Science and Engineering
Daffodil International University

Arman

Abu Sayem Arman
ID:172-15-9587
Department of Computer Science and Engineering
Daffodil International University

Tanvir Ahmed

Tanvir Ahmed
ID:172-15-9909
Department of Computer Science and Engineering
Daffodil International University

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We would also like to thank our entire course mate at Daffodil International University, who helped us make this project successful and discuss it while completing the course work.

Last, we respect our parents for continuous support and patients for all the steps. We also must acknowledge their goodwill.

ABSTRACT

This project is titled "Designing and developing an android application for tree diseases (Gardian)". We tried to develop an android application that will help to treatment tree diseases and be able to give a solution for that problem. This service will be available 24 hours through this application. Users can access various information about their trees, able to discuss anytime about their tree's diseases with other necessary things for trees and get tips for the tree. We also included an online chat system for the users to discuss with us for their tree diseases. We tried to make the user interface very user-friendly so that the user can easily access this app without any hesitation. Any person who has a smartphone can use this application by login with the phone number. For the first time login, users need to register with their name, phone number and email. In this case, every user must give their information correctly. If an admin sees any activity of a user that violates the terms and conditions, the admin can disable that user. To control the app (Gardian) perfectly some relational features are also built for the admin and users. Every one of them has a different role to control this app. Tree diseases specialized doctors and some pharmacies will be registered by the admin. The medicine seller will know about the product and orders are placed by the users. We also have a plan to improve the features and facilities more.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Today in our digital world we all have a smartphone. Which offers advanced technologies with functionality similar to a personal computer. Nowadays we try to do all of our daily tasks with a mobile phone. We cannot deny that it is a part and parcel of our daily life. There are many useful applications that are used on a mobile phone. We collect these applications from various websites and play stores. We noticed that there are so many applications in our country. But there is no such application that fulfills all the demands of a Tree.

There is an application that are used for our **Tree Diseases**. In this case, the user will use the app name "**Gardian**". These applications are designed for a smartphone or a tablet pc running on the Android operating system. People can download these applications from various play stores. After installing this application, people can sign up and become a member. Only registered members can access all the features of the application. A user can deal with all their necessaries through this app. This application has been made in Bengali for a better understanding of the user.

1.2 Motivation

Nowadays, technology is so updated in our country. We can get any type of stuff for our daily necessaries online. All of the services are accessed through smartphones. So that we can use them anywhere anytime. It is hard for a user today to find a tree disease solution for a simple disease issue. They need to open a browser and search for that problem. Sometimes they need to go physically to the nursery or regional agricultural office. That is the reason they struggled with traffic jams and waste valuable time.

Our motive is to make an application which can be used in smartphones to ensure tree diseases solutions very easily. A user will be able to search tree problems, medicine suggestions, get their solution through app, order medicine, search nursery, and they will also get their all-necessary help through this application.

A few applications are made like our application but they develop partially. They have so many bugs and are not very simplistic to the user. This app will ensure a better solution for trees and also the solution of all problems.

1.3 Objectives

1. To develop an android based tree disease.

2. To make a friendly platform for users.

3. To provide cloud-based Solution System.

4. To provide 24 hours online chat support.

5. To reduce time and money to find the tree's problems.

6. To provide proper use of the tree diseases reports.

1.4 Expected Outcome

● Precaution and medicine for the tree diseases

● Will be a reliable platform for user

● 24 hours online chat support

● Regular tips for tree

● Faster solution for the problem

● No more additional expense

CHAPTER 2

BACKGROUND

2.1 Introduction

This is an android application that will deal with the user for their tree's diseases issues. At present android application is more efficient and reliable for every class of people. Everyone wants to save their valuable time and wants their life easier. They want a more user-friendly platform. There are some similar applications on the web sites but that application has a lot of bugs and poor maintenance service. All the things that we are talking about are unique, combined and user-friendly applications from others.

2.2 Related Works

Plantix: This is a mobile crop consulting application for farmers, extension workers and gardeners. The application claims to diagnose insect damage, plant diseases and crop damage nutrient deficiencies and provides related treatment measures. [Plantix.net, 2021. [Online]. Available: https://plantix.net/en/]

Fosholi: Fosoli has emerged for farmers in the form of digital platforms. Digital platforms, including consulting services for farmers in the form of Fosholi. [Fosholi.com, 2021. [Online]. Available: https://www.fosholi.com/]

Leaf Doctor: Leaf Doctor performs quantitative assessments for plant diseases on plant organs such as leaves. [Play.google.com, 2021. [Online]. Available: https://play.google.com/store/apps/details?id=com.leafdoctor&hl=en&gl=US]

2.3 Comparative Studies

Comparatively, there are very few applications available in the market. Moreover, the applications are not fully active. Most of them are web-based applications. They do not have any packages. They do not give any online chat support. Other hand most of them have a huge bug. Some are trying to make this type of app but they have different ideas.

2.4 Scope of the Problem

The main scope of the problem is the source of easy ideas and information. We always trying to make our application easier and user-friendly. If we want to make this application easier, we have to collect information from Upozila Agriculture Office. But it is very hard to get the information by convincing them.

2.5 Challenges

Requirement: The most challenging matter is to fulfill the design of the app so that the user willingly uses this app. Sometimes we fall in bugs when the version will update when developing this application. Sometimes there is some invisible error that is very much tough to find and correct. It needs to spend some hours.

Poor Communication: We are three members developing this project. For the pandemic situation it is very tough to get together and solve every stage of the project problem. Effective communications are very important to make this project successful.

Time Scheduling: It is very hard to complete the project on time. Because our previous project supervisor went to America after our title defense.

CHAPTER 3

REQIUAREMENT SPECIFICATION

3.1 Business Process Model

The model we use for our project is given below. The business process model is a systematic way of presenting the workflow of a system. The image of data flow is a graphical way to present data tracking through an information system. Logical data flow diagrams describe the flow of data through a system to perform certain tasks in a business. We can link up our DFD and business process diagram to connect our system processes and business activities. Our system DFD is displayed:
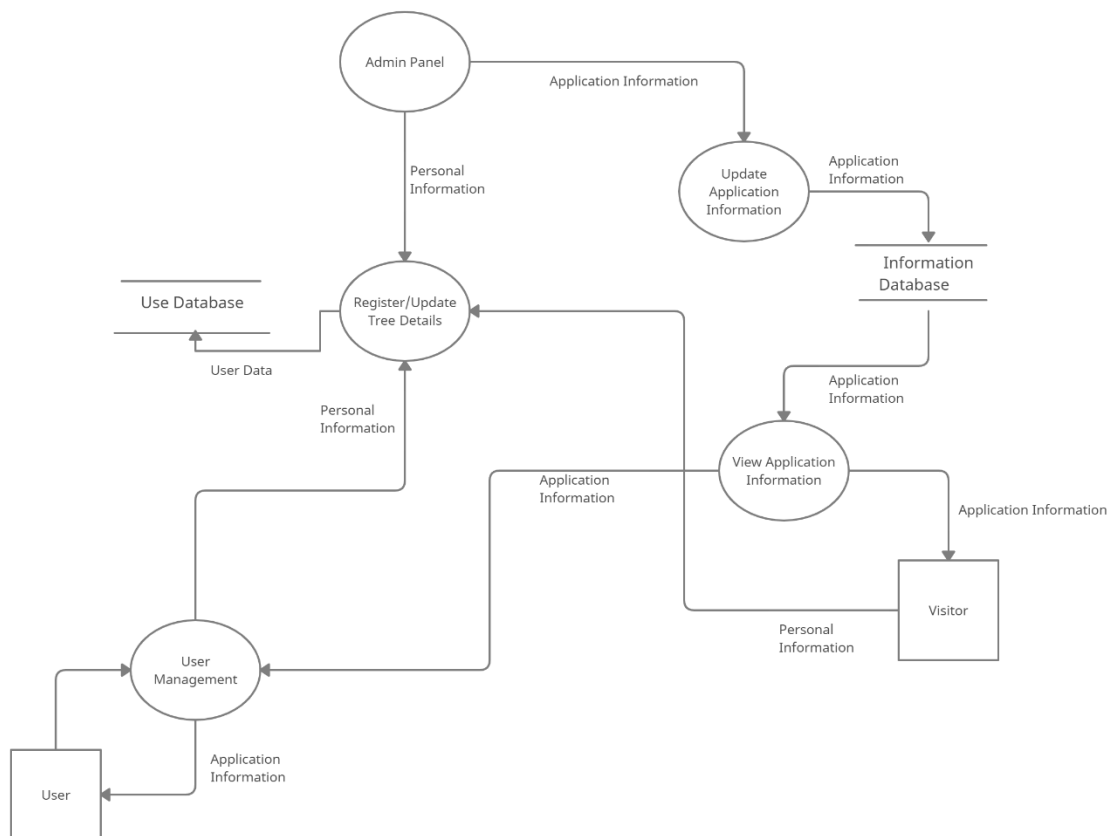

Figure 3.1: Data Flow Diagram

3.2 Requirement Collection and Analysis

The primary conditions of development are requirement analysis and requirement collection. There are two types of requirements for development. One is the functional requirement and the other requirement is nonfunctional. Those activities performed by software are called functional. Nonfunctional requirements generally define the personality of an application.

Functional Requirement: In our project, there are many functional requirements. There is an authentic login, medicine suggestion, get their solution through app, order medicine, search nursery, and they will also get their all-necessary help through this application.

Nonfunctional Requirement: Nonfunctional requirements usually depend on how much user-friendly UI you are using. The UI should be user friendly and for a fantastic user experience.
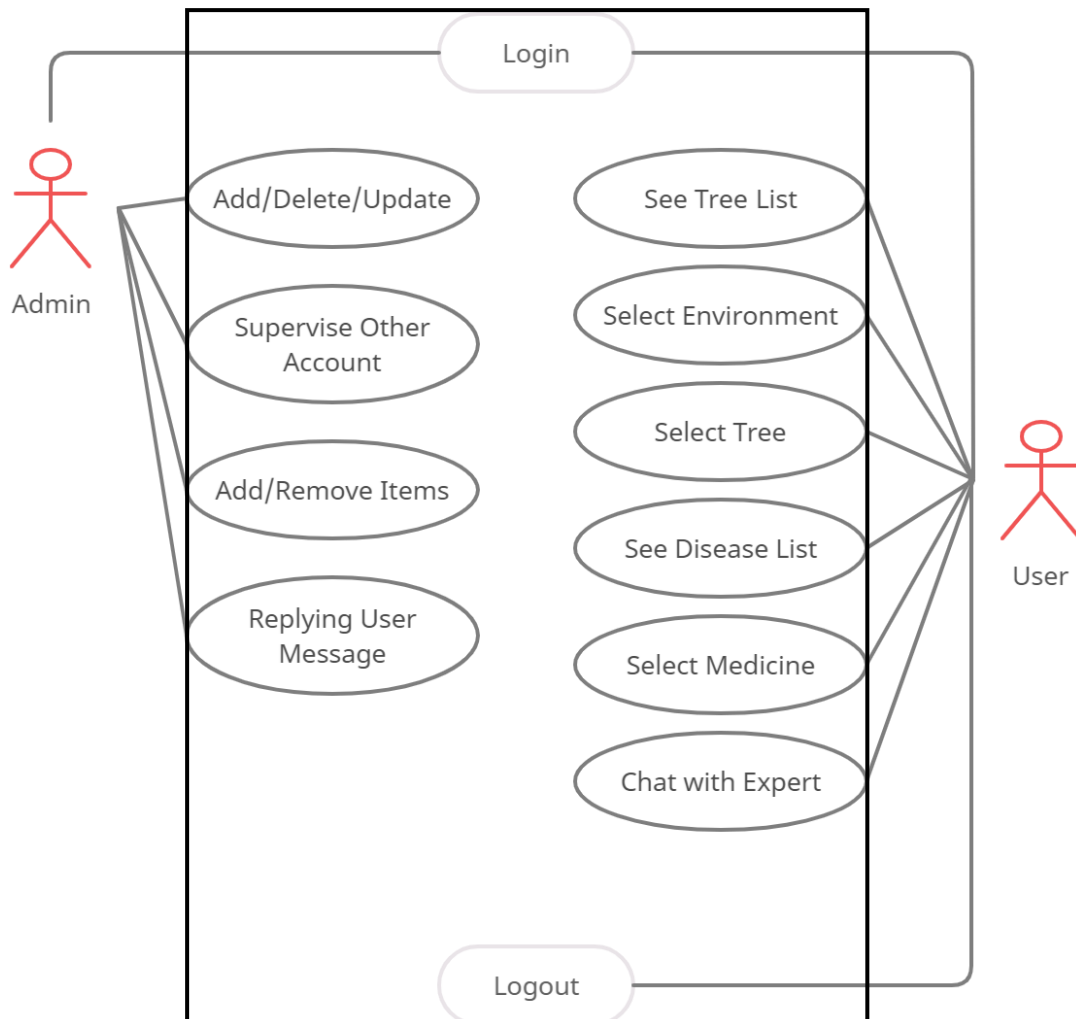
3.3 Use Case Model and Description

Figure 3.3: Use Case Diagram for the System

Users can log in, able to see the most commonly used tree list, after that users need to choose their environment (veranda or roof) garden, then need to select the tree that the user wants. After selecting the tree, the user can see some common disease list for that tree. Then select the disease and be able to find out the medicine for the disease. If there is any problem or the user could not understand the issue then the user can share an image file or live chat with the expert.

Admin can add, delete or update the tree list, disease list, medicine list, and tree image for better understanding to the users. An admin also supervises other user accounts and anytime can add or remove products depending on user requirements.

In the chat, the admin can answer the user query about the tree-related issues and be able to see the user image for better understanding.

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 an object, a component of data. An entity set is a collection of similar entities. These entities can have attributes that define its properties. The logical data model presents the Entity-relationship diagram called the ER diagram. An entity is a piece of data-an object or concept about which data is stored. The ER diagram of our system is given below.
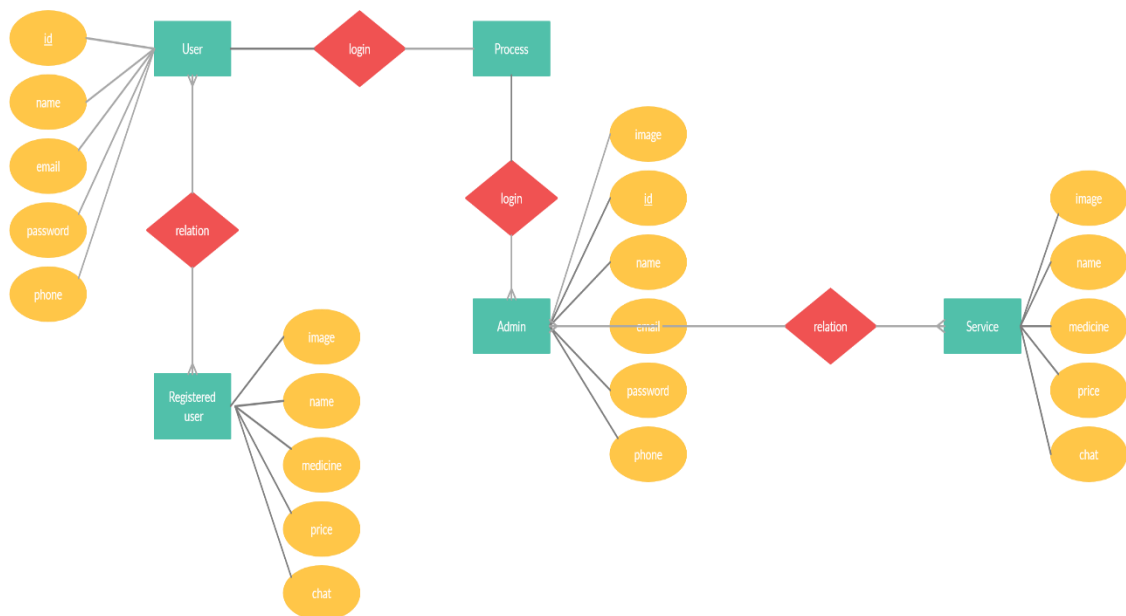

Figure 3.4: Entity Relationship Model

3.5 Design Requirements

Each system or software must consider some issues that have reproduced overall the system is designed to achieve that goal. The design of the project will be differed from system to other system We look for some points for the design requirements given below:

Efficient: Running the application faster on any device is very important. We made our application very smoother and bug-free. We made this application design very light.

User-Friendly: This application is very much user-friendly. People will easily be able to access all of the features smoothly. The design is very soft and all the layouts are very well decorated.

Compatible to various devices: our application is compatible with any android smartphone that supports the minimum SDK level 23.

Some Extra Features:

- There are two types of users: Admin, User.
- Admin can add / delete / update tree lists.
- Admin can supervise all other account details.
- Users will register and update an account.
- Users can easily find out the tree from the list.
- Users can share images with experts.
- Users can see tree list, medicine list and disease list.
- Users can chat with experts.
- Users can request to update the tree list.
- Users can suggest to the admin.

CHAPTER 4

DESIGN SPECIFICATION

4.1 Front-End Design

Front-end is the visual part of an application. Front-End Design consists of two parts: XML file for the design and structure of the user interface and class for developing logical operations of that user interface.

In the XML file of our user interfaces, we are using various activity layouts and various types of labels such as recycler view, card view, circular image view, edit text, image view, button, text view, slider, and various animation and custom fonts. We have also used some extra XML files and classes to make our application much more user-friendly and attractive user interface so that it becomes easy to use for the users. As a result, it has turned out simple but attractive.

Figure 4.1: User Welcome Page Figure

Figure 4.1 shows the user's welcome page. When the user opens the application, he will see this page.

4.2: User Registration Page   4.3: User Login Page

Figure 4.2 shows the user's registration page. When the user will try to log in to his account, this login page will be visible on the device screen. For a new user, he needs to register first to enter the application. Here only fill up a valid email, name and password. All details need to be correct information.

Figure 4.3 shows the user's login page. A user will log in with email and password regularly. If they try the wrong email and password, they will be notified else they will successfully log in.
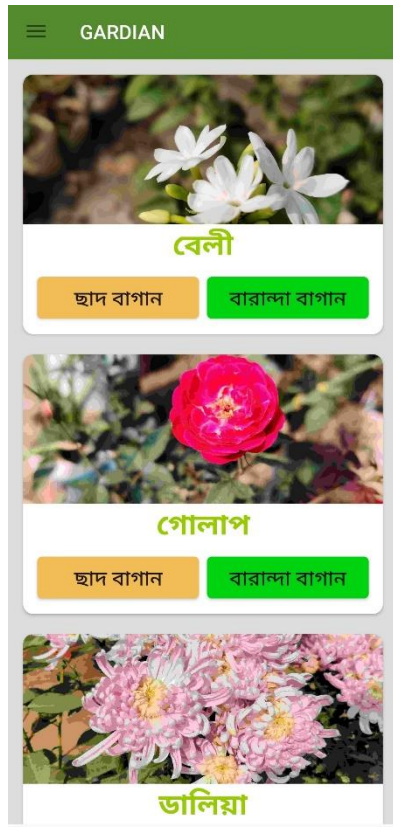
Figure 4.4: User Home Page Figure   4.5: Tree Disease List

Figure 4.4 show the user home page. After successfully login on the login page, the user shows this home page in his mobile screen. Here the user has to choose the tree he wants to look for and then select the environment. This selection is for the first time only.

Figure 4.5 shows the tree disease list. When a user selects a tree from the given list then the user will be able to see some common disease name and picture. From this list users can identify the disease of their plant.

Figure 4.6: Details of Tree   Figure 4.7: Disease Description & Solution
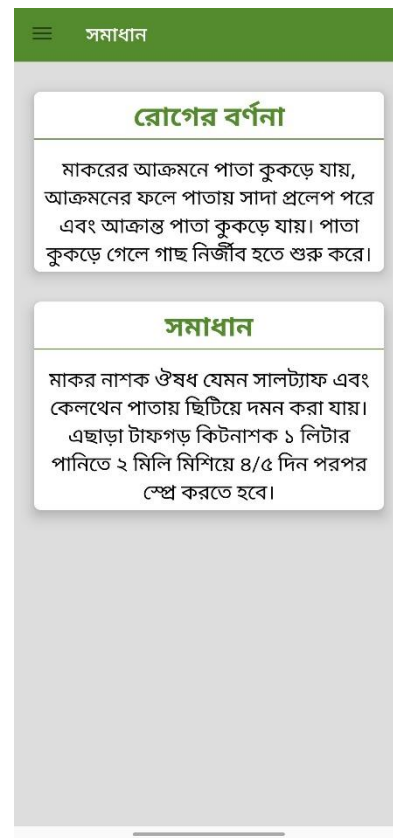
Figure 4.6 shows details of tree. Here the user has to select the amounts of tree and age of tree.

Figure 4.7 shows disease description and solution. After input the tree details the user will be able to see the suitable solution of his tree's disease. First column is the description of disease and the second column is the best solution of that disease.
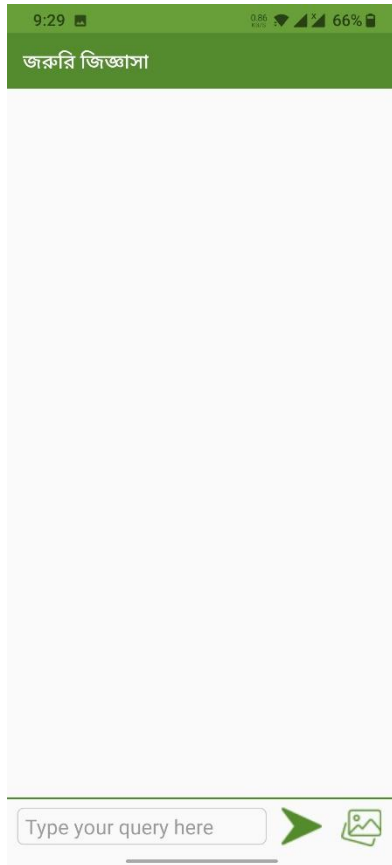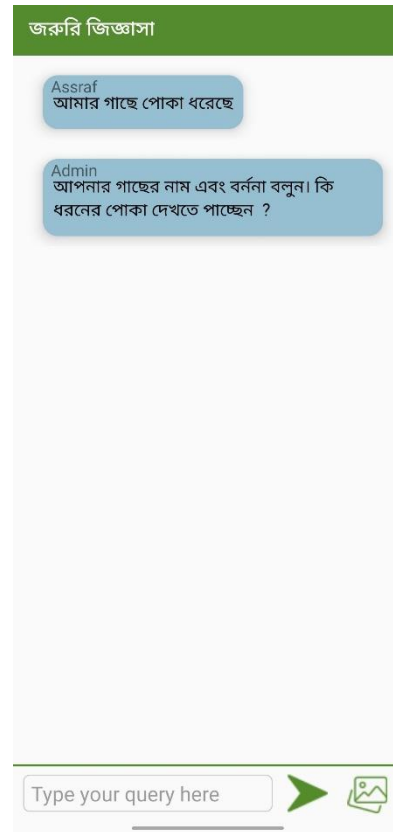
Figure 4.8: Chat Layout   Figure 4.9: User Chat Details

Figure 4.8 shows the layout of the chat. Here experts will reply to all the messages sent by the user.

Figure 4.9 show's user chat details. Here the user can ask anything about the tree and share pictures if he wants. After that the expert team as soon as possible answers his query and also sends the image to the user.
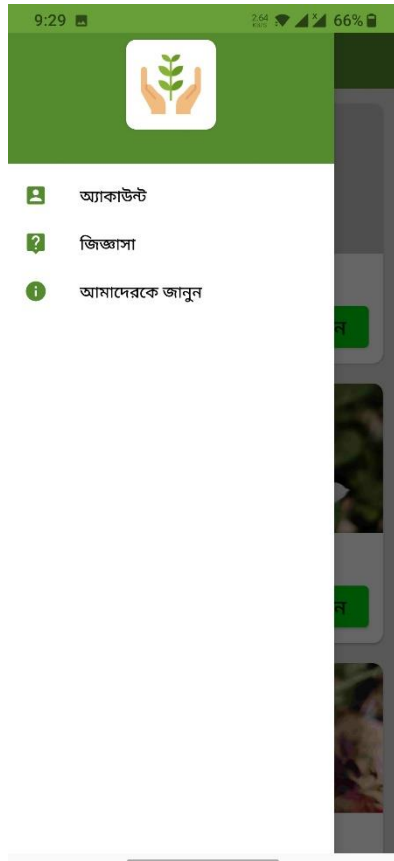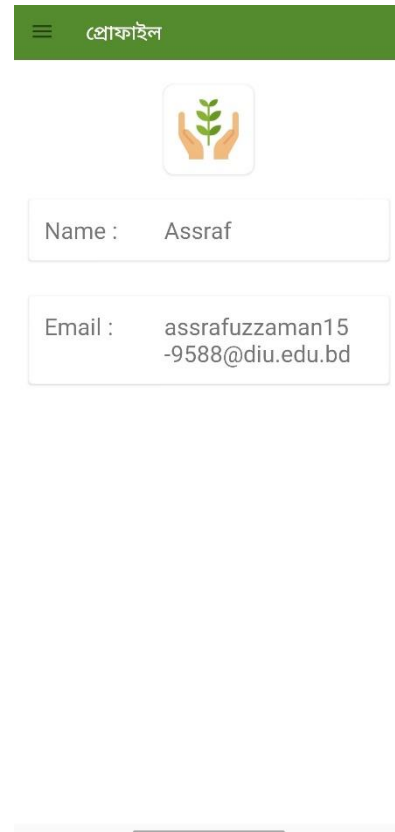
Figure 4.10: Account Control   Figure 4.11: Update Profile

Figure 4.10 shows user account control. Here users can move from one feature to another.

Figure 4.11 Here users will be able to see their profile and update their information.

Figure 4.12: User About Page

Figure 4.12 Here users are able to see about the admin and app authorization.

4.2 Back End Operations

As we are developing an android application, we must consider some important backend operations. The database is the major of them because of all the tasks performed based on the database. The database we used was MySQL database. The MySQL database is very fast and real-time. Some basic back-end operations of our application are given below:

Some basic back-End Operation of our application is given below:

- Automatic capacity scaling
- Automatic real-time data synchronization
- Automatic server maintenance
- Easy user authentication

- Messages and notifications
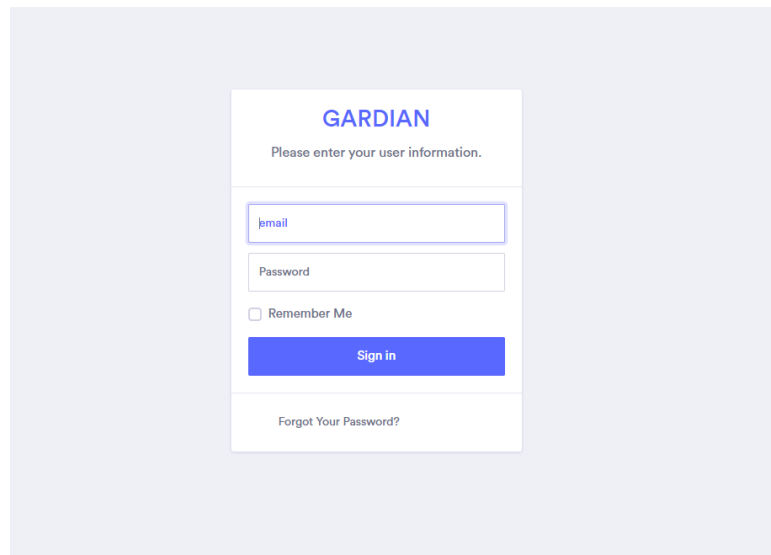- Synchronize data across multiple devices

Figure 4.13: Admin Login

Figure 4.13 Admin can log in to the database with a valid email and password.
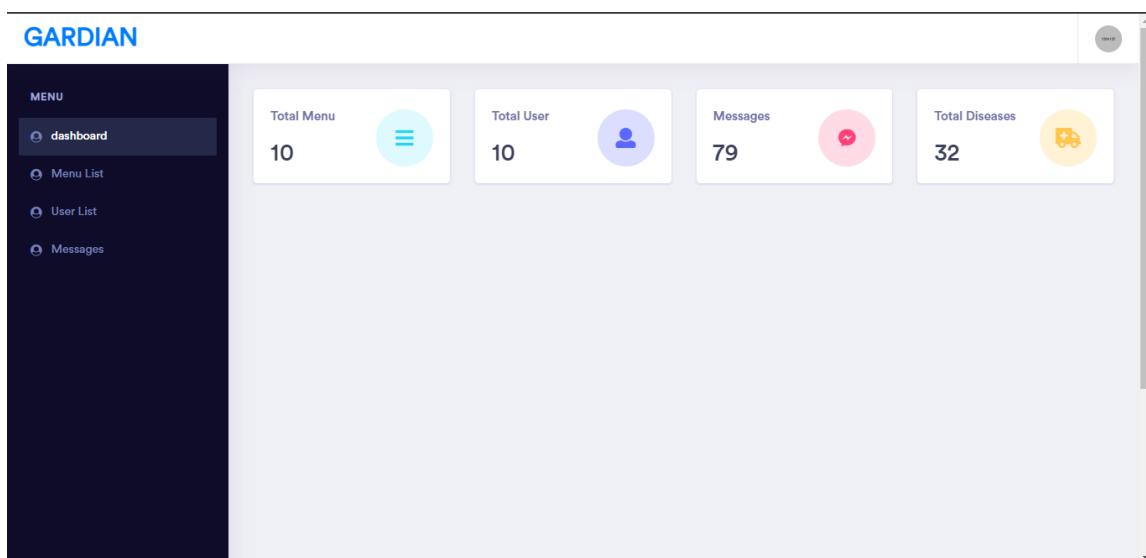

Figure 4.14: Admin Dashboard

Figure 4.14 In this segment Admin is able to see the current status and summary of the application database. Here mentioned total number of users, total number of messages received from users and many more related to the project
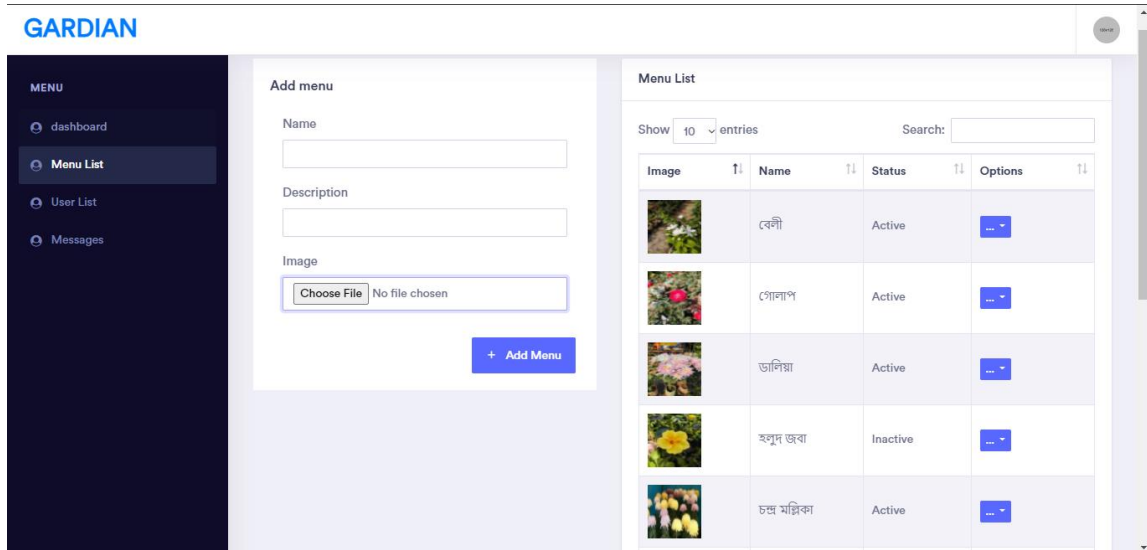
Figure 4.15: Admin Menu List

Figure 4.15 shows admin menu list. Here admin can add a new tree item whenever he wants. Admin can set the name, description, and image of the tree.

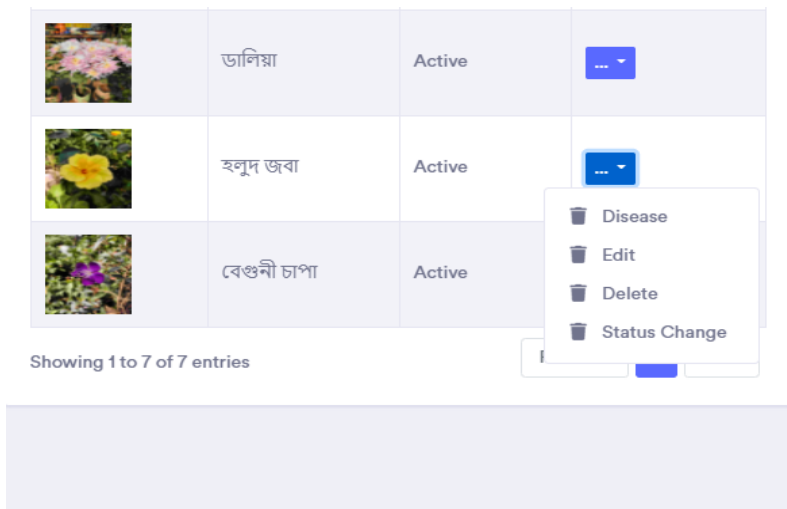The menu list will show the list of trees that the admin adds before.

Figure 4.16: Item Customization

Figure 4.16 shows menu list item customization. An admin can change/edit/delete or change the status of a tree from the menu list.
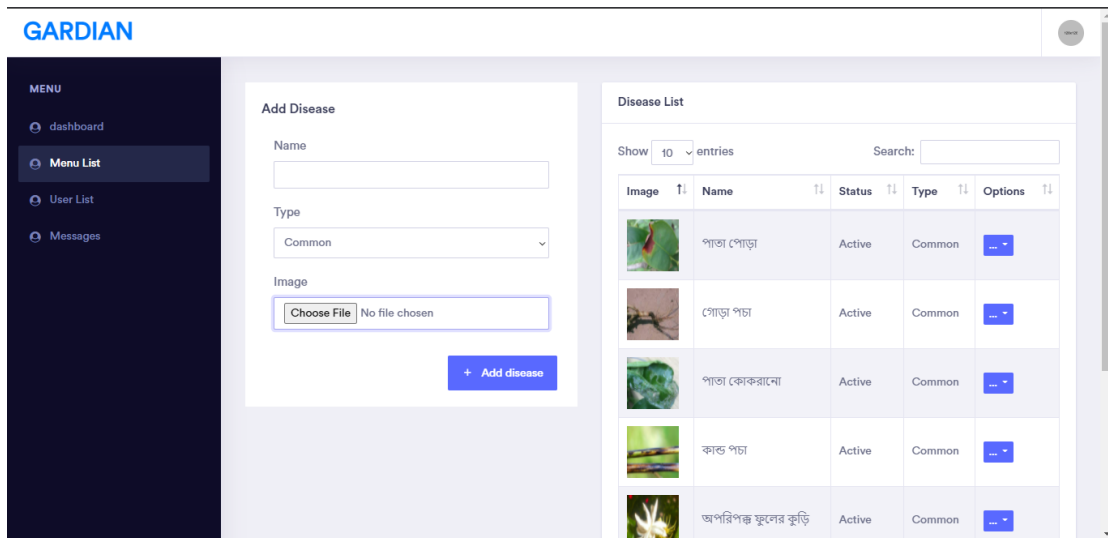
Figure 4.17: Add Disease

Figure 4.17 shows add disease. When the admin selects disease from the menu list tree then this page is visible to him. Here the admin will be able to add a new disease name, description and set an image for better understanding to users.

The disease list will show the list of diseases for a specific tree that the admin adds before.
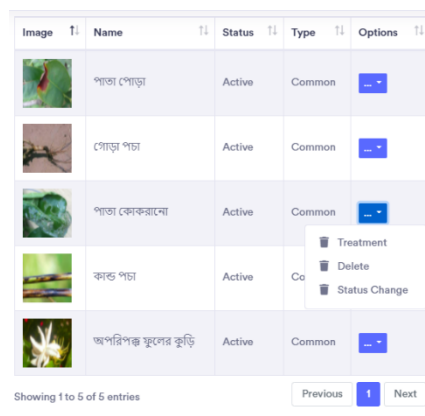

Figure 4.18: Disease Customization

Figure 4.18 shows disease list item customization. An admin can change/delete or change the status of disease from disease list.
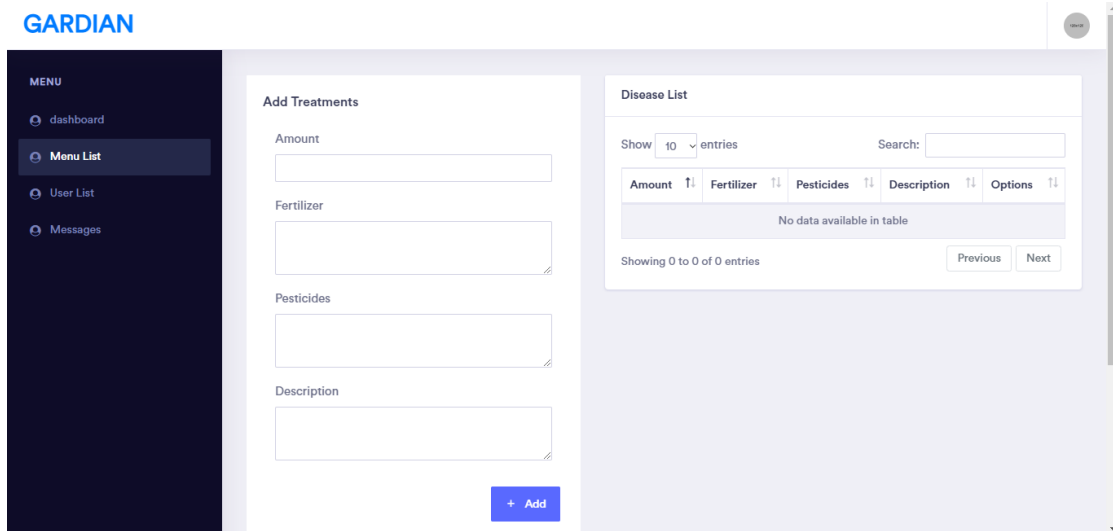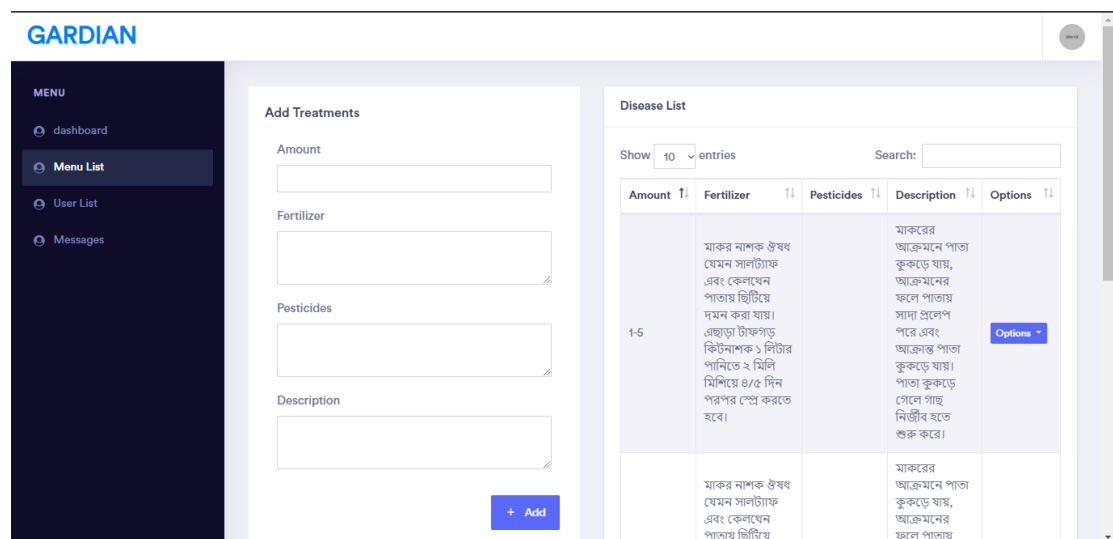
Figure 4.19: Add Treatment

Figure 4.19 shows add treatment. When the admin selects a treatment from the disease list then this page is visible to him. Here the admin will be able to add an amount of soil, fertilizer, pesticides and description of a disease.

The treatment list will show the list of treatment for a specific disease that the admin adds before.

Amount ⇅	Fertilizer ⇅	Pesticides ⇅	Description ⇅	Options ⇅
1-5	মাকর নাশক ঔষধ যেমন সালট্যাফ এবং কেলথেন পাতায় ছিটিয়ে দমন করা যায়। এছাড়া টাফগড় কিটনাশক ১ লিটার পানিতে ২ মিলি মিশিয়ে ৪/৫ দিন পরপর স্প্রে করতে হবে।		মাকরের আক্রমনে পাতা কুকড়ে যায়, আক্রমনের ফলে পাতায় সাদা প্রলেপ পরে এবং আক্রা... কুকড়ে পাতা ব...গে গেলে গাছ নির্জীব হতে শুরু করে।	Options ▾ 🗑 Delete

Figure 4.20: Treatment List

Figure 4.20 both shows treatment list. An admin can change or delete treatment list. The treatment list will show the list of solutions for a specific disease that the admin adds before.

Figure 4.21: User List

Figure 4.21 Here admin is able to see every user of this application and their user account authentication.
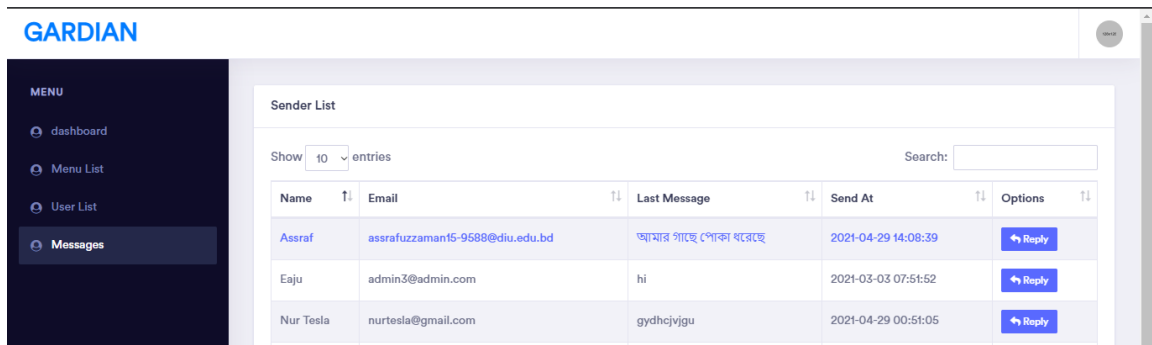
Figure 4.22: Admin Chat Details

Figure 4.22 shows admin chat details. Here admin gets all notifications from the user message. He can see the user's name, email, last message and the time. From this page admin will be able to reply to the user.

Figure 4.23: Admin Chat Layout

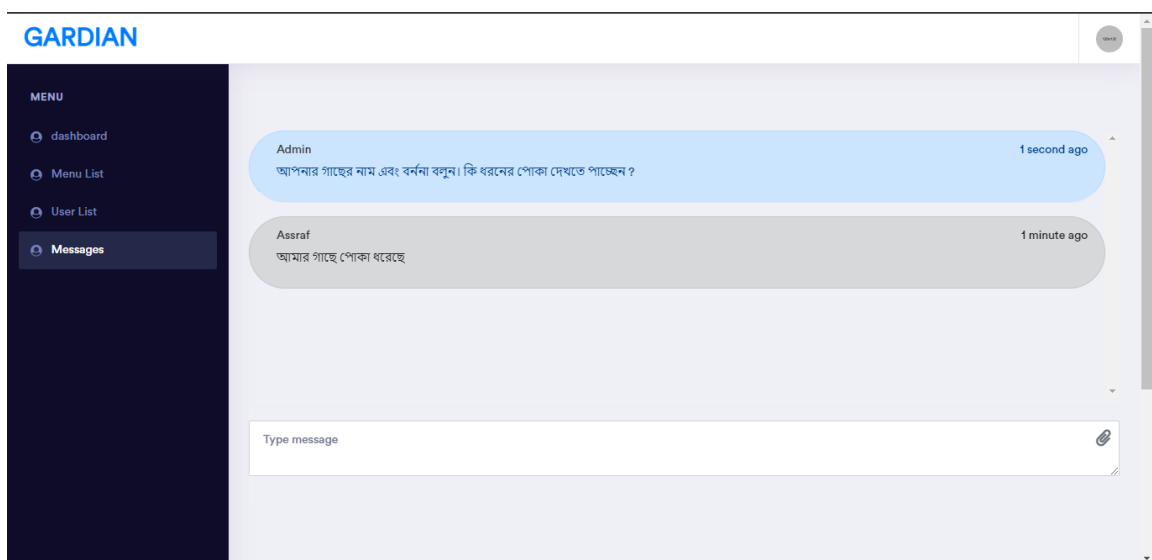Figure 4.23 shows admin chat layout. Here admin receives and replies the user query by text, image or other file.

4.3 Interaction Design

Today every person wants interaction design for their android mobile phones and tabs. The interaction design makes the app more user-friendly and attractive to the users. The goal of interaction design is to create products that enable the user to achieve their

objectives in the best way possible. Interaction design is the proper way that observes the interaction between a system and its user.

Other hand user experience focuses on the overall experience interaction design between a user and an application.

4.4 Implementation Requirements

To implement the project, we needed Android Studio to design and develop the whole project. Other hands for the backend we needed a browser and a Google account. For testing purposes, we need JDK and SDK also NDK. We also needed a virtual device to run and test the app on the PC. Adobe illustrator, Photoshop is also used for making different types of icons and backgrounds. We also needed a strong internet connection to update the Gradel file of the Android studio.

CHAPTER 5

IMPLEMENT AND TESTING

5.1 Implementation of Database

The main task is to create a database and tables to load the data. In MySQL. We connected our app to the database and through our app, we made all the data collations. Sometimes, we update some data using queries initially. We also made some queries to load the data from the database. This is the implementation process of our database.

We used Query to store and retrieve data from the database. In this case, we stored all image files to the hosting storage section and generated an image link to the database using some queries. So that we can access it easily and smoothly. Besides we stored all the data into the real-time database. We used MySQL authentication to make using a unique id for the separation of all user role-based. We used parameters to show the treatment segment. Authentication also helps to recover user passwords easily. Also, we can upload/ delete/update through the authentication.

We related all of the facilities of the database to our application by java classes, various libraries, and dependencies. To execute our application with the connection of the database we used many methods to upload data, retrieve data and register users via MySQL Authentication.

5.2 Implementation of Front-end Design

In the android studio, front-end design is related to XML files and Java classes. XML files are used to design the user interface (UI). In the XML file, we added the Buttons, edit text, Relative Layout, Recycler view, Card view, Bottom navigations, Circular image view, various shapes for the backgrounds, Icons, and backgrounds. Then we related all the things with class by calling them. Classes play logical operations.

5.3 Implementation of Interactions

For the comparison of our opinion to our friends and supervisor and some of our faculty members about their opinion about the app. We shared our goals and visions. We took

their suggestions and opinions. Then we discussed with our project members for a friendly user interface, we used pictures and buttons with enough information so that the design is more interactive. After all the things we made more user-friendly and interactive applications.

5.4 Testing Implementation

The system is tested basically for the correctness of an application. Testing is an integral part of an application. Ultimately, the software is interfaced with other software/hardware systems. System Testing is a series of outputs. There are some test cases of our application are given below:

Table 01: A Test Case for The System (White Box Testing)

Test Case	Test Input	Expected Outcome	Obtained Outcome	Pass/Fail
1. Sign-up	Sign up with correct info	Create account successfully	Account creates	Pass
2. Sign-up	Sign up with incorrect info	Create account unsuccessfully	Unsuccessful account creates	Pass
3. Login	Login with a valid email and valid password	Login successfully	Successfully login	Pass
4. Login	Login with an invalid email or invalid password	Login Failed	Login failed	Pass
5. Select Option	Select Option	Select successfully	Successfully selected	Pass
6. Select Disease	Select Disease	Select successfully	Successfully selected	Pass
7. Select Treatment	Select Treatment	Select successfully	Successfully selected	Pass
8. Online Chatting Support	Tap to chat	Message sent and receive successfully	Successfully worked	Pass

A white box test case for the system that we tested internal structures or workings of an application, as opposed to its functionality.

5.5 Test Results and Reports

A test case is a formal way of testing. It is the easiest way to estimate testing. It is a document that records data obtained from an evaluation experiment in an organized manner, describes the environment or operating conditions. And shows the comparison of the test results with objectives.

- Login System
- Registration System
- Updating System
- Uploading Images
- Chat with experts
- Tree Information
- Disease Information
- Treatment Information
- Add image
- Download image
- Delete item
- Update profile
- Delete profile

CHAPTER 6

CONCLUSION AND FUTURE SCOPE

6.1 Discussion and Conclusion

Nowadays people are using most of the applications that are android-based mobile applications. Now everyone passes most of the time with the mobile phone. Other hand tree is the most essential component for our ecology. For this generation, our application will be very serviceable to tree lovers. Many people could not care of tree because of tree disease. End of the day they lose interest in gardening. Sometimes users waste their money to buy fake products fertilizer because they have no clear idea about the tree. To fulfill all the needs of a tree lover our application can be very effective. We hope to get rid of all the tree problems our application will be the solution.

6.2 Scope for Further Developments

In this sector, there is a huge scope for further development. People's interest in planting trees is constantly increasing. The android application-based tree disease solution is upgrading day by day. Some next plans for our app are given below:

- Users know about disease by scanning tree leaves.
- Use both languages (Bengali and English) for the people.
- User knows the suitable plant according to the weather and season.
- Proper virtual assistant for the users.

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Gardian