

**MOBILE APPLICATION FOR PERSONAL HEALTH RECORD AND
MANAGEMENT**

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

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DAFFODIL INTERNATIONAL UNIVERSITY

DHAKA, BANGLADESH

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APPROVAL

This Project titled “**Mobile Application for Personal Health Record and Management System**”, submitted by Md. Ferdouse Oahid, ID No: 142-15-4032, Md. Ariful Islam, ID No: 142-15-3671, Shalaha Akter, ID No: 142-15-3773 and Somaiya Jannat, ID No: 142-15-3487 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 7th May, 2018.

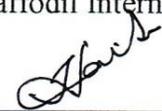
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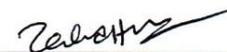
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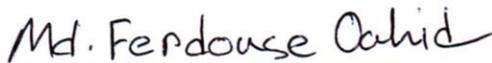
We hereby declare that, this project has been done by us under the supervision of **Dr. Syed Akhter Hossain, Professor and Head, Department of CSE**, Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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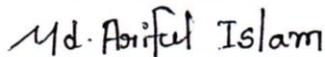


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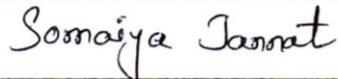
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ABSTRACT

In terms of health issues, it is always better to prevent than cure and technology is making that prevention easier than ever before. In this age of electronic information technology we get all the information we need right into our hand in just a few tap. Mobile and wireless technologies are benefiting millions of people around the world in every sector including health. But the medical system in our country is still running in an analog manner.

Thereby, people face lots of problems while taking medical services. For example our medical reports are often lost, or we forget about our scheduled checkups. We don't archive our medical states, so we cannot monitor our health or get the data when necessary. Such activities often cause serious health problems. In the other hand, patients like Diabetes, heart diseases, old-age etc. who need to monitor and analyze their health condition on a regular basis. They need to follow appropriate nutrition plan, regular exercise activities and maintain their medication properly. This motivated us to take-up a project on "Mobile Application for Personal Health Record and Management" which will target to achieve the expected. The project conceived from the requirements of real life. The project is implemented using Android platform. This innovation is tested from the real-time point of view and found very useful. The project already achieved an outstanding accolade in the ICT Carnival 2018 organized by the Daffodil Group. In future data analytics will be added to incorporate intelligence with the system.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

In this age of electronic information technology we get all the information we need right into our hand in just a few taps. Internet and smartphones made access to information easier and faster than ever before. But our medical system is still running in an analog manner.

Thereby, people face lots of problems while taking medical services. For example our medical reports are often lost, or we forget about our scheduled checkups. We don't archive our medical reports, so we cannot monitor our health or get the data when necessary. Such activities often cause serious health problems. In the other hand, patients like Diabetes, heart diseases, old-age etc. always need to monitor and analyze their health condition. The mobile application, "Personal Health Record" may be helpful for both the cases. In this project we are meant to build that application in such way that it could fulfill all the following requirements to make a complete, simple and easy to use personal health record and management system.

1.2 Motivation of Work

The rate of mHealth (Mobile Health) technologies and use of smartphones for better health management is increasing day by day. Our motivation behind this project is to make better use of those mHealth technologies in our country.

In Bangladesh smartphone users are increasing day by day, but very few of them use their smartphone for medical assistance. They are not enough conscious to their health, in this case a smart health assistance mobile app can grow that consciousness. A good mobile health application can be very helpful maintaining routine diet, exercise and medication, getting better and easier medical services, recording user's health data and develop better understanding of health data.

On the other hand, there are thousands of mobile health apps available on the app stores but among them, amount of Bangla health apps is negligible. It was also a great motivation for us to work in such project.

1.3 Objectives

- To help people record and monitor their health data to maintain better health.
- To help people to measure and achieve required and appropriate daily nutrition.
- To help people manage exercise plan for maintaining good health.
- To grow better consciousness of medication among people with proper medication reminder.
- To increase peoples understanding of medical test data.
- To increase people's health consciousness by informing them about the bad effects of unhealthy activities.
- To build a complete mHealth mobile application in Bangla language for better understanding.

1.4 Expected Outcome

We will consider the project a success if we be able to build such a mobile application that is complete, fully functional and fulfill all the requirements that are described in this document bellow in chapter: 3. And our main intention is to release the application in the top app markets for free so that all kinds of user can access the application and get benefits from it. Also the knowledge and skill we gain from doing this project will be considered valuable outcomes for us as we will be able to apply these skill and knowledge in our upcoming job life.

1.5 Report Layout

- **In chapter 1:** Introduction of the project, our motivation, objectives and goal are described in the first chapter of this document. Also a brief overview of the whole document has been shown hare.
- **In chapter 2:** This chapter will provide information of the background studies of the project such as relative works, existing systems as well as comparative studies and challenges we faced.
- **In chapter 3:** Requirement collections and analysis; use case models and descriptions, digital data modeling and design requirements etc. are shown in this section of the report.
- **In chapter 4:** In this chapter all the design process are here like font-end design, back-end design, interaction design and UX and the last thing of this chapter in implementation requirement.
- **In chapter 5:** This chapter discussed about the implementation of database, front-end designs, implementation and interactions, testing implementation and the test results of the project.
- **In chapter 6:** Finally outcomes, conclusion and discussion of the project as well as our future plans for the project have been shown in this last chapter.

CHAPTER 2

BACKGROUND

2.1 Introduction to mHealth

“MHealth”, also written as m-health, is the abbreviation of “mobile health”. Mobile health refers to any kind of use of mobile phones or other wireless technologies or devices in medical or health care. Nowadays mHealth is mostly refers to various types of smartphone applications such as pregnancy care, exercise assistance, etc. People, using these applications, taking better care for their as well as their close ones health and also modern hospitals and other health service providers are using these types of mHealth applications for providing better and easier service to their customers.

2.2 Related Works

There are plenty of mobile health applications available on the internet already. In fact *research2guidance.com* says there are 325,000 mobile health apps available in 2017 all over the world, among them Google Play Store is home to 158,000 health apps. Most of them are designed for a specific purpose such as physical exercise, medicine reminders, food and nutrition etc.

There are also few Bangladeshi health apps available but they barely support Bangla language and also developed for specific purposes by individual companies.

2.3 Comparative Studies

In this project we tried to build such an application that will fulfill most of the basic requirements of a mobile health application. The app will support both Bangla and English language. And also the app will provide some unique features that other apps barely provides, such as, test data analysis, report generation and storing, blood pressure and sugar summary etc. Few apps relatively similar to ours are Samsung Health, Health Pal and Huawei Health etc.

Besides few similarities, our app is quite unique in its characteristics and some other criteria. For example very few apps are available out there that provides nutrition, exercise and medication manager all together.

2.4 Challenges

- **Scarcity of Data:** In such project, one of the most perspiring tasks is data collection. Medical data are very sensitive to share; especially in our country very few medical records are archived. Because of the scarcity of medical data, despite spending most of the projects time we had to rely on the internet in most cases.
- **Representing medical terms in Bangla:** We faced difficulty while representing medical terms in Bangla language especially the numeric data as some medical terms are well known in English than Bangla such as, blood sugar, pedometer etc. Eventually we overcome this problem.
- **Making the app proficient and easy to use at the same time:** Most of the health applications UI get complicated as representing medical data is by default complicated and not easily understandable for general people. In our app we tried to keep the user interface clean and simple by dividing the whole app in different sections for each component. We also used graphs and charts for easy representation of medical data. Also the Bangla language support drastically increases the usability of the app.

CHAPTER 3

REQUIREMENT SPECIFICATION

3.1 Business Process Modeling

In our system there are two entities, the user and the system itself. After releasing, the mobile app will be accessible to everyone from the app stores. After installing the app user have to signup first to use the application by giving some basic information such as username, password, birth date, gender etc. Then after login the system avails all the functionalities of the app for the user. The user profile is completely online and user must keep it updated to ensure better response from the app as well as some functionality like, nutrition planning, exercise calculation etc. requires information from the user profile, i.e. height, weight etc. Besides accessing all the features, user can change his/her user password and the app language from the settings option. User can logout from the application and different user can use different account in the application in the same device. While logging in the user data and other information will be automatically synchronized. The system keeps most of the important data online so the risk of losing important data is minimized.

To provide all the services the application uses several components of the device such as, internet connection, camera, storage system, display, accelerometer sensor etc. and requires user permission for those while installation.

- **Application Flow Diagram**

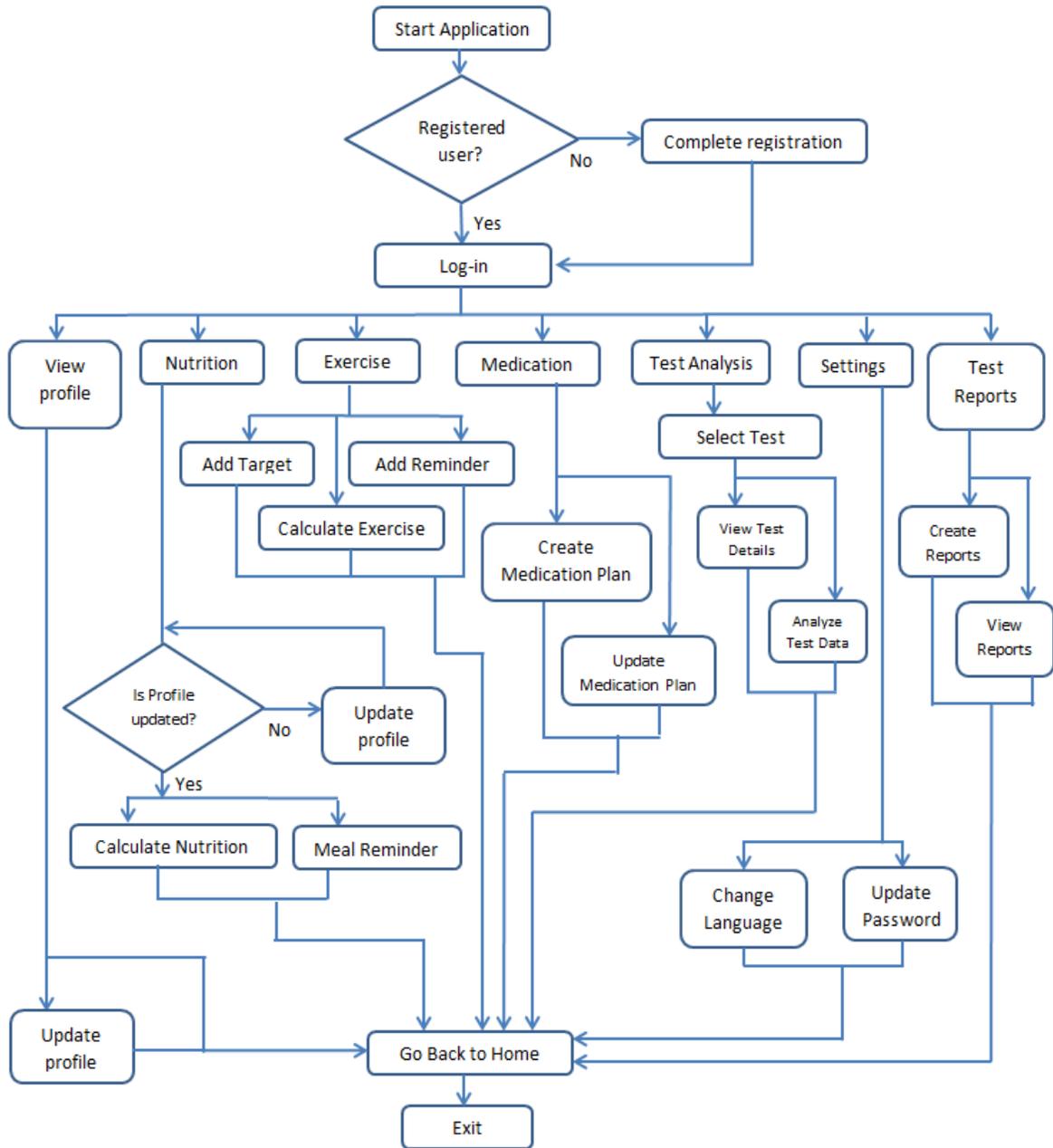


Figure 3.1: Application Flow Diagram

3.2 Requirement Collection and Analysis

The basic functionalities of the application “Personal Health Record” are given bellow.

3.2.1 Maintain user profile

- The application shall allow user to create own profile and update it.
- The application shall allow user to view and edit his/her profile.

3.2.2 Manage Nutrition

- The application shall show user his/her daily nutrition requirements as per his/he health condition.
- The application shall allow user to create own nutrition plan.
- The application should allow user to calculate gained nutrition from particular food items.
- The application shall provide user with reminders for his/her meal.

3.2.3 Manage Exercise

- The application shall show user his/her daily exercise requirements as per his/her health condition and previously set exercise target.
- The application shall allow user to create own exercise plan or target.
- The application should allow user to calculate amount of burned calorie from particular exercise of specified portion of time.
- The application shall provide user with advanced features such as pedometer for easier exercise monitor.
- The application shall provide user with reminders for his/her exercise.

3.2.4 Manage Medication Plan

- The application shall allow user to make and update his/her daily medication plan as per the prescription.
- The application shall provide user with reminders for his/her medication.

3.2.5 Medical Test Data Analysis

- The application shall show user list of common medical test to select.
- The application shall provide user with detailed information for the selected medical test.
- The application shall allow user to analyze particular medical test data to understand whether the report is good or bad for his/her health.
- The application shall record necessary test data for future requirements and show summary if required.
- The application shall allow user to record regularly necessary test data such as blood pressure and blood sugar level and show analytics (graphs) for better health understanding

3.2.6 Test Reports and Recording

- The application shall allow user to create digital PDF report from their test reports by taking pictures.
- The application shall allow user to view their test reports and share with others.

3.2.7 Health Tips and News

- The application shall provide user with useful health tips that will be helpful to user maintaining good health
- The application shall provide user with health related news from various organizations such as the government, hospitals and other health service providers as well as the app itself.
- The application shall allow user to view those tips and news as well as hide them.

3.2.8 Reminders and Notes

- The application shall allow user to make and manage necessary health notes or reminders such as appointments etc.
- The application shall provide user with notification for previously set reminders.

3.2.9 User Specified Language

- The application shall provide user with both English and Bangla language support.
- The application shall allow user to switch between languages as per requirements.

3.3 Use Case Modeling and Description

3.3.1 Use Case Model 01 (System):

- To use the application, user must be registered to the system by signing up with some required user information.
- After signing up user has to log in to enter the application.
- While signing up and logging in, the web client validates the data and stores them to the database for further use.
- From the home screen user can access all other components of the application such as, nutrition, exercise and medication plan, reminders and etc.
- In each individual component user is allowed to perform certain task such as nutrition calculation in nutrition plan, setting or deleting alerts in medication plan, etc.

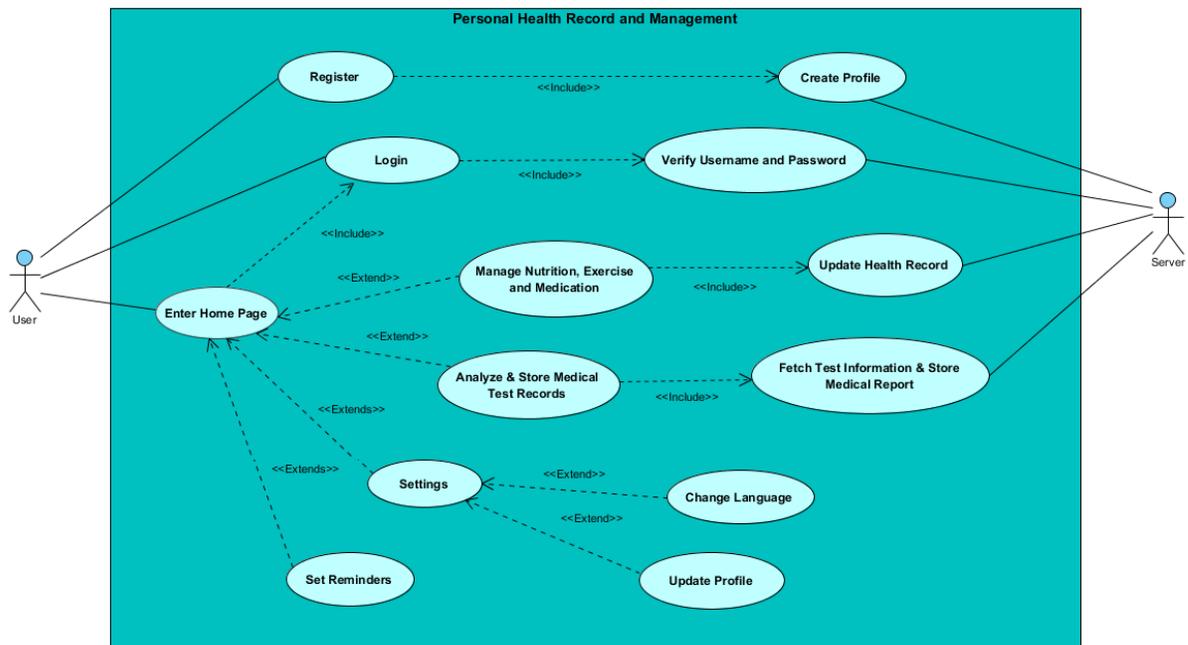


Figure 3.3.1: Use Case Model (System)

3.3.2 Use Case Model 02 (Nutrition Management):

- All health information has to be fulfilled to get access in nutrition management.
- Nutrition management shows the amount of daily nutrition (Calorie, Carbohydrate, Fat, and Protein) necessary for user by analyzing health data.
- User can update the amount of gained nutrition by selecting particular food item and compare with necessary nutrition amount.
- Reminder notify user for meal.

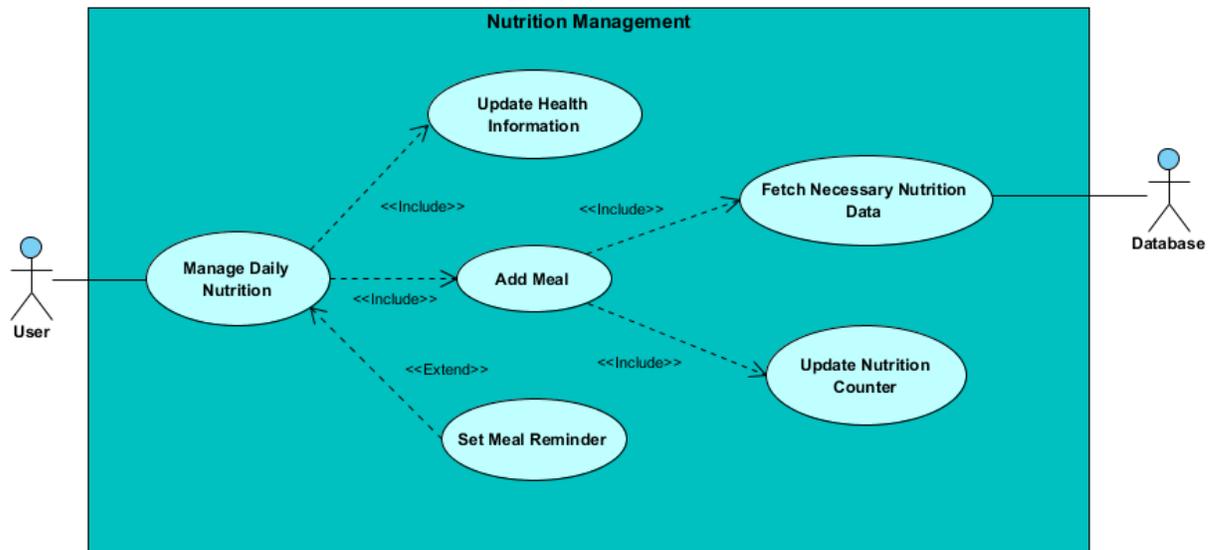


Figure 3.3.2: Use Case Model (Nutrition Management)

3.3.3 Use Case Model 03 (Exercise Management):

- Exercise Management keeps a record of how many calories the user burned from daily exercise.
- It shows an overview of users exercise level in each day of week.
- Daily and weekly target for exercise can be set.
- User has to update exercise activity manually by selecting a particular exercise and time.
- Pedometer helps to measure exercise amount by detecting motion.
- Reminder notify user for exercise.

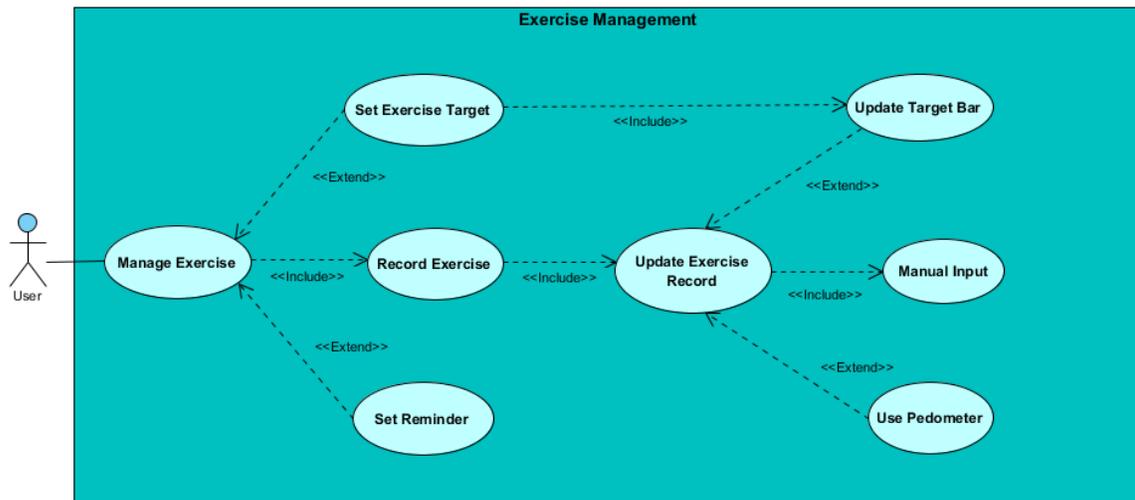


Figure 3.3.3: Use Case Model (Exercise Management)

3.3.4 Use Case Model 04 (Medication Management):

- Medication Management works as a reminder for medications.
- Medication plan can be created by giving medicines name, dose, reminder time and day as input.
- Medication plan is saved online so it will not be lost if user logout from application.
- It is also possible to delete plan and edit medicines of a medication plan.

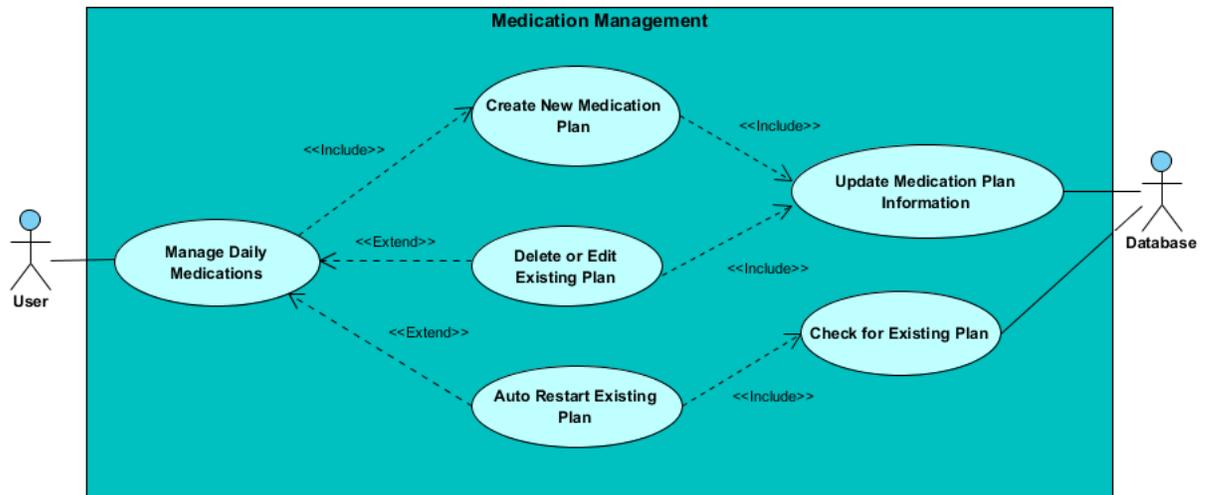


Figure 3.3.4: Use Case Model (Medication Management)

3.3.5 Use Case Model 05 (Test Data Analysis):

- Application can provide proper understanding about test result by analyzing.
- User has to select a test and input test result to analyze.
- Can learn and get information about any medical test.

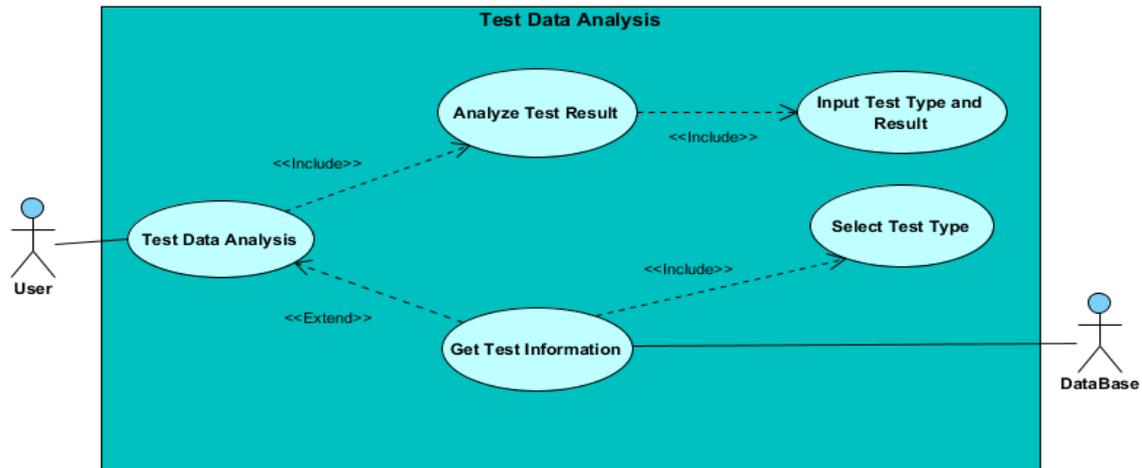


Figure 3.3.5: Use Case Model (Test Data Analysis)

3.3.6 Use Case Model 06 (Report Storage System):

- Medical report can be Stored to your smartphone by creating PDF from report images.
- Image can be picked from gallery of directly captured using camera.
- Report PDF file can be opened from application and can also be deleted.

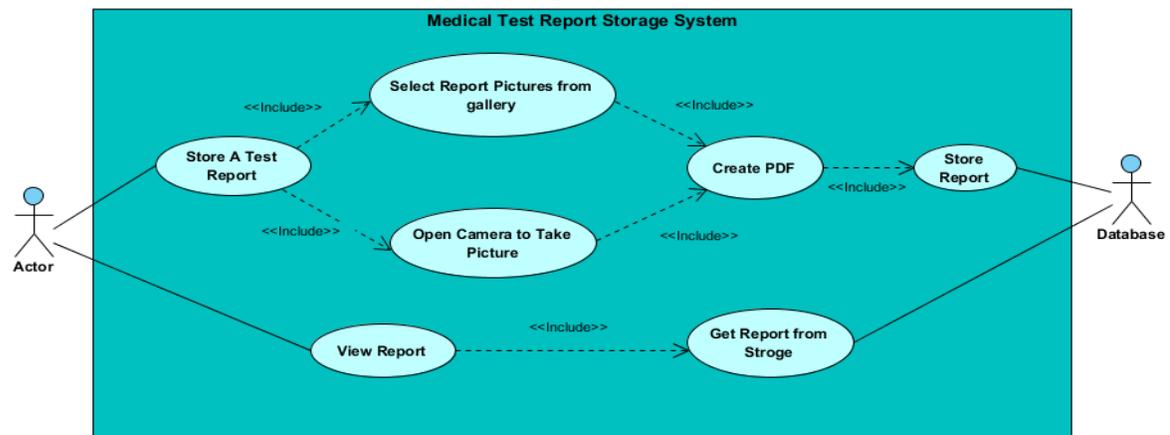


Figure 3.3.6: Use Case Model (Report Storage System)

3.4 Logical Data Model

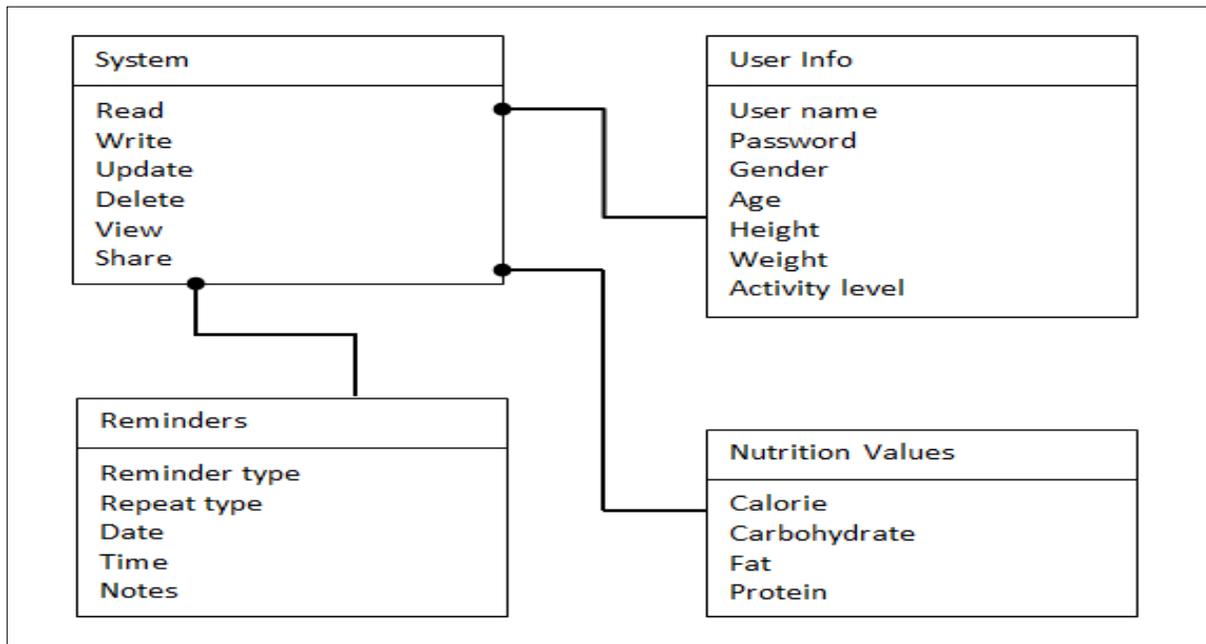


Figure 3.4: Logical Data Model

3.5 Design Requirements

Designing a system from the front end and back end plays the main role as they are responsible to run the system smoothly and attract its user to use it. We have followed below points.

User Friendly: The application interface must be user friendly. It should assist user performing all the functionalities and do not seem confusing at any stage.

Easy to understand: We have used the latest graphical user interface designing tools and techniques to ensure user feel comfortable and interested as well as we used graphs and charts to represent critical data so that user can understand easily.

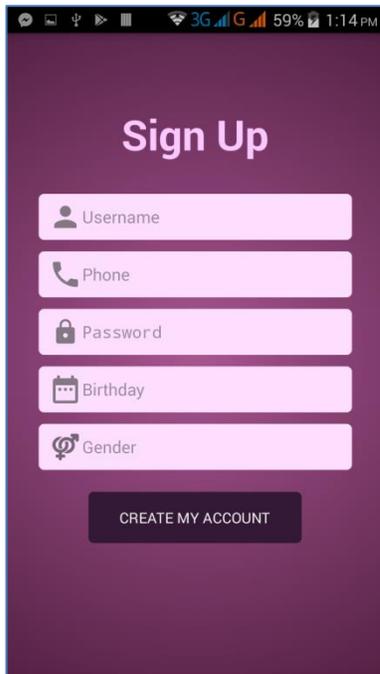
Compatible to various Android Version: There are a lots of android SDK (Software Development Kit) version. Alfa to now Oreo is running in the market. Studying the market we decided the minimum SDK version to be 19 or KITKAT.

Efficiency: To run faster and efficiently, we kept internet access and background services as minimized as possible so that the app uses little amount of mobile data and battery power as well.

CHAPTER 4

DESIGN SPECIFICATION

4.1 Front End Design



4.1.1 Sign-up Screen

At first the user is required to sign-up providing some basic information.

Figure 4.1.1: Sign-Up

4.1.2 Log-in Screen

After signing up user has to log in by giving his/her username and password

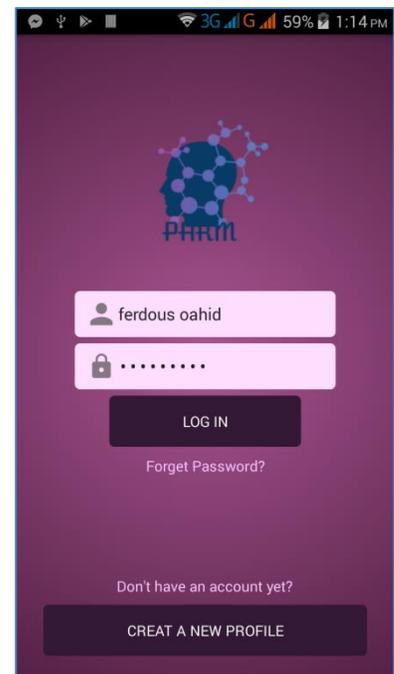


Figure 4.1.2: Log-In



4.1.3 Home Screen (English)

After logging in, the application shows user the home screen. From the home screen user can access all the basic features of the application such as nutrition, exercise and medication management, medical test analysis.

Figure 4.1.3: Home

4.1.4 Nutrition Plan Management

In nutrition management screen the application shows user his/her daily nutrition requirements as per his/her health condition.

User also can calculate gained nutrition values from a particular meal and add it to his/her meal.

Here the user is also allowed to make several meal reminders.

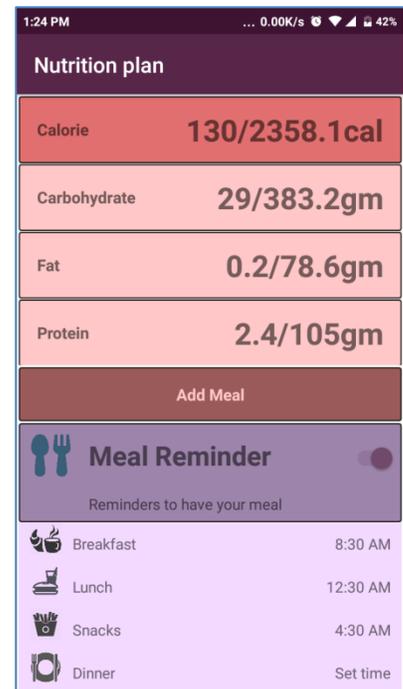
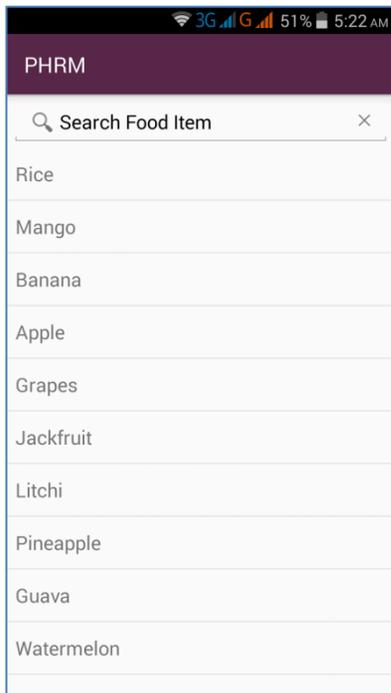


Figure 4.1.4: Nutrition



4.1.5 Add Meal to Nutrition Plan

After clicking the “Add Meal” button in the nutrition screen, user is shown a list of daily food items.

When user selects any meal item, the nutrition values of one serving portion (100gm) are automatically calculated and added to user’s daily consumption.

Figure 4.1.5: Food List

4.1.6 Exercise Plan Management

The next feature accessible from the home screen is exercise management. At the top of the screen user is shown his/her daily exercise progress along with the target they set.

Bellow that, a weekly exercise summary chart is shown.

Hare the user can set or update his/her daily or weekly exercise target, calculate burned calorie from particular exercise and add it to daily exercise progress. It also provides user reminders for user specified exercise.

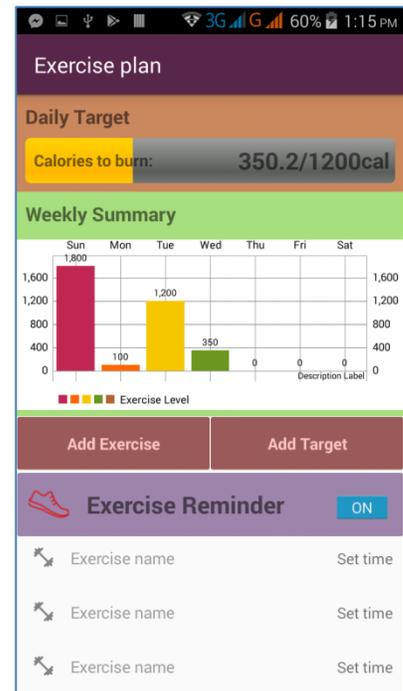
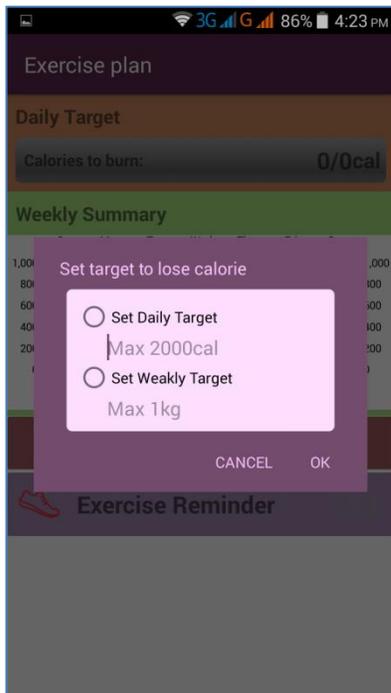


Figure 4.1.6: Exercise Management



4.1.7 Add Exercise Target

From the exercise screen user can set his/her daily or weekly exercise target.

Figure 4.1.7: Add exercise Target

4.1.8 Calculate and Add Daily Exercise

To calculate burned calorie from a particular exercise, user has to select that exercise from the exercise list and enter the exercise time. After doing so, user can start that exercise or add it directly to his/her daily progress.

Hare the application also provides a pedometer to calculate burned calorie from exercise on the go.

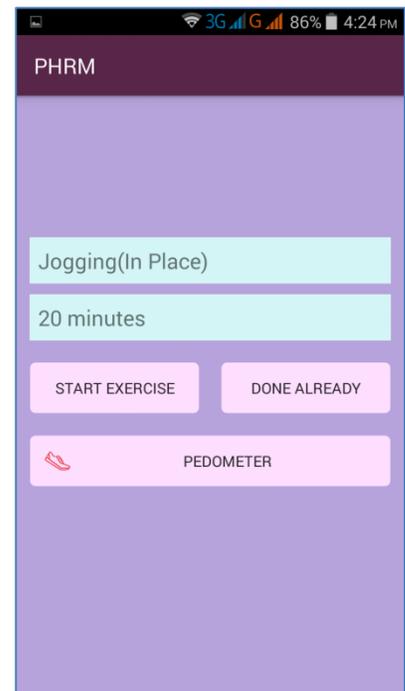
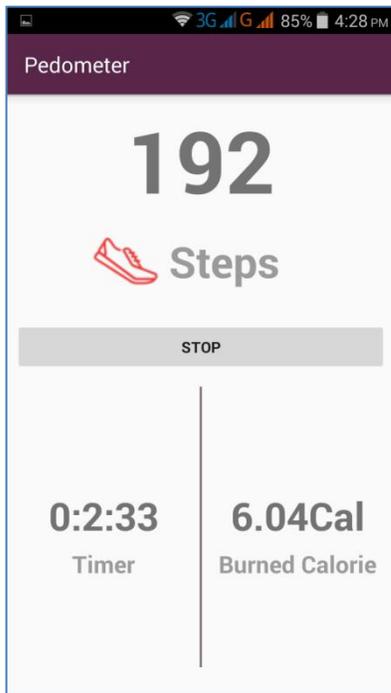


Figure 4.1.8: Exercise



4.1.9 Pedometer

The pedometer automatically counts user's steps while exercising and calculates the amount of burned calorie for a particular time.

To use this feature user has to keep the smartphone in his/her pant pocket or set it to an arm while walking or running or jogging etc.

Figure 4.1.9: Pedometer

4.1.10 Medication plan Management

In medication management user is able to add his/her daily medication to the reminder list and the application will notify user when it is time to take that medication.

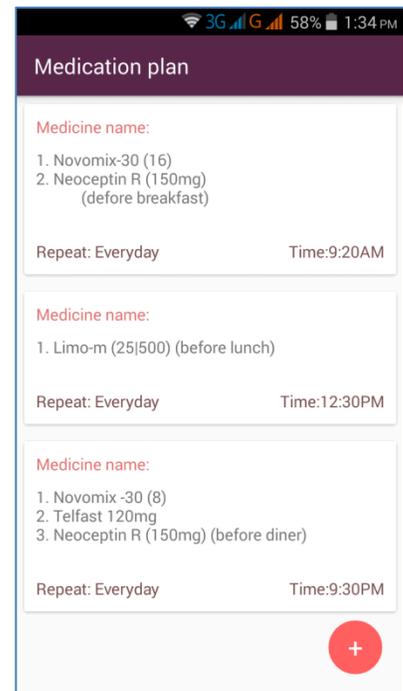


Figure 4.1.10: Medication Plan

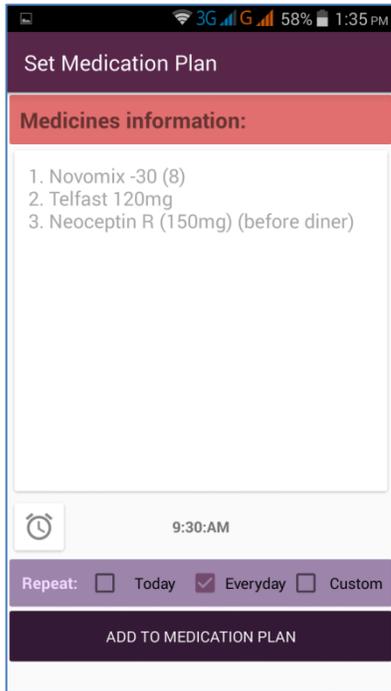


Figure 4.1.11: Set Medication Plan

4.1.11 Add Medication Plan

To add a particular or several medicines in the same time to the medication plan, user has to give necessary information about the medicine/s, set medication time and days of the week. After putting all the information user can add that to his/her medication plan.

4.1.12 Medical Test Analysis

User can analyze and keep record of Blood Pressure and Blood Glucose test data right from the home screen as well as a list of several other common medical check-up tests has been given in the application

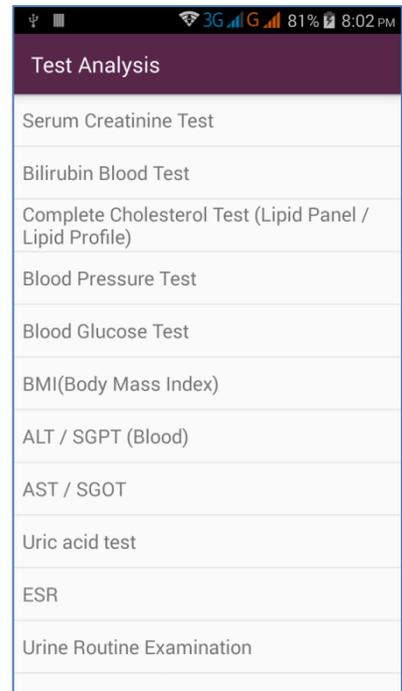


Figure 4.1.12: Medical Test List

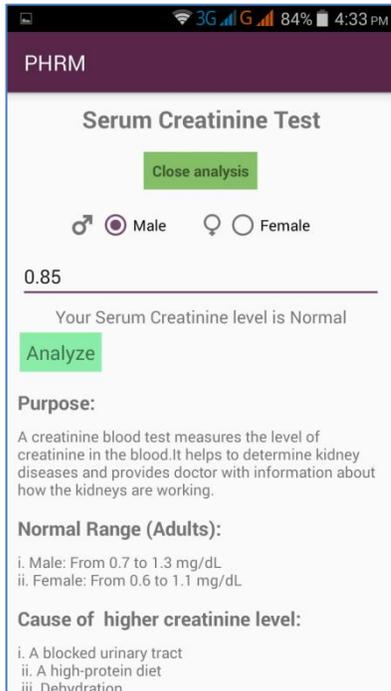


Figure 4.1.13: Medical Test Details

4.1.13 Medical Test Details and Analysis

When user selects any particular test from the test list, a new screen appears and shows user detailed information of that particular test such as purpose of the test, normal result values etc.

4.1.14 Medical Test Details and Analysis

User can also analyze test results. To analyze the test data is good or bad for him/her, the user has to input specified data as per the test and the application shall show user whether the data is normal or not.

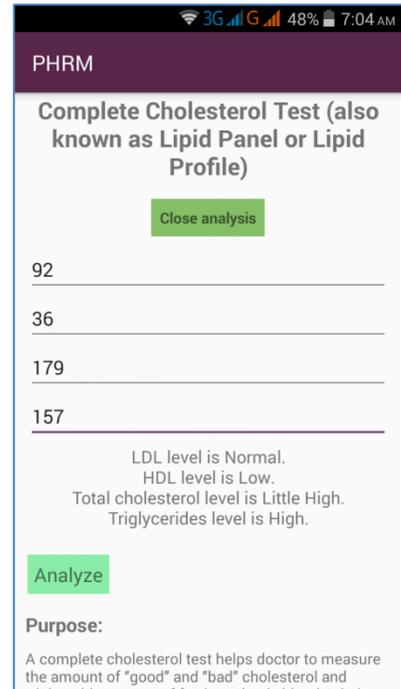


Figure 4.1.14: Medical Test Analysis



Figure 4.1.15: Medical Test Analysis

4.1.15 Blood Pressure and Blood Glucose Summary

In the middle section of the home screen, two different graphs show fifteen days summary of blood pressure and blood sugar respectively. User can hide or show these summaries accordingly.

4.1.16 Medical Test report storage

In the reports screen by clicking on the “Store Reports”, user can create PDF report by taking pictures of the real report using the phone camera. The system stores the reports in the phone memory. User can view, share or delete those reports from Reports screen in the app.

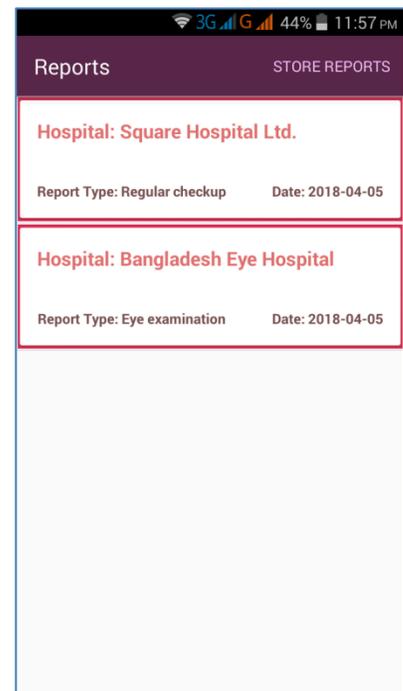
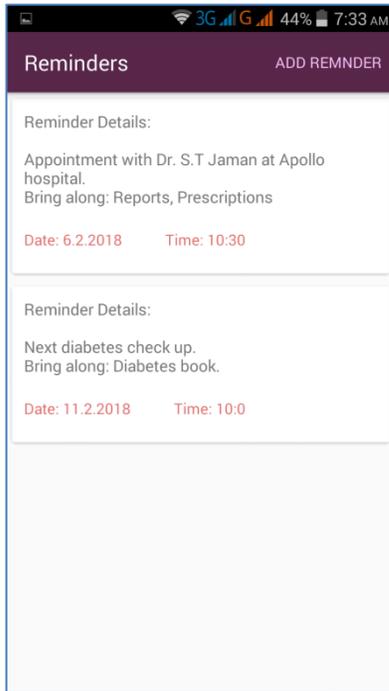


Figure 4.1.16: Medical Test Analysis



4.1.17 Notes and Reminders

The application provides user with ability to make notes or reminders for important health issues such as appointments etc.

The application reminds user about previously set reminders by notification.

Figure 4.1.17: Notes & Reminders

4.1.18 Change App Language

The application also provides both English and Bangla language support. User has to go to the settings and just change the app language as per his/her requirement.

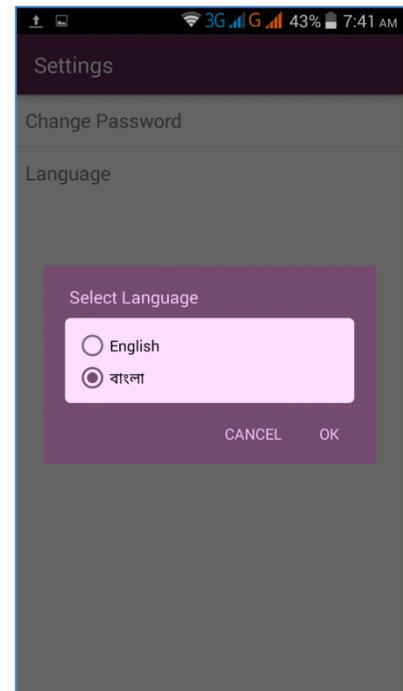


Figure 4.1.18: Language Settings



4.1.19 Language Changes (Home Screen)

After setting the app language to Bangla, this is how the home screen looks like.

Figure 4.1.19: Home Screen in Bangla

4.1.20 Language Changes (Nutrition Management)

Nutrition plan activity in Bangla language.



Figure 4.1.20: Nutrition Plan in Bangla

4.2 Back-end Design

- The front-end user interface has been designed with XML as the default designing language for android application development. We also used Java in some case as well.
- The back-end development has been done with Java. Java was previously the default programming language for android application development, now it is Kotlin.
- We used Android Studio as the IDE for developing the project. We also used Adobe Photoshop in some design cases.
- For database support we used Firebase which is the general purpose database dedicated for android development provided by Google and we also used MySQL server as well.

4.3 Interaction Design and UX

For any application, maintaining good and easy interaction between the system and the user is very important for the success of the project. Especially this kind of apps, “Personal Health Record and Management”, need regular data update from user to provide better service. In such cases clumsy user interaction can lose user interest and can be fatal for the future of the application.

In this project we have tried hard to make the app as much interactive as possible with user. The application generates regular notification to keep the user active, also features like health tips and news makes the app more attractive to its user.

We shared the app with our friends and family members as well as some of our teachers. Most of them liked the UI and gave positive feedback and suggestions. Also we showcased our project in the “Daffodil ICT Carnival 2018”, there lots of people seen the app and almost all of them gave positive feedback about the app. Mentionable that, the project was selected in the First category and won a prize money of 20000 (Twenty Thousand) taka.

CHAPTER 5

IMPLEMENTATION AND TESTING

5.1 Implementation of Front-end Design

The front end of the application is actually comprised of several screens or activities in terms of android application development. These activities are completely different in design and functionality.

We have designed the user interfaces in Android Studio IDE using XML as the designing language. XML stands for Extensible Markup Language and it is the default and official designing language for android apps development.

We also had to use Adobe Photoshop and Illustrator in some cases to design the apps logo, app icons and app background. Also we used the Android Studio IDE in some of these types of cases.

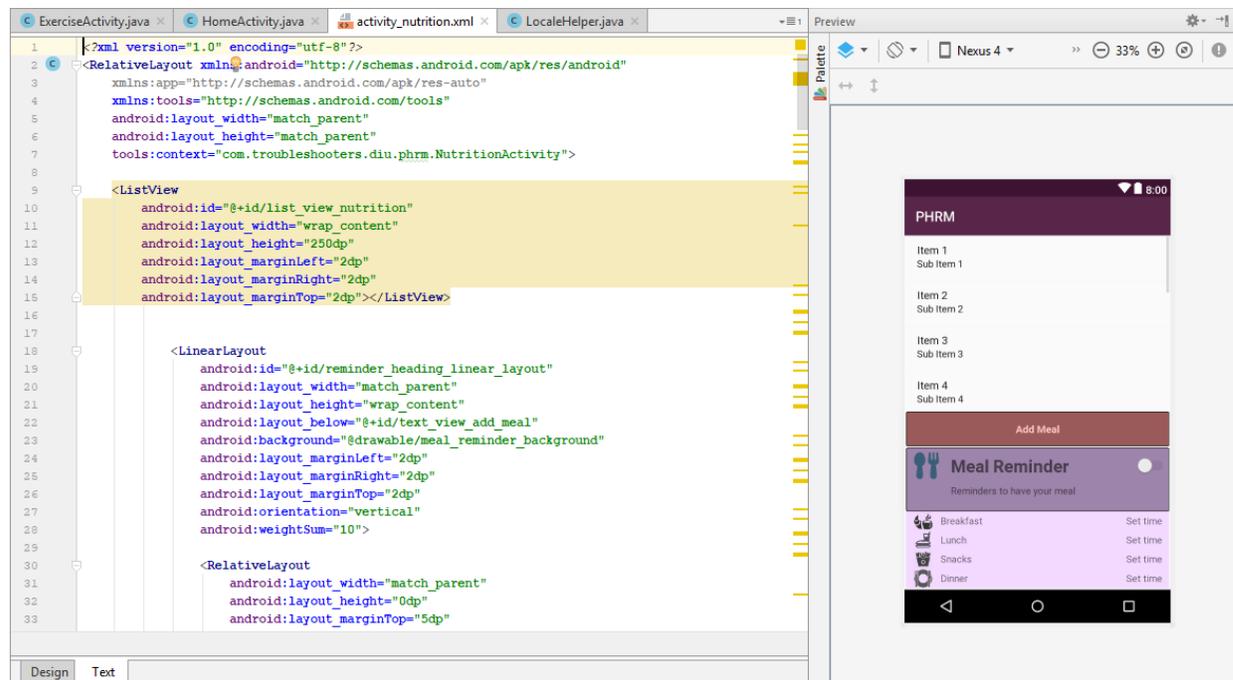


Figure 5.1: Implementation of Front-end Design

5.2 Implementation of Database

We have used four different types of database in this project to increase the efficiency and the speed.

- **Shared Preference:** Shared preference is androids internal data storage system. It is used to store small amount of data that are required during the runtime of the application. Small data such as, login status, username, password and some other numeric values are stored in this storage. Data stored in shared preference are only accessible to the application itself; user does not have direct access to any data stored in shared preference.
- **SQLite Database:** This is offline database management system for android to access phone memory or SD cards. Data stored in SQLite database can be accessed from the app as well as other applications installed in the device. We used SQLite to store and access medical test reports.
- **Firebase:** Firebase is a dedicated to android database management and storage system developed and provided by Google. In terms of storing and managing big amount of data online Firebase is much faster and easy to implement than typical MySQL database. Our application uses Firebase to store user information, food nutrition information, remainders etc.
- **MySQL Database:** For health tips and news the application rely on MySQL database. We kept those web pages on the MySQL database and user can access or view them from the app.

5.3 Testing Implementation

Table 5.3: Test case evaluation

Test Case	Test Input	Expected Output	Actual Output	Result	Action
1. Run App	Click on app icon	App will open with welcome screen and then open 1. If not logged in: Log-in screen 2. If logged in: Home screen.	Same as expected.	Pass	Tested on 11.3.2018
2. Create New Profile	Enter username, phone, password, birth date and gender and click on "Create"	System will validate the data, store them on the database and show success note.	Same as expected.	Pass	Tested on 11.3.2018
3. Log in	Enter username and password and click on "Log in"	System will validate the data and then, 1. Correct input: Enter the home screen. 2. Wrong input: Show wrong input note.	Same as expected.	Pass	Tested on 11.3.2018
4. Navigate among functionalities from home.	Click on different options to access different features	The home screen will go to background and new screen related to the feature will appear	Same as expected.	Pass	Tested on 11.3.2018
5. Change app language	Click on Settings >Language and select a language form the language picker dialog.	The language of the app will change and screens will appear with the selected language.	Same as expected.	Pass	Tested on 17.3.2018
6. View User Profile	Click on the "Profile" option from the top navigation bar in the home screen.	User profile will appear if internet is connected or else internet status will appear.	Same as expected.	Pass	Tested on 11.3.2018
7. Update User Profile	Click on any Profile option in the profile screen.	Input option will appear for editable option, after entering data the system will validate data, and record and show updated profile.	Same as expected.	Pass	Tested on 11.3.2018

Test Case	Test Input	Expected Output	Actual Output	Result	Action
8. View tips and news	Click on “Tips and News” view widget from the upper section of the home screen	Currently showing option “Tips” or “News” will be opened in new window if internet is available.	Same as expected.	Pass	Tested on 12.3.2018
9. Nutrition Plan	Click on “Nutrition Plan” from the upper middle section in the home screen.	Nutrition Plan screen will appear with daily nutrition requirements, gained nutrition and meal reminders.	Same as expected.	Pass	Tested on 14.3.2018
10. Calculate nutrition gain	Click on “Add Meal” button in the Nutrition Plan screen, a list of different food item will appear, select any one.	Gained nutrition values for one portion size (100gm) of the selected food item will be added to the daily nutrition gain and shown in Nutrition Plan screen	Same as expected.	Pass	Tested on 14.3.2018
11. Set meal reminders	Switch on the Meal Reminder in the Nutrition Plan screen; then Click on “Set Time” for different reminder.	Reminder will appear on the “Meal Reminder” section in Nutrition Plan screen and reminder will appear in phone notification panel at given time with notification tone and vibration.	Same as expected.	Pass	Tested on 14.3.2018
12. Exercise Plan	Click on “Exercise Plan” from the upper middle section in the home screen.	Exercise Plan screen will appear showing exercise target, daily burned calorie, weekly exercise summary chart and exercise reminders.	Same as expected.	Pass	Tested on 17.3.2018
13. Add exercise target	Click on “Add Target” button from the Exercise Plan screen; enter daily or weekly target.	Daily calorie burn target will appear on the upper section of the Exercise Plan screen.	Same as expected.	Pass	Tested on 17.3.2018

Test Case	Test Input	Expected Output	Actual Output	Result	Action
14. Add exercise	Click on “Add Exercise” button from Exercise Plan screen; exercise type and duration; press “Done Already” or “Start Exercise”	If pressed “Done Already” the system will calculate the calorie burn at once or if pressed “Start Exercise”, system will calculate calorie burn on the go and show exercise progress in the Exercise Plan screen.	Same as expected.	Pass	Tested on 17.3.2018
15. Pedometer	Click on “Pedometer” in the Add Exercise screen; put the phone in your pocket or your shoulder and start walking	The system will automatically count your steps, calculate burned calorie and show progress in the Exercise Plan screen.	Same as expected.	Pass	Tested on 17.3.2018
16. Set meal reminders	Switch on the Meal Reminder in the Exercise Plan screen, then Click on “Set Time” for different reminders.	Reminder will appear on the “Exercise Reminder” section in “Exercise Plan” screen and reminder will appear in phone notification panel at given time with notification tone and vibration.	Same as expected.	Pass	Tested on 17.3.2018
17. Medication Plan	Click on “Medication Plan” from the upper middle section in the home screen.	Medication Plan screen will appear showing each previously set medication time with medicine details.	Same as expected.	Pass	Tested on 22.3.2018
18. Add Medication Plan	Click on the add button in the bottom right corner of the medication Plan screen. In the Add Medication screen enter medication details, time and dose days and click add.	New medication plan will be added in the Medication Plan screen and medication reminder will appear in phone notification panel at given time with notification tone and vibration.	Same as expected.	Pass	Tested on 22.3.2018

Test Case	Test Input	Expected Output	Actual Output	Result	Action
19. Edit or delete Medication Plan	Long press on any medication plan in the Medication Plan screen, update the medicine details or press "Delete" to delete it.	Updated medication plan will appear on the Medication Plan screen if edited or removed if deleted.	Same as expected.	Pass	Tested on 22.3.2018
20. Analyze blood pressure	Click on "Blood Pressure" in the lower portion of the Home screen; enter your Systolic and Diastolic BP value and press Calculate.	Your Blood Pressure status will be shown and "Add to Record" option will appear.	Same as expected.	Pass	Tested on 24.3.2018
21. Record blood pressure data	Click on "Add to Record" button that appears after calculation in the Blood Pressure screen.	BP data will be stored and summary will be shown in home screen.	Same as expected.	Pass	Tested on 25.3.2018
22. Analyze blood glucose	Click on "Blood Glucose" in the Home screen; enter sugar level for Fasting and 2Hrs after meal and press Calculate.	Your Blood Glucose status will be shown and "Add to Record" option will appear.	Same as expected.	Pass	Tested on 25.3.2018
23. Record blood glucose data	Click on "Add to Record" button that appears after calculation in the Blood Glucose screen.	Blood glucose data will be stored and summary will be shown in home screen.	Same as expected.	Pass	Tested on 25.3.2018
24. Medical test analysis	Click on "More Items" in the Home screen and select any on from the medical test list.	New screen for the selected test will appear showing detailed information for that particular test.	Same as expected.	Pass	Tested on 3.4.2018

Test Case	Test Input	Expected Output	Actual Output	Result	Action
25. Analyze medical test results	In the Test Details screen; click “Analyze Test Data”, enter required data and press “Analyze”.	The system will analyze the given data and show status.	Same as expected.	Pass	Tested on 3.4.2018
26. Add Reminders	Click on “Reminders” in the Home screen; click on Add Reminder, enter note and set time and press “Create”.	New reminder will be created, shown in the Reminders screen and reminder will appear in phone notification panel at given time with notification tone and vibration.	Same as expected.	Pass	Tested on 3.4.2018
27. Delete reminder	Long press on any reminder from the reminder list and click Yes	That particular reminder will be removed from the reminder list.	Same as expected.	Pass	Tested on 3.4.2018
28. Store test reports	Click on “Reports” in Home screen; click “Store Reports”, enter report details then take photos of the report or select from gallery to add.	The system will create a PDF report, store it and show in the Reports screen.	Same as expected.	Pass	Tested on 3.4.2018
29. View test reports	Click on any report from the report list shown in the Reports screen.	The selected report will open in the default PDF viewer app of the device.	Same as expected.	Pass	Tested on 3.4..2018
30. Delete test reports	Press on any report from the report list and slide it towards left.	That particular report will be deleted from the report list.	Same as expected.	Pass	Tested on 3.4.2018

CHAPTER 6

CONCLUSION AND FUTURE SCOPE

6.1 Discussion

While working on this project, we faced several challenges. First of all gathering medical data was the worst hustle. That is why we had to take most of the data from the internet. Although we collected all the data from the best possible source, it would have been better if we could use real data. We have tried our best to overcome all the short comes yet there is always a huge scope of improvement.

6.1 Conclusion

The usefulness of this mobile application depends on usability and user acceptance. Although the app is still in development phase, we have tried our best to make as easy to use as possible. We are continuously trying to make the application better and better day by day. We are eagerly waiting for that day when our app will be available in the app stores and we see that people using the application and getting profit from it.

6.2 Scope for Further Developments

In future our dream is to make this application more useful, effortless, attractive and providing more features.

We are looking forward to add social media connectivity to the application so that using the app becomes more fun and enjoyable. We are also trying to build a direct easy communication between patients and the hospital or other health service providers for better and easier health service.

We also have plans to integrate e-commerce business with our system such as online pharmacy, so that the project can make money and we can continue its development.

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