

Complete Heath Solution

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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 “**Complete Heath Solution**”, submitted by **Md. Fahad**, ID No: **151-15-5024** 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 (BSc) and approved as to its style and contents. The presentation has been held on 9/12/2018.

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We hereby declare that, this project has been done by us under the supervision of **Saiful Islam, Lecturer, 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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ABSTRACT

Due to large number of population, Bangladeshi people faces double burden of disease. A large number of them avoid consulting a doctor at the very beginning stage of their disease due to unawareness, ignorance, shyness and anxiety where most of them don't have enough knowledge about diseases. Delay on diagnosis and taking treatment lead a disease to getting to a chronic level as a result treatment becomes less effective. Through the project "Complete Health Solution" I have tried to solve these problem through an android application called "Doctor Android" and a web application called "E-HealthCare". The main purpose of the android application is to help people to detect disease by their symptoms from their place without using internet so that they can know which doctor is appropriate for them. This application has four feature. By this application users can detect their disease using their symptoms, get nutrition guide based on their physique and physical condition and find first aid guide with pictorial representation and video tutorial. By the web application a patient can take appointment of doctors of any country and they can talk with their doctors through video or audio call, send their diagnosis report and send messages. This web application is not only useful for patients. It is also useful for doctors and medical researchers where they can post any medical related question and experts will answer them. Latest health and medical science news and articles will be available there.

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CHAPTER 1

Introduction

1.1 Introduction

To cure from disease it is important to detect diseases at the early stage. Diagnosing the proper disease at early stage not only makes treatment effective but also help to prevent getting it to chronicle level. The main goal of this project is to help people to detect some common diseases by their own who usually don't consult a doctor at the beginning of their health problems and also help to consult any specialist doctors around the world from their place so that people don't need to go abroad for better doctor consultation. For example, if anyone is not satisfied with the consultation and treatment of his own country's doctor, He or She can consult with specialist doctor of any country through the application.

This project consist of two application, one is android application and another is web application. Through android application a user can detect his or her disease using their symptoms. A user also can take doctor's appointment using this android application which is linked with a web application. Using this web application user can take appointment of doctor, user can make video or audio call with appointed doctors, send diagnosis reports and messages. User can post any medical related question and experts will answer them. By using this app user can get latest health and medical science news and articles.

1.2 Motivation

Disease accompany a person throughout life. They occasionally appearing in various forms. When people notice any health issue/fall ill some of them immediately go for doctor checkup but some of them don't want to go which led major health problem in future. On the other side when people fall ill and the disease is not curing or the patient is not satisfied with the treatment of his or her country then some people intend to go abroad for better treatment. But it is a matter of huge amount of money that everyone can't effort.

As the world is becoming increasingly digitalized, I have tried to solve these problems in a digital way. So I have done the project "Complete Heath Solution" which not only solve

these two problems but also give some extra features that will be helpful in medical researchers and will provide latest information about this field. Though there are some mobile application and web application exist to detect disease but all of them can't detect the proper disease and end up with a large number of detected disease though the patient is not suffering from those disease. Which makes the patient nervous and afraid that can cause another minor health problem. This project is much effective and reliable in term of disease detection because it follows the procedures that an experienced doctor follows. Moreover it uses the experience of many expert and specialized doctors as its knowledgebase.

1.3 Objectives

- To ensure better treatment and diagnosis.
- To avoid going abroad for better treatment.
- Reduce cost, time and effort in doctor's checkup
- To provide easier communication between doctor and patient.
- To develop an android application for general people by which they can detect their diseases using symptoms.
- To enable user to take appointment of doctors of any country.
- To develop a system where patients can consult with doctor through video or audio call.
- To create a system where patients can send diagnosis report to doctors through it.
- To make a platform where anyone can ask medical related question and experts will answer them.
- To make a platform where people can get latest health and medical science news and articles

1.4 Expected Outcome

The main purpose of the project is to develop an application that will reduce patients time, cost and trouble. It enable user to detect some diseases using symptoms, take world's best doctor's appointment and consult with them from home. I wanted to make sure that people

can detect their disease at primary stage and get world's best doctor's appointment and consultation facility without going outside of their country. User can send diagnosis report to their appointed doctors and based on that they can get better treatment. User can get answer of their medical related queries. By using this app user can get latest health and medical science news and articles.

1.5 Report Layout

Chapter 1: Introduction

This chapter contain an introduction of the project with its motivation, objectives and expected outcome. Later followed by the report layout

Chapter 2: Background

In this chapter I will discuss about the background of my project. This chapter also cover related works, comparison with other related systems, scope of the problem and the challenges of the project.

Chapter 3: Requirement Specification

This chapter describes requirement specification such as business process model, requirement collection and analysis, use case model and logical data model of the project.

Chapter 4: Design Specification

This chapter is all about the design of the project like front-end design, back-end design and interaction design.

Chapter 5: Implementation and Testing

This chapter contain description about implementation of database, implementation of front-end design, implementation of interaction, test result and reports.

Chapter 6: Conclusion and Future Scope

This chapter contain the discussion and conclusion and scope for further development.

CHAPTER 2

Background

2.1 Introduction

This chapter contains description about related works or similar application and also discusses about the difference between the existing similar application and my application. The limitation of existing similar work and how my project gives better result than other similar works. This chapter also contains scope of the problem and challenges of the project.

2.2 Related Works

There are some existing related web application and android application available in internet. According to their features we can divide them into three groups:

Information base application: This type of application provides information about diseases. In those applications, users can search diseases and get symptoms, cause, risk factors, complication and prevention related information.

Disease detection base application: This type of application provides disease detection feature and some of them provide some small additional features. Both android and web applications provide these types of features. This type of application takes user symptoms as input and gives a list of large number of diseases.

Appointment base application: This type of application provides doctor appointment feature and some of them provide some small additional features. Both android and web applications provide these types of features. Most of these types of applications give appointment and chamber information. Those applications don't have any feature to take direct appointment and consultation with doctor.

Some of existing applications are:

- Symptom checker [1]
- Symptomator [2]

- Doctor Diagnose [3]
- Isabel [4]
- WebMd [5]
- Doctoral [6]

2.3 Comparative Studies

Comparative Studies between existing application and my application is given below:

Table 2.1: Comparative studies

Application Name	Platform	Main feature	Additional Feature	Drawback
1. Symptom checker [1]	Android	Check symptom to detect disease	No additional feature	1. Take symptom based on body part. 2. Difficult to find user symptom. 3. Ask lots of Irrelevant question. 4. Interface is not user friendly
2. Symptomator [2]	Android	Check symptom to detect disease	1. Call emergency service	1. Difficult to select users symptom 2. Work based on body area. 3. Large number of wrong detected disease
3. Doctor Diagnose [3]	Android	Diagnose	1. Sickness database 2. Nutrition advisor	1. Don't contain all symptoms. 2. Only work with user's one symptom.

			3. Health calculator	3. Incorrect output
4. Isabel [4]	Web	Symptom checker	1. Blog	1. Large number of detected disease list. 2. Difficult to select correct one
5. WebMd [5]	Web	Symptom checker	1. Health and drug information 2. Find drug	1. Difficult to get correct result as it gives large number of disease list
6. Doctoral [6]	Web	Doctor appointment	1. Find hospital 2. Find blood donor	1. Online consultation only for Bangladeshi
7. Complete Health Solution	Both android and web	Disease detection and worldwide doctor consultation	1. Post health related query 2. Medical science news and articles.	No drawback

2.4 Scope of the Problems

To reduce recovery time and make treatment effective there is no alternative to diagnosis disease at primary stage and taking advance treatment. To provide people these facility in one platform with less cost, time and effort I have develop a system, because there are some existing application that doesn't contain all the feature in one application that my application has. On the other hand those similar existing application also need internet connection to detect disease and most of the time their detection is not accurate. Those application usually provide a group of 5 to 20 disease as output of disease detection which not only confusing but also led to wrong treatment and makes the patient nervous and afraid that can cause another minor health problem. The comparative study help me to develop my application more effectively and accurately and manage all medical related feature in

one platform. Other's limitation is my scope to improve my application and make it better and different from other.

2.5 Challenges

Unexpected obstacles and challenges are the most common part of a project development. Thus I have faced some challenges too during the development of the project.

At first I faced problem when I tried to start developing the android application because I didn't know which procedure I should follow to detect disease using an android application. After solving that I have faced challenges when I started to develop the android application because I was not that expert in android platform. Finally I have faced challenge in designing database and collecting data for different diseases. I had to read a lot about diseases and talk with doctors for collecting proper data for my application.

CHAPTER 3

Requirement Specification

3.1 Business Process Modeling

Business process modeling is a technique which is used for representing the process of a system. And the current process may be improved, analyzed and automated. In here I have defined our business model using the data flow diagram. Data Flow diagram describe how the data is processed in the system. In the following figure I draw a level-1 Data Flow Diagram for my system [7].

Figure 3.1.1 shows the data flow diagram of the web application.

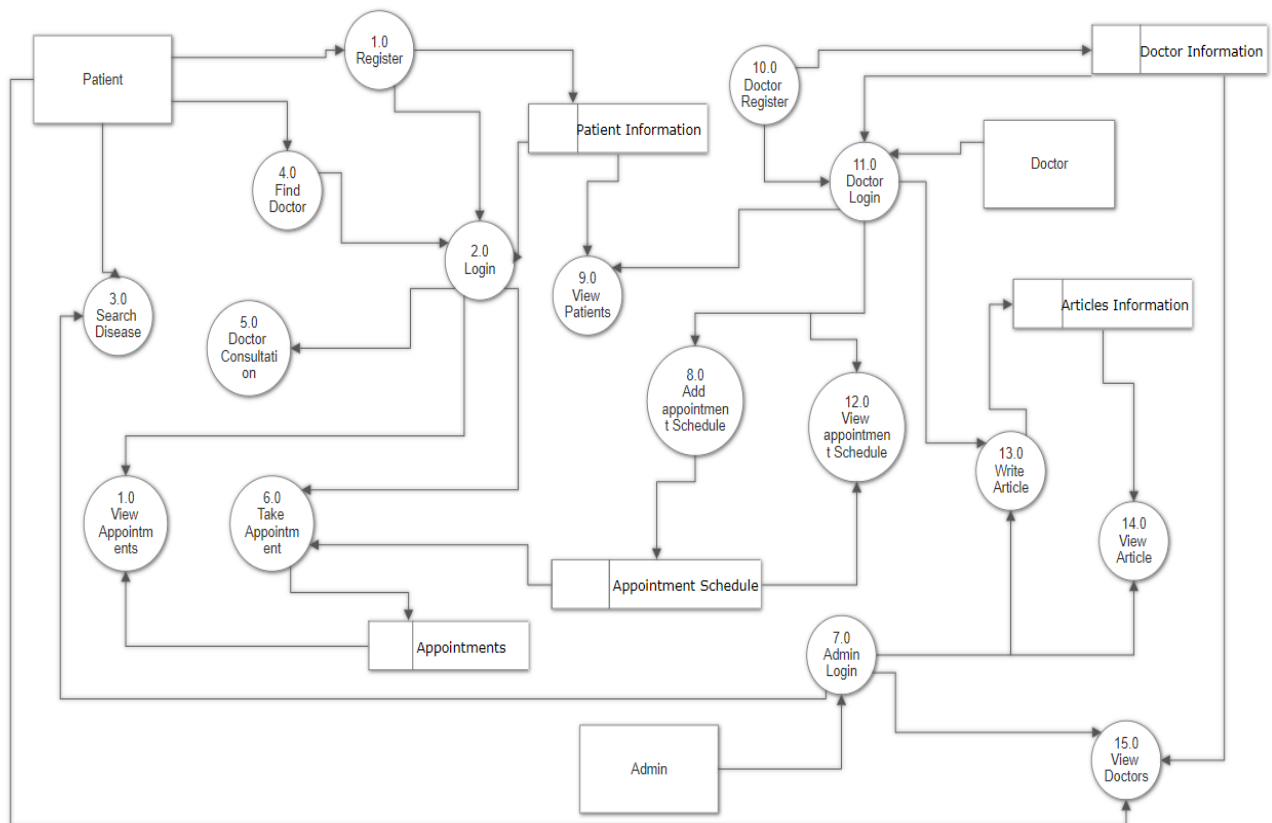


Figure 3.1.1: Business Process Model of E-HealthCare

Figure 3.1.2 shows the data flow diagram of the android application.

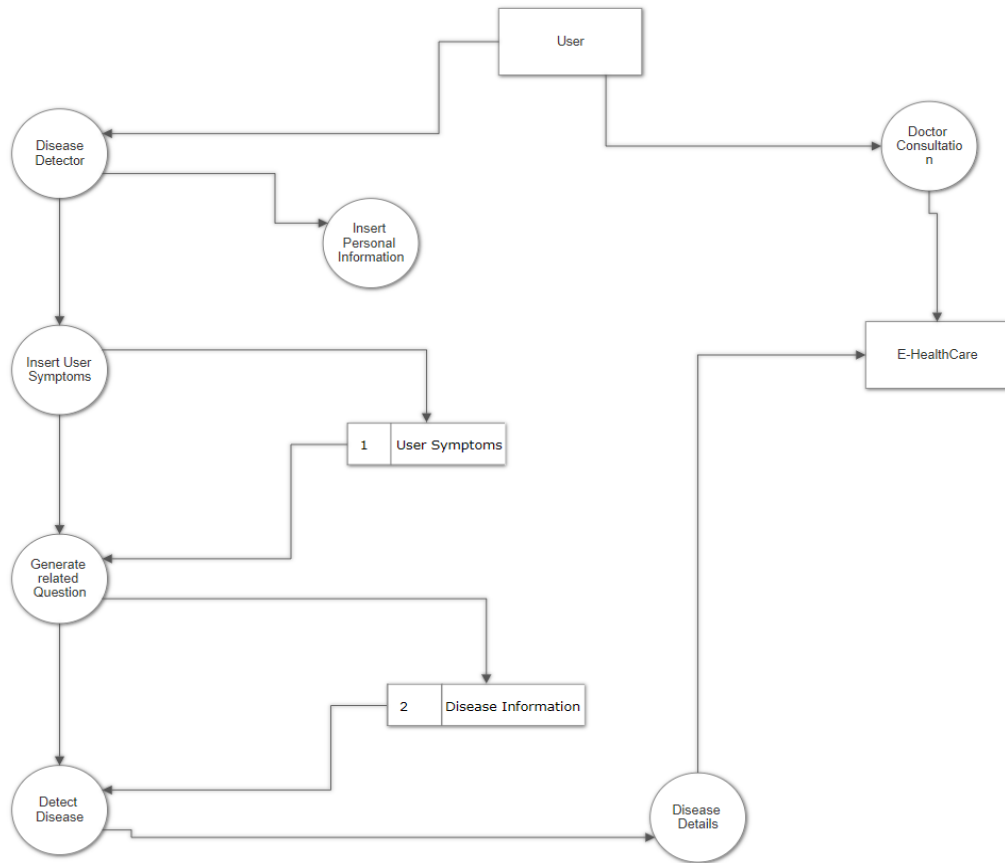


Figure 3.1.2: Business Process Model of Doctor Android

3.2 Requirement Collection and analysis

Requirement collection and analysis is one of the most impotent part in a project development process. It is not only important for developing a project but also help to make a project user friendly, efficient, optimized and smooth in operation. In term of project development, there are two types of requirement essential, one is function requirement and another is non-functional requirement. Functional requirement includes those activities or features that are required and essential to develop the application on the other hand non-functional requirement define how well the functional requirement can be implement to make better user experience. That means how efficient, reliable, smooth, time and space consuming will be the application.

3.2.1 Functional Requirement

As my project consist of two application. One is android application and another is web application.

For android application functional requirements are inserting user's symptoms, generating related question, detecting disease and getting disease details and taking doctor's appointment.

For web application there are many functional requirement like user registration, user login, getting disease details, taking doctor's appointment, payment option, Query posting, doctor consultation via audio and video call etc.

3.2.2 Non-Functional Requirement

Non-functional requirement for my applications are making all operations faster and smooth, reduce application's size, making user interface more easy and understandable for users, making secure payment method, making the application easy to maintenance and control by admin etc.

3.3 Use Case Modeling and Description

Use case model is a model which represent how various types of user interact with the system. It shows the interaction between user and systems elements in a pictorial format. Figure 3.3.1 shows the use case model of E-HealthCare application and Figure 3.3.2 shows the use case model of Doctor Android application. [8]

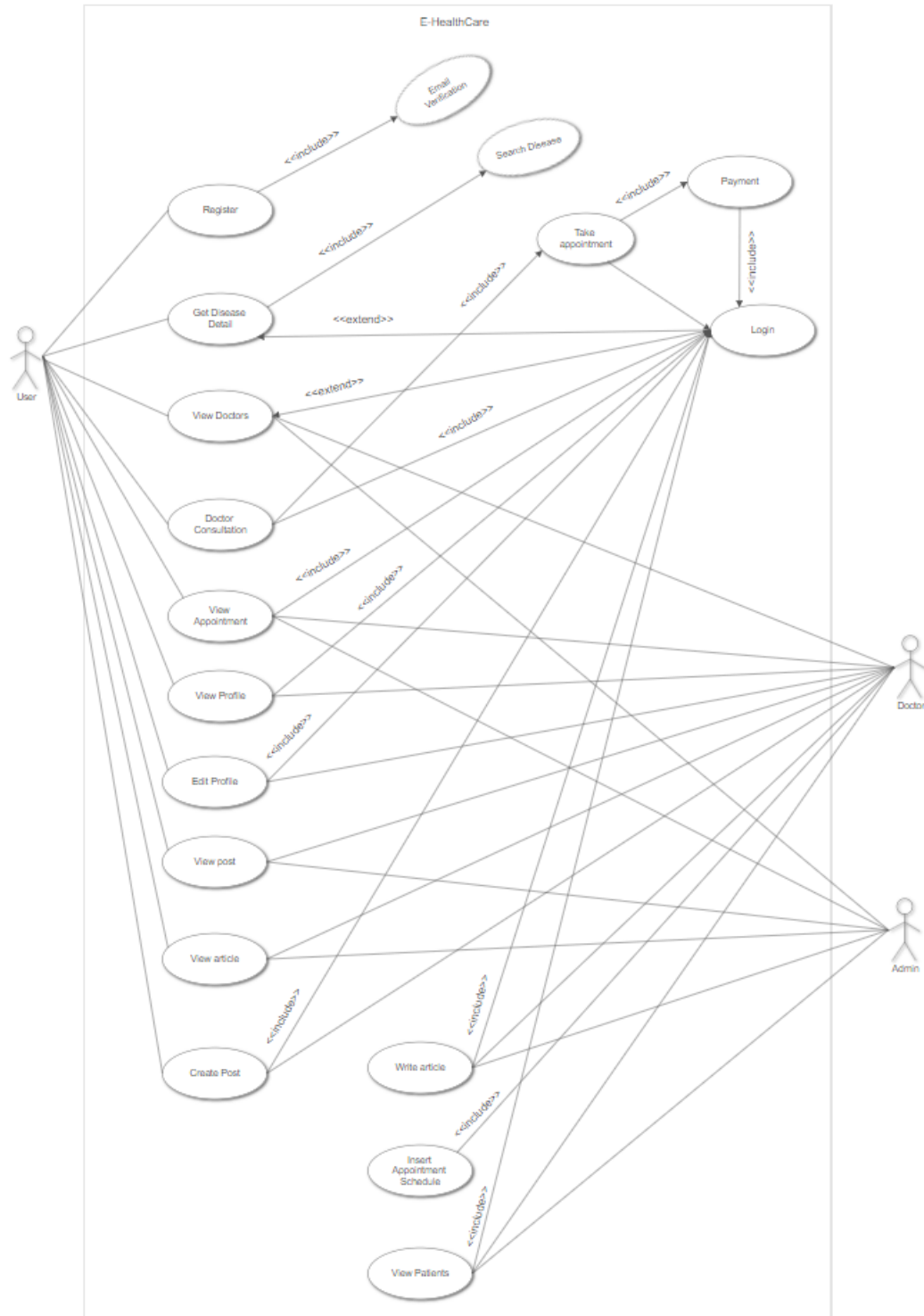


Figure 3.3.1: Use Case Model of E-HealthCare

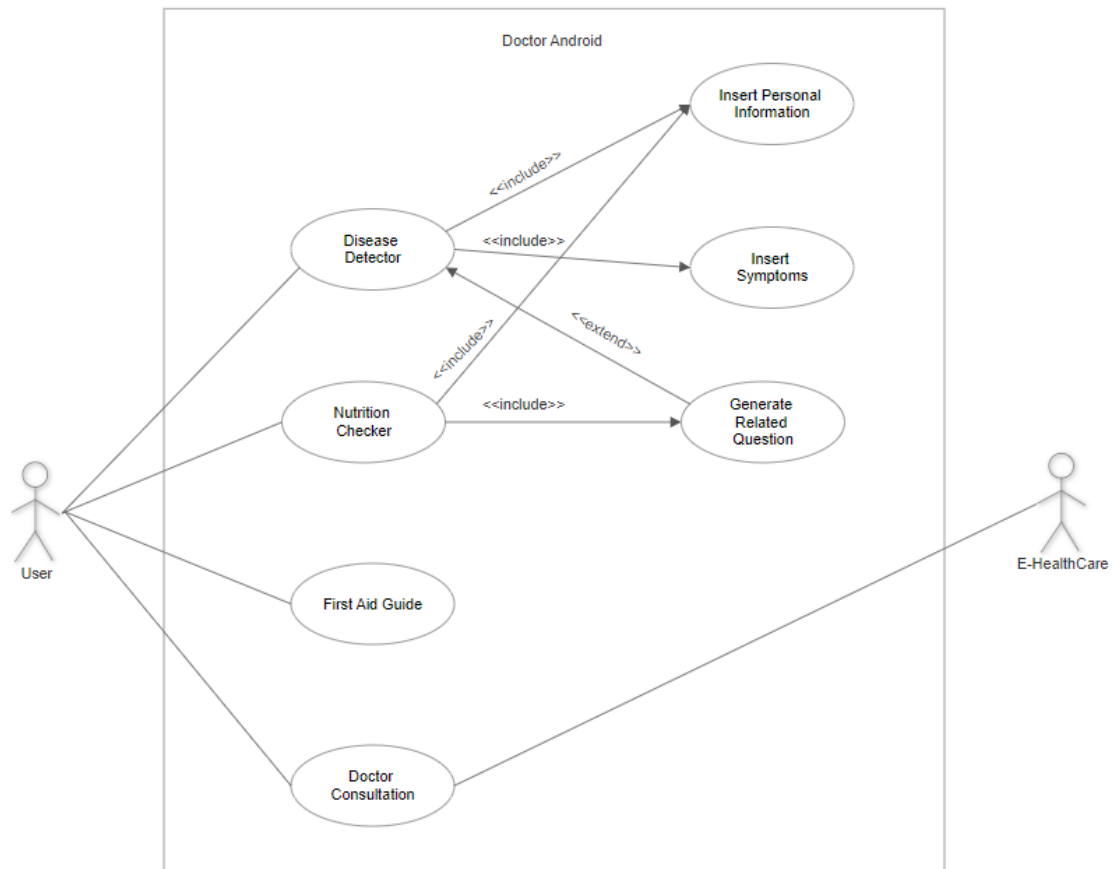


Figure 3.3.2: Use Case Model of Doctor Android

Table 3.1: Use case description of Disease Detector

Use Case Name	Disease Detector
Actor	User
Pre-Condition	None
Internal Path	1. Insert Personal Information 2. Insert Symptoms 3. Answer Related Question 4. Click “Detect” button 5. Click “Disease Detail” button
Exceptional Path	2.1. Wrong symptom 2.2. Wrong spelling
Note	Written by Md. Fahad on 17/11/2018 at 8:16 PM

Table 3.2: Use case description of Doctor Consultation

Use Case Name	Doctor Consultation
Actor	User
Pre-Condition	None
Internal Path	1. Click “Doctor Consultation” button
Exceptional Path	1. No internet connection
Note	Written by Md. Fahad on 17/11/2018 at 8:16 PM

Table 3.3: Use case description of Registration

Use Case Name	Registration
Actor	Patient, Doctor
Pre-Condition	Select User Type
Internal Path	1. Enter User Name 2. Enter Email 3. Enter Password 4. Upload Image 5. Click “Submit” button
Exceptional Path	1. User Name cannot be empty 2.1. Invalid Email 2.2. Email cannot be empty 3.1. Wrong Password format 3.2. Password cannot be empty 4.1. Invalid Image format 4.2. Image cannot be empty
Note	Written by Md. Fahad on 17/11/2018 at 8:16 PM

Table 3.4: Use case description of Login

Use Case Name	Login
Actor	Patient, Doctor
Pre-Condition	Registration
Internal Path	1. Enter Email 2. Enter Password 3. Click “Submit” button
Exceptional Path	1.1. Wrong Email 1.2. Email cannot be empty 2.1. Wrong Password 2.2. Password cannot be empty
Note	Written by Md. Fahad on 17/11/2018 at 8:16 PM

Table 3.5: Use case description of Disease Detail

Use Case Name	Disease Detail
Actor	Patient, Doctor
Pre-Condition	None
Internal Path	1. Enter Disease name 2. Click “Search” button
Exceptional Path	1.1. Wrong Disease name 1.2. Wrong spelling 1.3. Field cannot be empty
Note	Written by Md. Fahad on 17/11/2018 at 8:16 PM

Table 3.6: Use case description of View Doctors

Use Case Name	View Doctors
Actor	Patient, Doctor

Pre-Condition	None
Internal Path	1. Select Department 2. Select Country 3. Enter Doctor name 4. Click “Search” button
Exceptional Path	3.1. Wrong Doctor name 3.2. Wrong spelling 3.3. Field cannot be empty
Note	Written by Md. Fahad on 17/11/2018 at 8:16 PM

Table 3.7: Use case description of Take Appointment

Use Case Name	Take Appointment
Actor	Patient
Pre-Condition	Login
Internal Path	1. Select Doctor 2. Click “Appointment” button 3. Select Date 4. Select Time 5. Pay Appointment fee
Exceptional Path	3.1. Select wrong date 3.2. Date cannot be empty 4. No appointment available on that date 5. Insufficient fund
Note	Written by Md. Fahad on 17/11/2018 at 8:16 PM

Table 3.8: Use case description of View Appointment

Use Case Name	View Appointment
---------------	------------------

Actor	Patient, Doctor
Pre-Condition	Login, Take Appointment
Internal Path	1. Select appointment from list 2. Click “View” button
Exceptional Path	1. No appointment in list
Note	Written by Md. Fahad on 17/11/2018 at 8:16 PM

Table 3.9: Use case description of View Posts

Use Case Name	View Posts
Actor	Patient, Doctor
Pre-Condition	None
Internal Path	1. Select Topic 2. Select Title 3. Enter Title name 2. Click “Search” button
Exceptional Path	3.1. Invalid Title name 3.2. Field cannot be empty
Note	Written by Md. Fahad on 17/11/2018 at 8:16 PM

Table 3.10: Use case description of Create Posts

Use Case Name	Create Posts
Actor	Patient, Doctor
Pre-Condition	Login
Internal Path	1. Write Title 2. Write Description 3. Select Topic 4. Click “Post to Timeline” button
Exceptional Path	1. Title cannot be empty

	2. Description cannot be empty 3. Topic cannot be empty
Note	Written by Md. Fahad on 17/11/2018 at 8:16 PM

Table 3.11: Use case description of Edit Posts

Use Case Name	Edit Posts
Actor	Patient, Doctor
Pre-Condition	Login
Internal Path	1. Select posts from user's profile 2. Click "Edit" button 3. Enter new Title 4. Enter new Description 5. Select new Topic 6. Click "Update Post" button
Exceptional Path	3. Title cannot be empty 4. Description cannot be empty 5. Topic cannot be empty
Note	Written by Md. Fahad on 17/11/2018 at 8:16 PM

Table 3.12: Use case description of Delete Posts

Use Case Name	Edit Posts
Actor	Patient, Doctor
Pre-Condition	Login
Internal Path	1. Select posts from user's profile 2. Click "Delete" button
Exceptional Path	None

Note	Written by Md. Fahad on 17/11/2018 at 8:16 PM
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Table 3.13: Use case description of View Profile

Use Case Name	View Profile
Actor	Patient, Doctor
Pre-Condition	Login
Internal Path	1. Click “My Profile” button
Exceptional Path	None
Note	Written by Md. Fahad on 17/11/2018 at 8:16 PM

Table 3.14: Use case description of Edit Profile

Use Case Name	Edit Profile
Actor	Patient, Doctor
Pre-Condition	Login
Internal Path	1. Click “Edit Profile” button 2. Enter new information 3. Click “Update” button
Exceptional Path	2. Field cannot be empty
Note	Written by Md. Fahad on 17/11/2018 at 8:16 PM

Table 3.15: Use case description of Insert Appointment Schedule

Use Case Name	Insert Appointment Schedule
Actor	Doctor
Pre-Condition	Login
Internal Path	1. Click “Add/Update Appointment” button 2. Click “Update Date” button 3. Select new Date 4. Click “Update” button

	5. Click “View Time” button 6. Click “Update Time” button 7. Select new time 8. Click “Update” button
Exceptional Path	3. Date cannot be empty 7. Time cannot be empty
Note	Written by Md. Fahad on 17/11/2018 at 8:16 PM

Table 3.16: Use case description of View Users

Use Case Name	View Users
Actor	Admin
Pre-Condition	Login
Internal Path	1. Click “View Patient” button 2. Click “View Doctor” button
Exceptional Path	None
Note	Written by Md. Fahad on 17/11/2018 at 8:16 PM

3.4 Logical Data Model

The process of representing data architecture in a pictorial way without any relation to the physical implementation is called logical data modeling. All the information of each entity and the relationship between them that are present in a database is described by logical data model. It provides a structural overview of the data and the information related to the implementation of that data are not provided by logical data model. Here in figure 3.4 I have used Entity Relationship (E-R) diagram which shows the relationship among entities in graphical form.

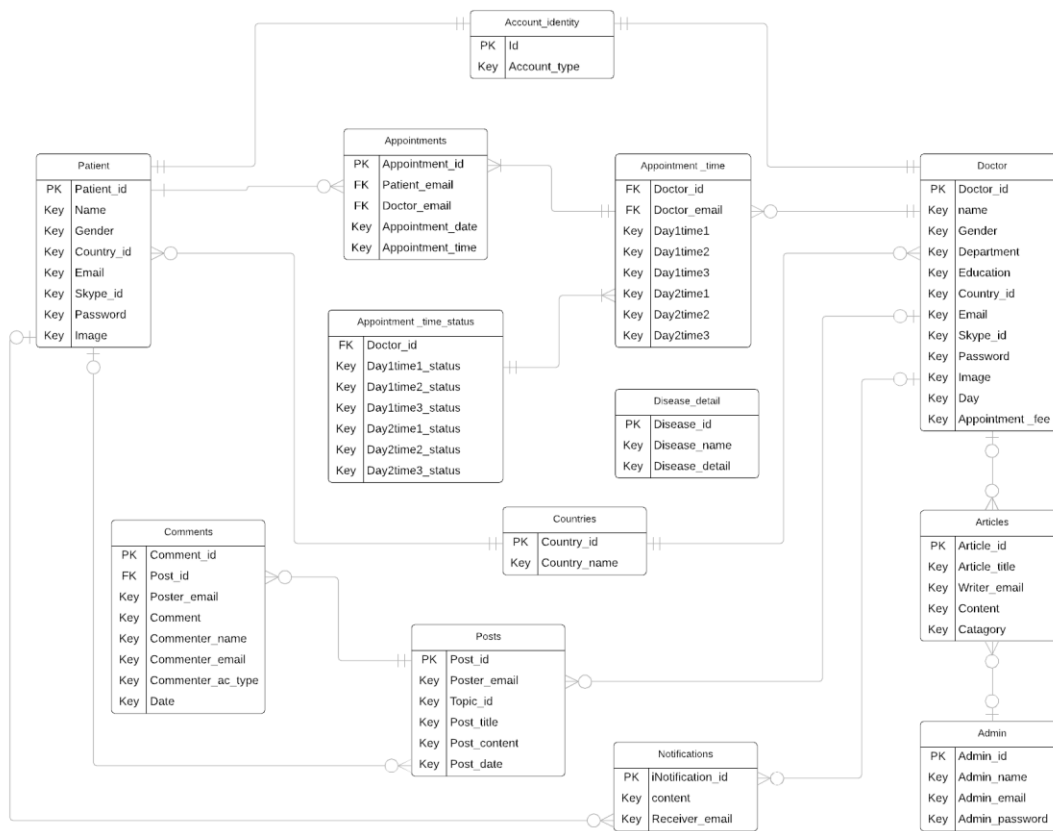


Figure 3.4: Entity Relationship Diagram

3.5 Design Requirement

Design requirement is a major part in a project development which makes an application not only unique but also user friendly. In my project I mainly focused on making user friendly design so that user can easily understand how to use the application. I have tried to make all the designs unique and all operations smoother for better user satisfaction. I have used auto complete search button for both android and web application so that users can select the correct thing and get great experience when they search for something in these applications.

CHAPTER 4

Design Specification

4.1 Front-End Design

Front-end design means the visual interface of an application by which user can interact with the application. In an application front-end design is the most important segment because it is the only part of an application that a user can directly interact with. To make an application usable, understandable, user friendly and easy to use front-end design play the major role. In my application I have tried to keep the front-end or GUI as simple as possible so that all kind of user can use it easily without any trouble. In my project consist of two application, one is android and another is web so we can divide the front-end design into two part.

The front-end design of the android application includes XML, material design and java. In material design I have used Collapsing toolbar, Splash screen, Search view, Card view, Alert dialog, Spinner, Drop-Down List, Auto complete text view etc.

The front-end design of the web application includes HTML, CSS, JavaScript, jQuery and Ajax. In this application I have added Drop Down navigation bar, Image overlay, Auto Complete textbox, Image popup etc.

Here some front-end design of the android application

The Figure 4.1.1 shows the splash screen of the application which shows up when the application starts.



Figure 4.1.1: Splash UI

Figure 4.1.2 shows the home screen of the application. There are two option in the home screen. One is Disease Detector and another is Doctor Consultation.

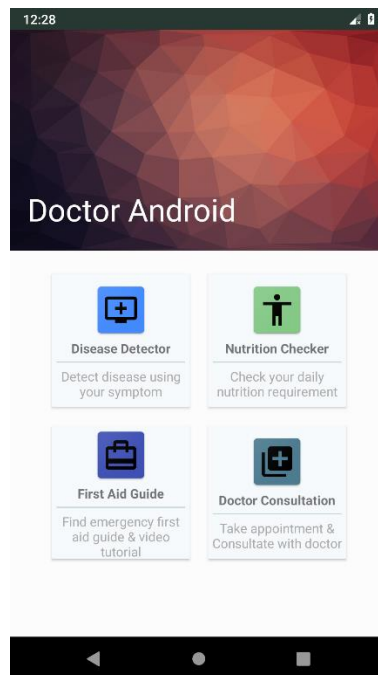


Figure 4.1.2: Home Screen

Figure 4.1.3 shows the disease detector screen of the application. When a user press the Disease Detector button then this screen will appear where you can detect your disease.

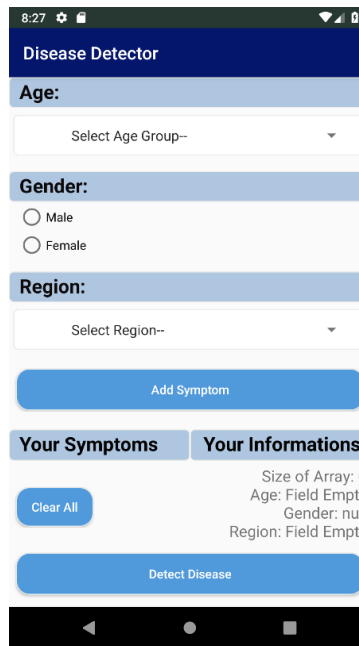


Figure 4.1.3: Disease Detector Screen

Figure 4.1.4 and 4.1.5 shows the selection of user's age group and selection region respectively.

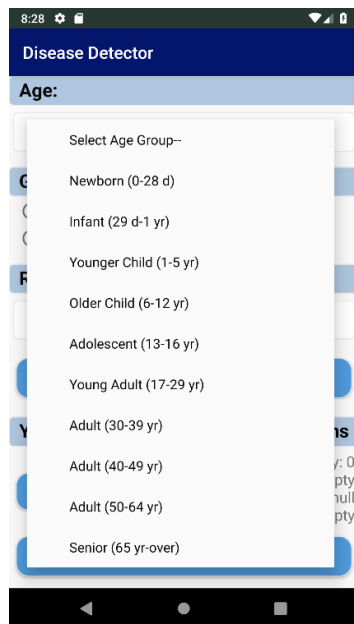


Figure 4.1.4: Selection of Age

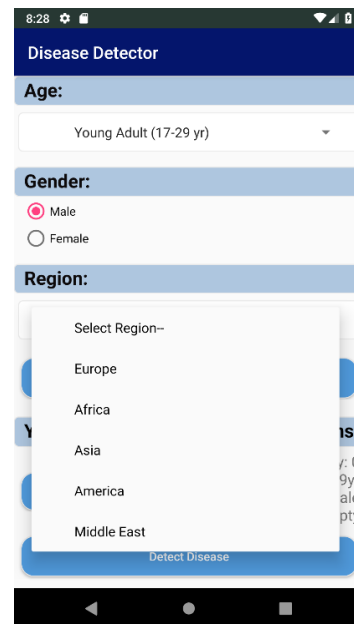


Figure 4.1.5: Selection of Region

Figure 4.1.6 and 4.1.7 shows the insertion of user symptoms using searchable spinner. Where a user can search and add their symptoms.

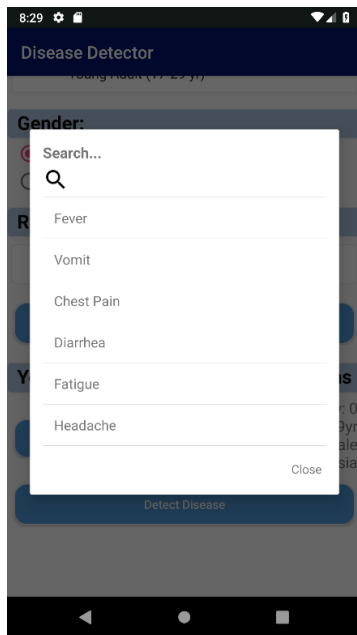


Figure 4.1.6: Insertion of Symptoms

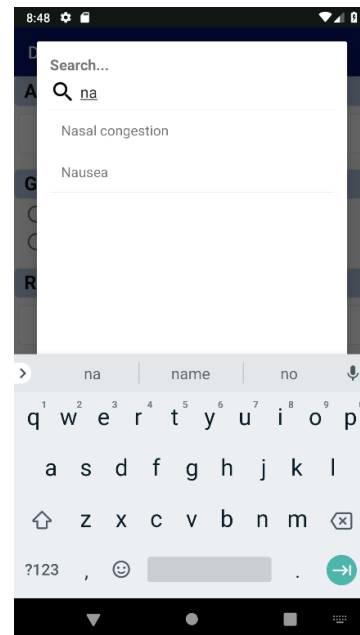


Figure 4.1.7: Search Symptoms

Figure 4.1.8 shows the questions generated by the application. When a user select a specific symptom based on that the application generate related questions.

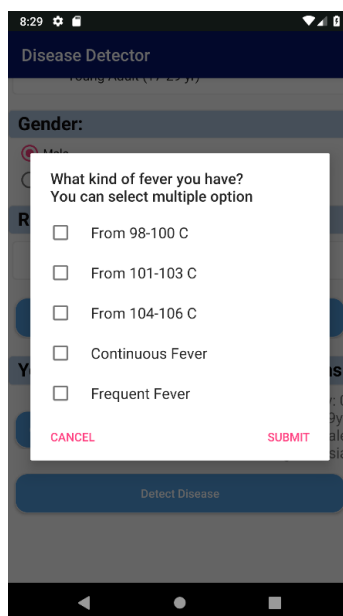


Figure 4.1.8: Generated Question

Figure 4.1.9 shows all the information's and symptoms that are given by the user.

The screenshot shows the 'Disease Detector' app interface. At the top, there is a back arrow and the title 'Disease Detector'. Below this, the 'Gender:' section has two radio buttons: 'Male' (selected) and 'Female'. The 'Region:' section has a dropdown menu currently showing 'Asia'. Below these is a blue button labeled 'Add Symptom'. The main area is divided into two tabs: 'Your Symptoms' and 'Your Informations'. Under 'Your Symptoms', there is a list of symptoms: 'Chest Pain', 'Coughing For 3 Weeks', 'Coughing up Blood', 'Weakness', and 'Sweating at Night'. Under 'Your Informations', there is a summary: 'No of symptom: 5', 'Age: 17-29yr', 'Gender: Male', and 'Region: Asia'. At the bottom of the main area, there is a blue button labeled 'Clear All' and another blue button labeled 'Detect Disease'. Below the 'Detect Disease' button, there is a red text prompt: 'Click Again To Get Result'.

Figure 4.1.9: User Information

Figure 4.1.10 shows the detected disease and information's that are generated by the application.

The screenshot shows the 'Detected Diseases' app interface. At the top, there is a back arrow and the title 'Detected Diseases'. Below this, there are two columns: 'Disease Name :' and 'Probability:'. Under 'Disease Name :', the text 'Tuberculosis(TB)' is displayed. Under 'Probability:', the text 'Very Strong' is displayed.

Figure 4.1.10: Detected Disease

Figure 4.1.11 and 4.1.12 shows the insertion of user physical information and answer of question generated to calculate required nutrition values.

12:44

← Nutrition Checker

By this checker you can check whether you are at a healthy weight or not and calculate your daily nutrition requirement

Gender ☒ Male ☐ Female

Age 24 yrs

Height 5 4

Weight 55 kg

Activity Sedentary

Calculate Daily Required Nutritions

Figure 4.1.11: Insertion of Information

12:44

← Nutrition Checker

Blood pressure Normal

Do you have Heart Disease ?
☐ Yes ☒ No

Do you have Kidney Disease ?
☐ Yes ☒ No

Do you have Diabetes ?
☐ Yes ☒ No

Are you Smoker ?
☐ Yes ☒ No

Calculate Daily Required Nutritions

Figure 4.1.12: Answering Question

Figure 4.1.13 shows the suggestion about the weight of the user and list of required nutrition values according to his physical condition.

12:44

← Your Daily Requirement

You are in Healthy Weight
Upper weight limit for you is 66kg

Nutrition values required for you

Calories	R:1741cal
Saturated Fat	Min:0g Max:13g
Monounsaturated Fat	Min:29g Max:38g
Polyunsaturated fat	Min:9g Max:17g
Cholesterol	Max:261mg
Sodium/Salt	Max:1500mg
Carbohydrate	Min:195g Max:282g
Sugar	Max:38g
Protein	Min:44g
Vitamin A	R:900mcg
Vitamin C	R:90mg
Vitamin D	R:15mcg
Calcium	R:1000mg
Iron	R:8mg

Figure 4.1.13: Nutrition Values

Figure 4.1.14 and 4.1.15 shows the list view of first aid topics and pictorial representation of first aid guide for selected topic.

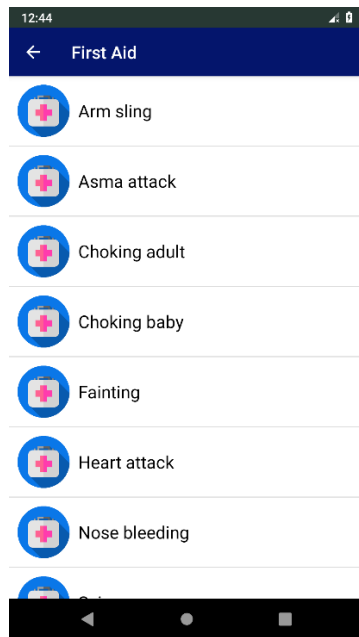


Figure 4.1.14: First Aid Topics



Figure 4.1.15: First Aid Guide

Figure 4.1.16 shows the pictorial representation of first aid guide and button of video tutorial of that topic.

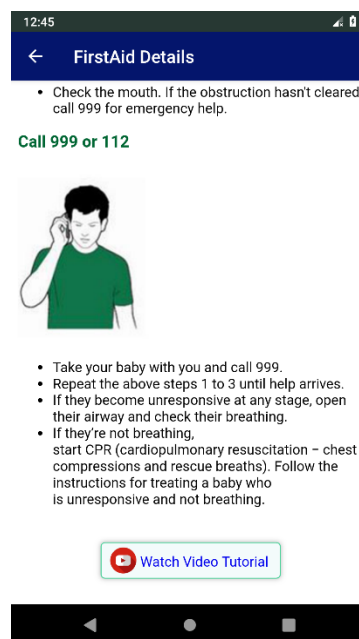


Figure 4.1.16: First Aid Guide and Video Tutorial

Here some front-end design of the web application

The Figure 4.1.17 shows home page of the web application. Login option appears when the user click on the “Signup/Login” button on the top right corner of the application



Figure 4.1.17: Home Page

The Figure 4.1.18 shows search bar for disease detail of the web application. In the search bar a user can search any disease name to get detail of that particular disease.

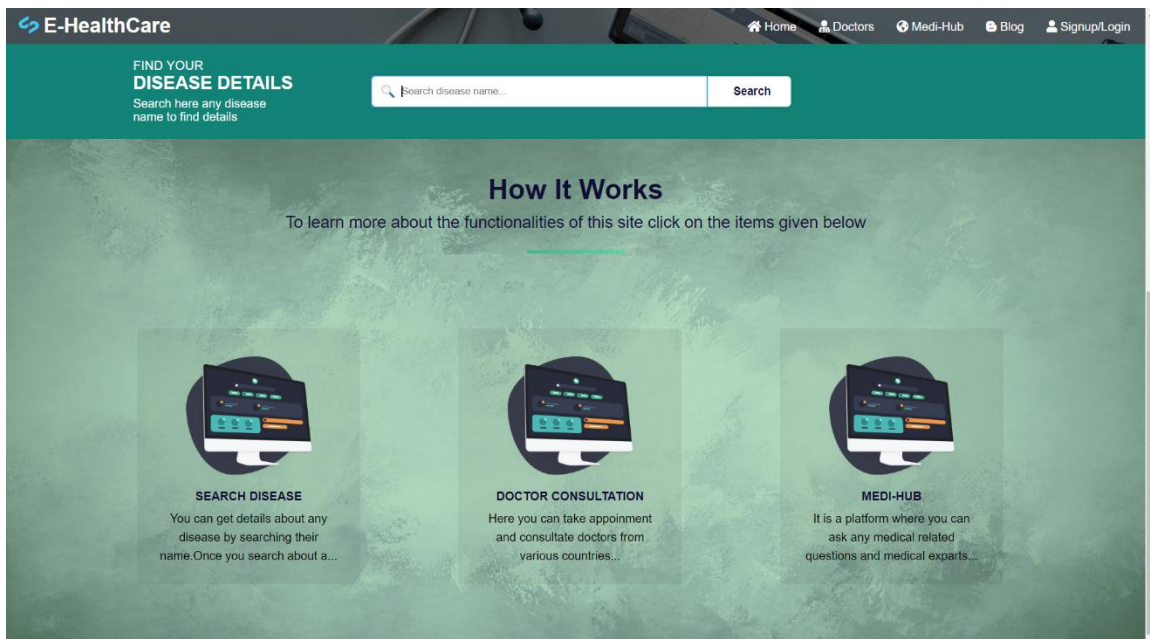


Figure 4.1.18: Search Bar of Disease

The Figure 4.1.19 shows disease detail page of the web application. It appears when a user search a disease name on the search bar located in the home page of the application.

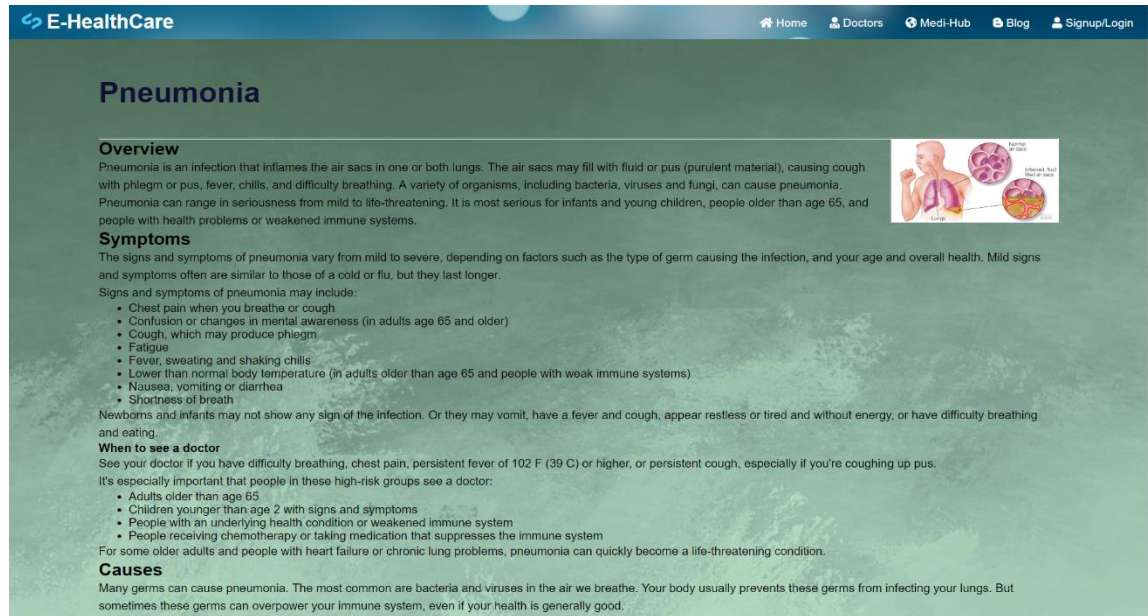


Figure 4.1.19: Disease Details

The Figure 4.1.20 shows all the doctors page of the web application. This page shows all the registered doctors profile. User can sort these profile by department and country. User also can search by name.

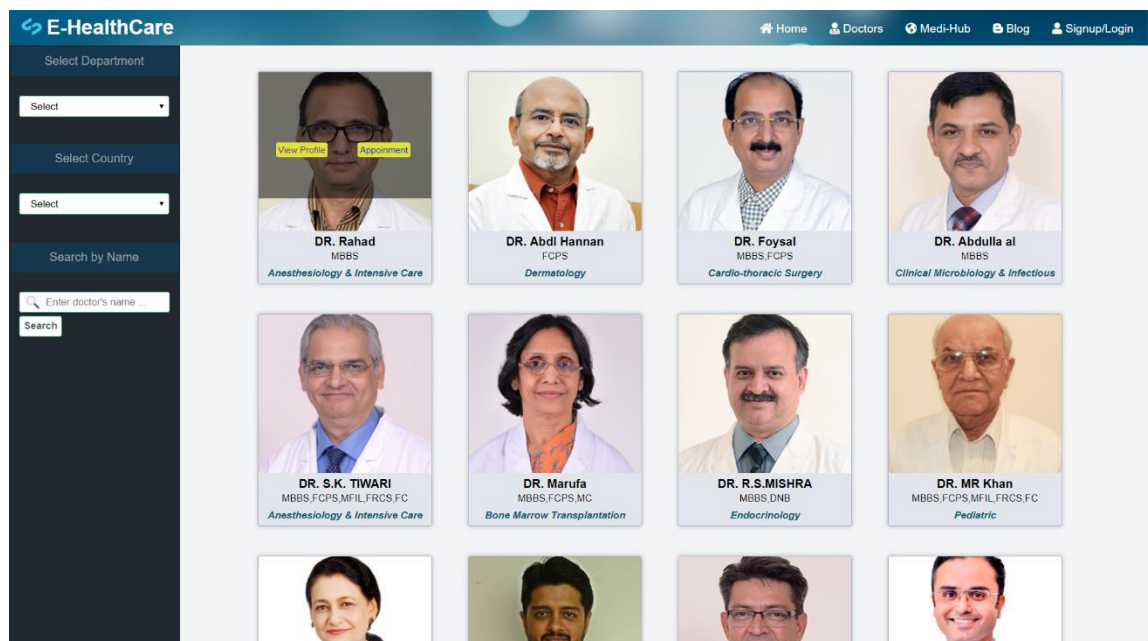


Figure 4.1.20: Doctors Profile

The Figure 4.1.21 shows individual doctors profile details of the web application. When a user click “View Profile” button located on each doctor profile then this page appear.

E-HealthCare Home Doctors Medi-Hub Blog Signup/Login

DR. MR Khan
Department Of Pediatric

Book an Appointment

Fees for new patient's appointment: \$10
Fees for returning patient's appointment: \$5

Awards Information:

- Publications in indexed peer reviewed Journals (10) and 2 book chapters
- Travelling Fellow Award , MDS(USA) Annual Conference , Taiwan(2010) and Dublin(2012)
- Travel Fellow Award, IEC ,Rome(2011)
- Invited Speaker/ Faculty at various conferences- API Conference (2015), Neurosonoon, ANI
- Reviewer for BMC Neurology

Education & Training:

- MBBS from Govt. Medical College, Amritsar(2000)
- MD Medicine from Christian Medical College, Ludhiana(2005)
- DM Neurology from GB Pant Hospital /MAMC, New Delhi(2011)
- Fellowship in Stroke and Neurosonology, National University Hospital, Singapore (2013)
- American Society of Neuroimaging(USA) Certification for Neurosonology (2015)

Work Experience:

- Joined PGI Chandigarh in 1962(First Pediatrician at PGI and in Chandigarh)
- Developed Neonatology at PGI Chandigarh and started First DM course in Neonatology in India 1989
- Professor & Head of Pediatrics and Neonatology from PGI Chandigarh
- Visiting Professor at GMCH, Chandigarh
- Visiting Professor at Dayanand Medical College Ludhiana

Figure 4.1.21: Doctors Profile Details

The Figure 4.1.22 shows appointment page of the web application that contain selected doctor information's and date selection option.

E-HealthCare Home Doctors Medi-Hub Blog Signup/Login

Selected Doctor **Department** **Appointment Date**

DR. MR Khan Pediatric 2018-07-22

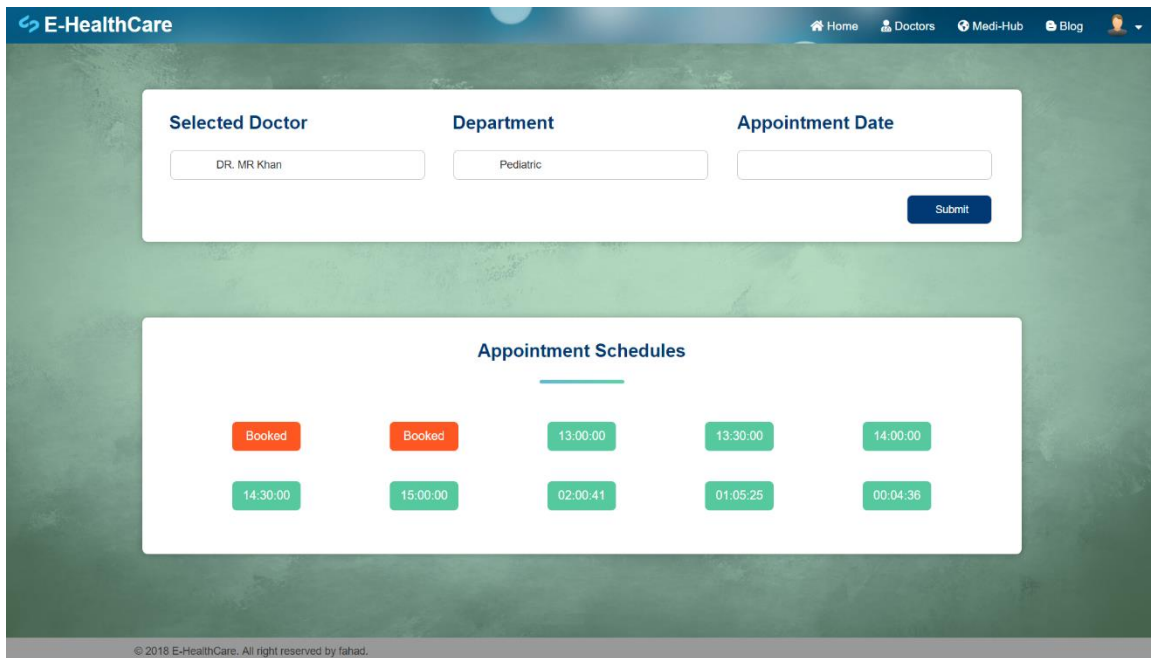
Submit

Appointment Schedules

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Figure 4.1.22: Appointment Date Selection

The Figure 4.1.23 shows appointment page of the web application that contain all the available appointment times schedule for selected date.



E-HealthCare Home Doctors Medi-Hub Blog

Selected Doctor DR. MR Khan

Department Pediatric

Appointment Date

Submit

Appointment Schedules

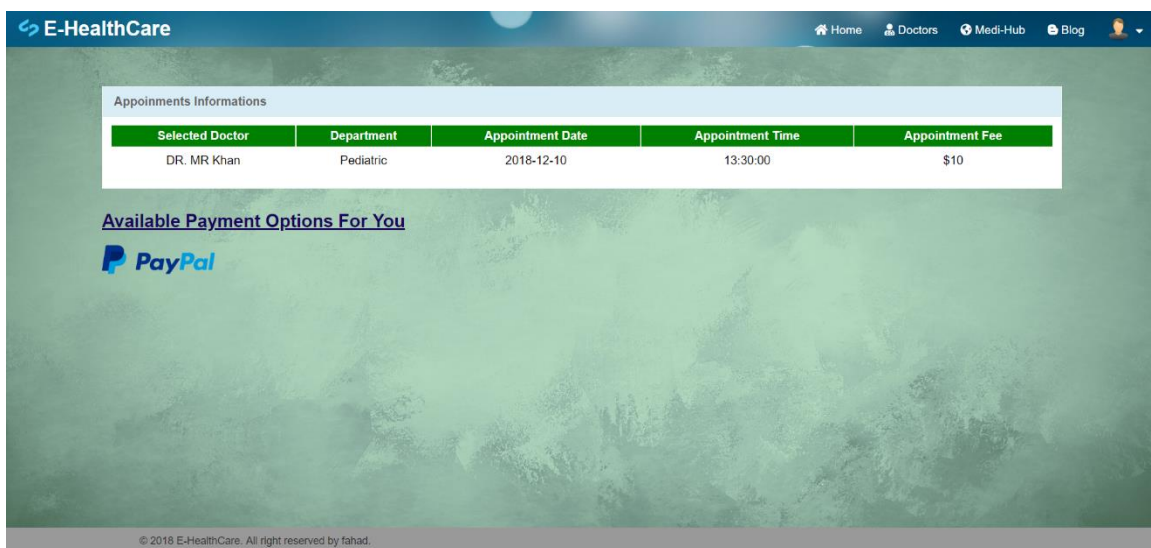
Booked Booked 13:00:00 13:30:00 14:00:00

14:30:00 15:00:00 02:00:41 01:05:25 00:04:36

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Figure 4.1.23: Appointment Times Schedule

The Figure 4.1.24 shows payment page of the web application that contain all available payment options to confirm appointment.



E-HealthCare Home Doctors Medi-Hub Blog

Appointments Informations

Selected Doctor	Department	Appointment Date	Appointment Time	Appointment Fee
DR. MR Khan	Pediatric	2018-12-10	13:30:00	\$10

[Available Payment Options For You](#)

PayPal

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Figure 4.1.24: Payment Options

The Figure 4.1.25 shows payment and appointment confirmation page of the web application. After successfully paying appoint fees a user can see this page.

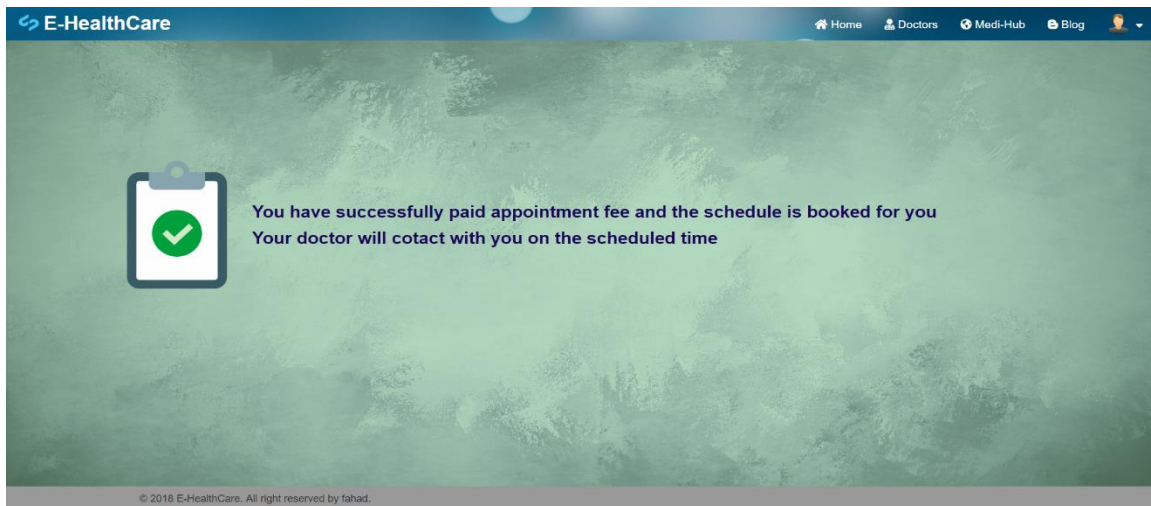


Figure 4.1.25: Payment and Appointment Confirmation

The Figure 4.1.26 shows Medi-Hub page of the web application that contain all the query post of users. Users can sort posts by Topic and Title. Posts can also be found by searching the title of a post.

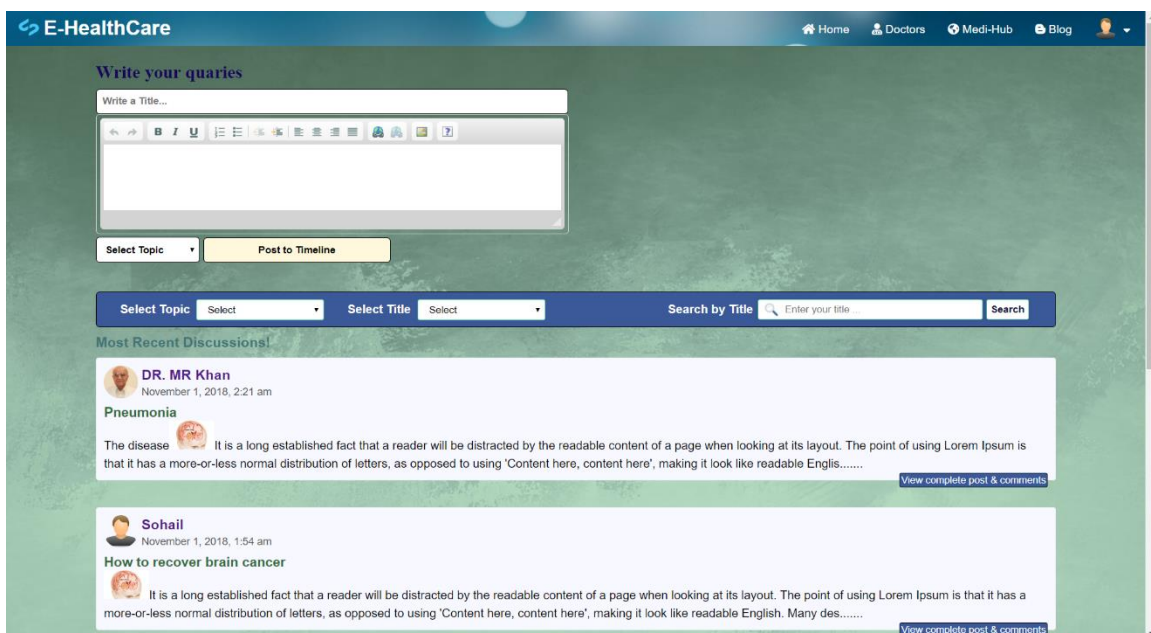


Figure 4.1.26: Medi-Hub

The Figure 4.1.27 shows the individual post and all the comment regarding the post.

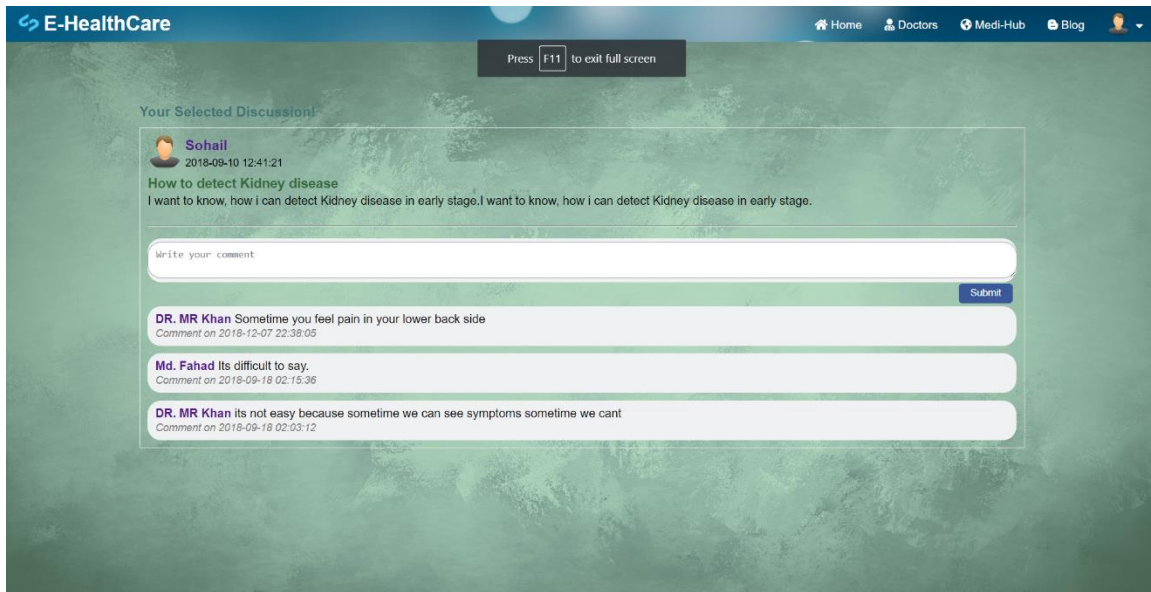


Figure 4.1.27: Individual Post

The Figure 4.1.28 shows the blog tab. From this page user can navigate to individual blog and categorized blogs

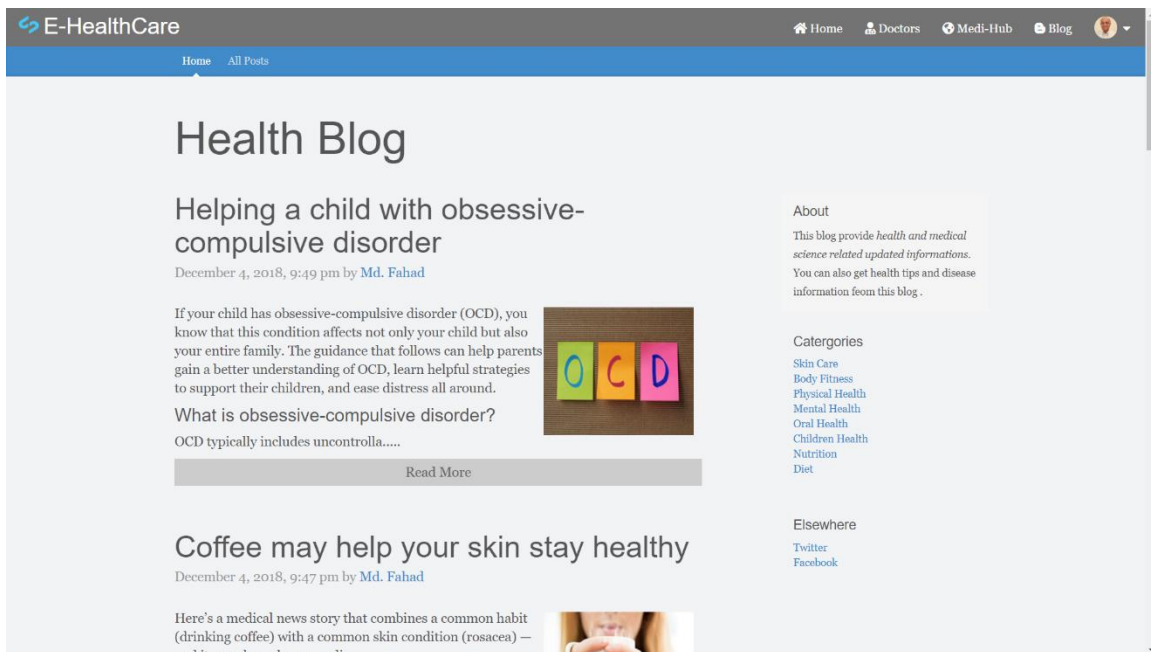


Figure 4.1.28: Blog Page

The Figure 4.1.29 shows the individual post and all the comment regarding the post.

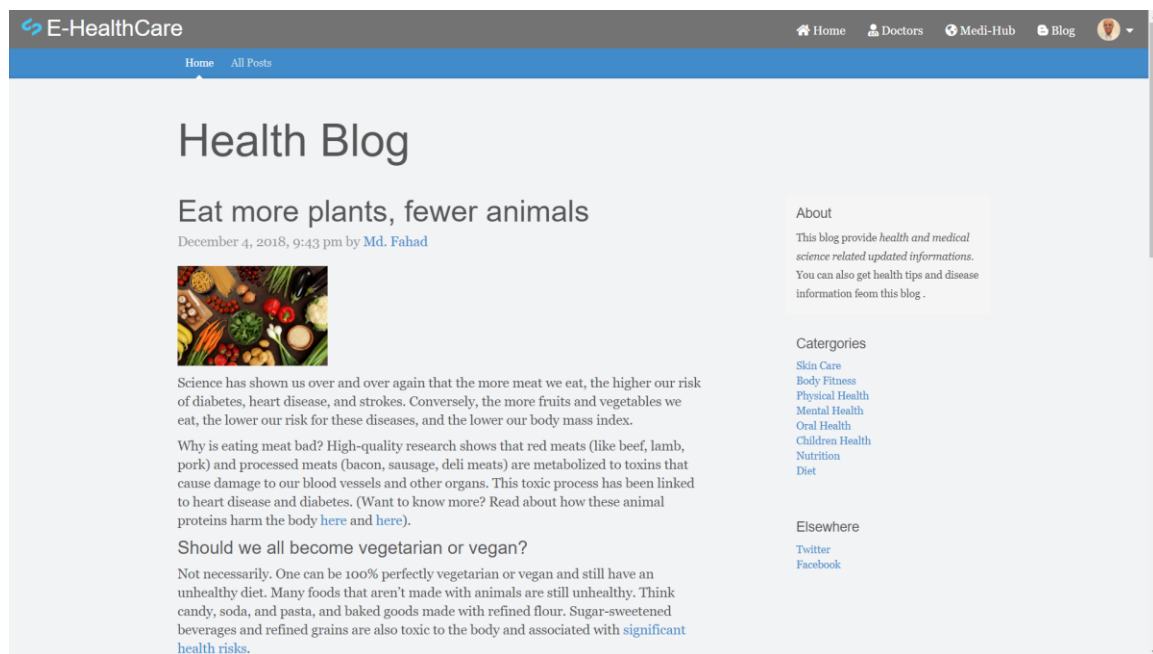


Figure 4.1.29: Individual Blog

The Figure 4.1.30 shows profile of a patient. A patient can view, edit, see message and see his posts from this page.

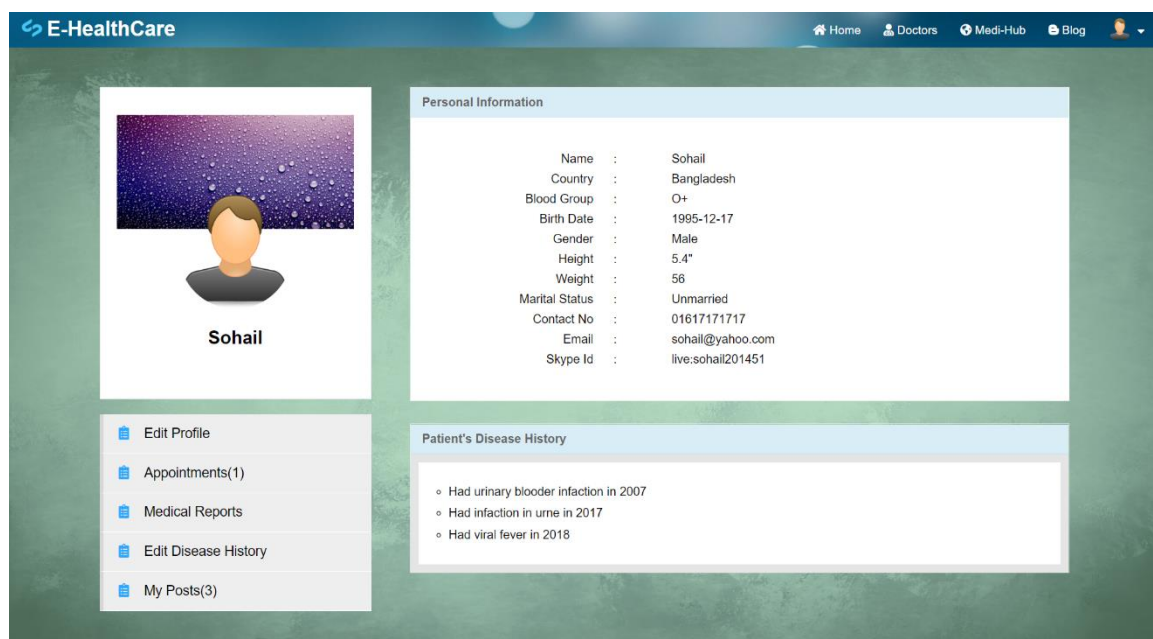


Figure 4.1.30: User Profile

The Figure 4.1.31 shows all the appointments of the user. From here that user can make call and send messages to his doctor

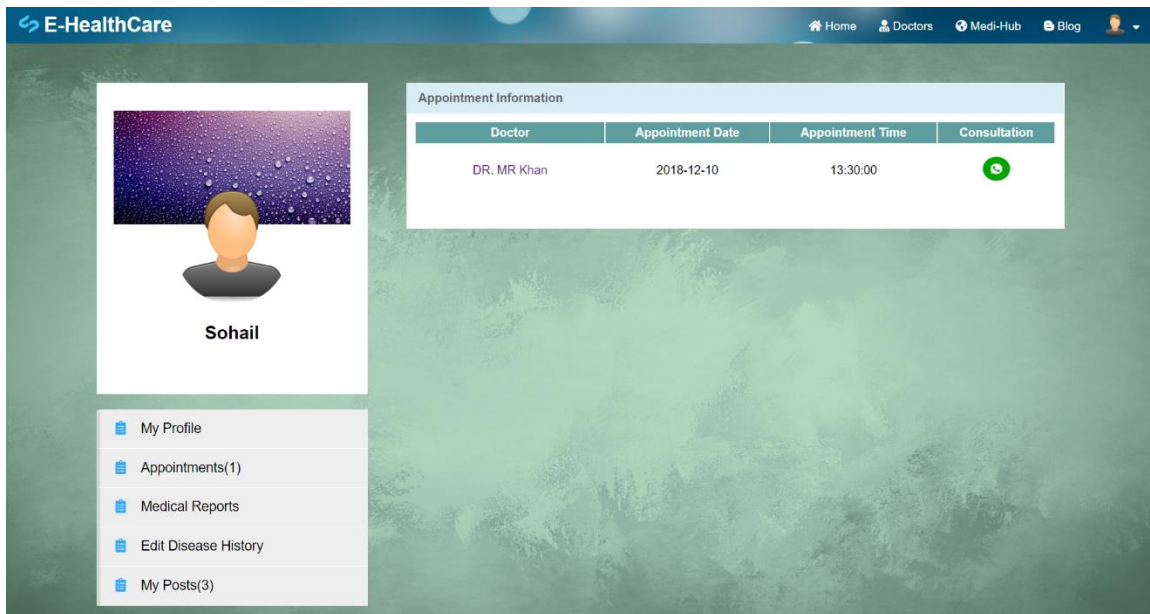


Figure 4.1.31: Use Appointments

The Figure 4.1.32 shows patients reports page of the web application. Here a patient can upload and download his medical reports.

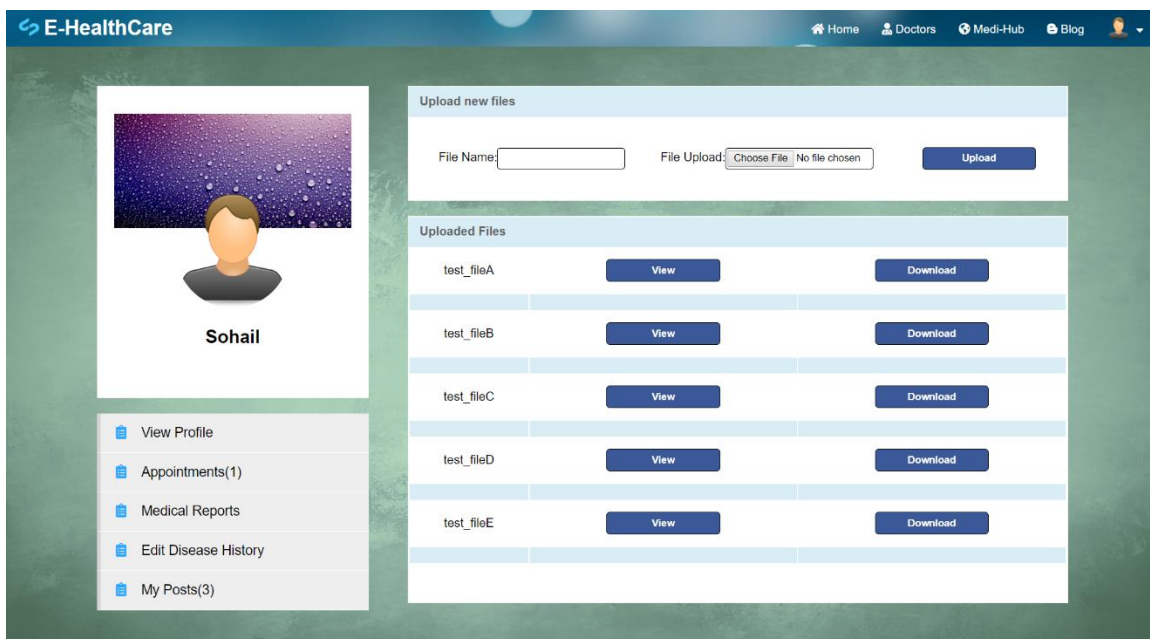


Figure 4.1.32: User Reports

The Figure 4.1.33 shows all post of a specific user. From here that user can view, edit and delete posts.

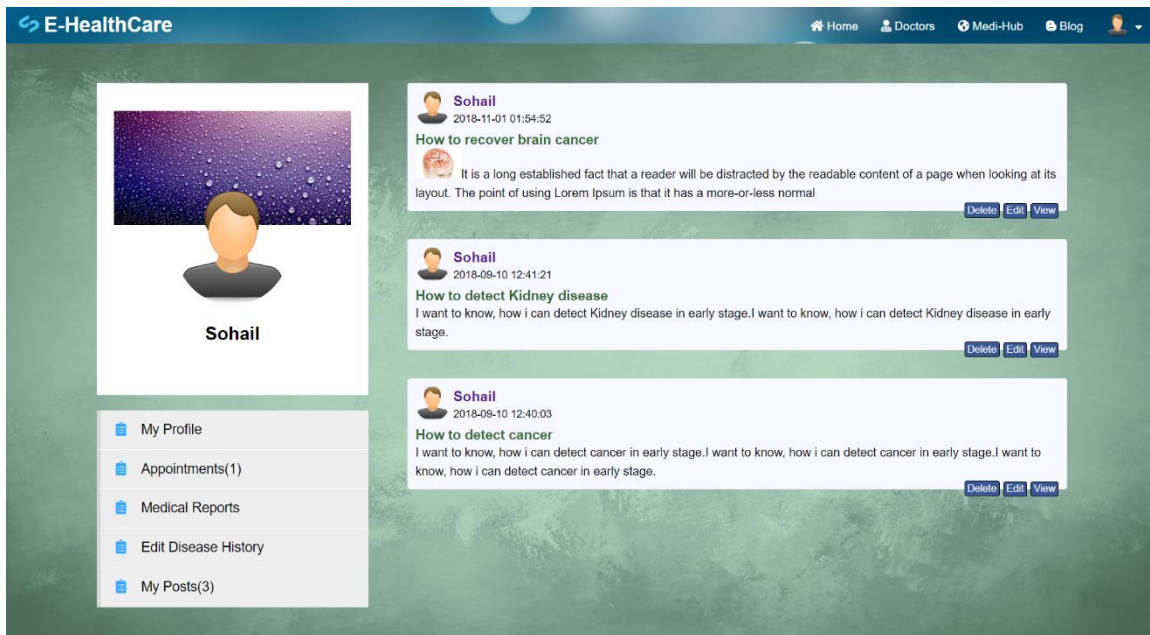


Figure 4.1.33: Use posts

The Figure 4.1.34 shows patients edit profile page of the web application. A patient can update and edit his or her profile information's from here

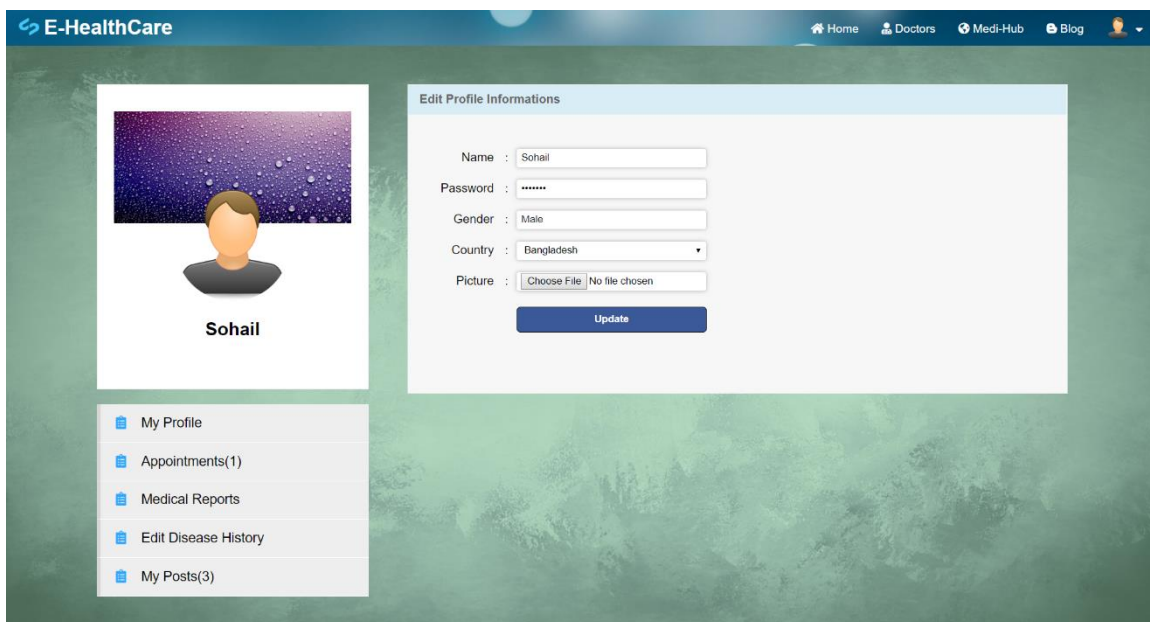


Figure 4.1.34: Edit profile

The Figure 4.1.35 shows edit post page of the web application that can be accessed from My Profile page. The post can be updated by clicking the update post button.

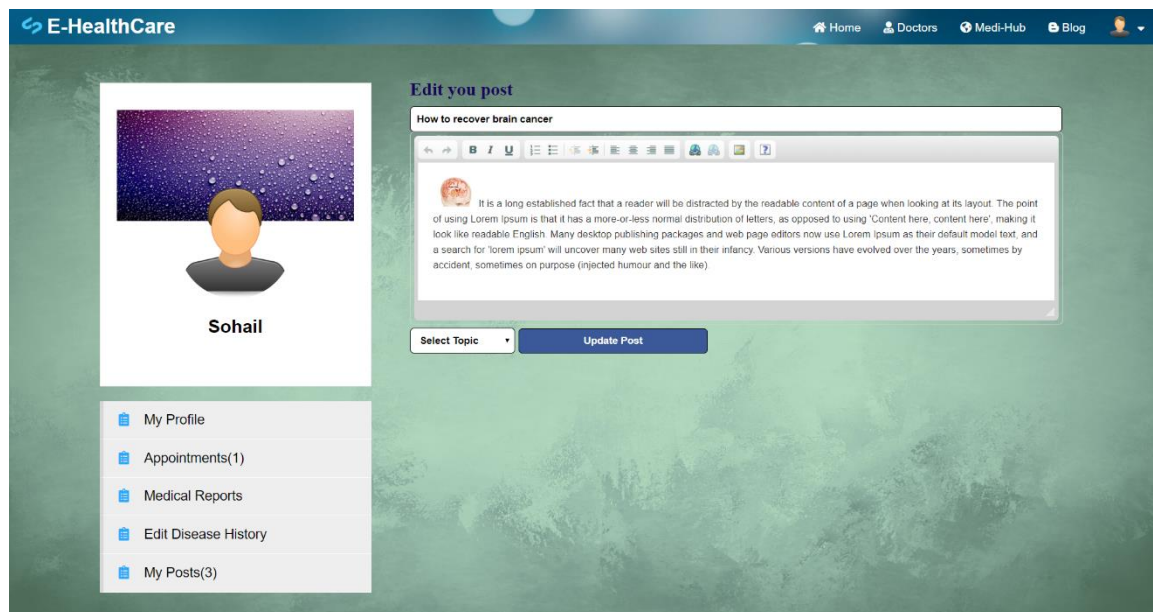


Figure 4.1.35: Edit Post

The Figure 4.1.36 shows the profile page of a doctor. From this page a doctor can see appointment, edit profile, see messages, and see posts.

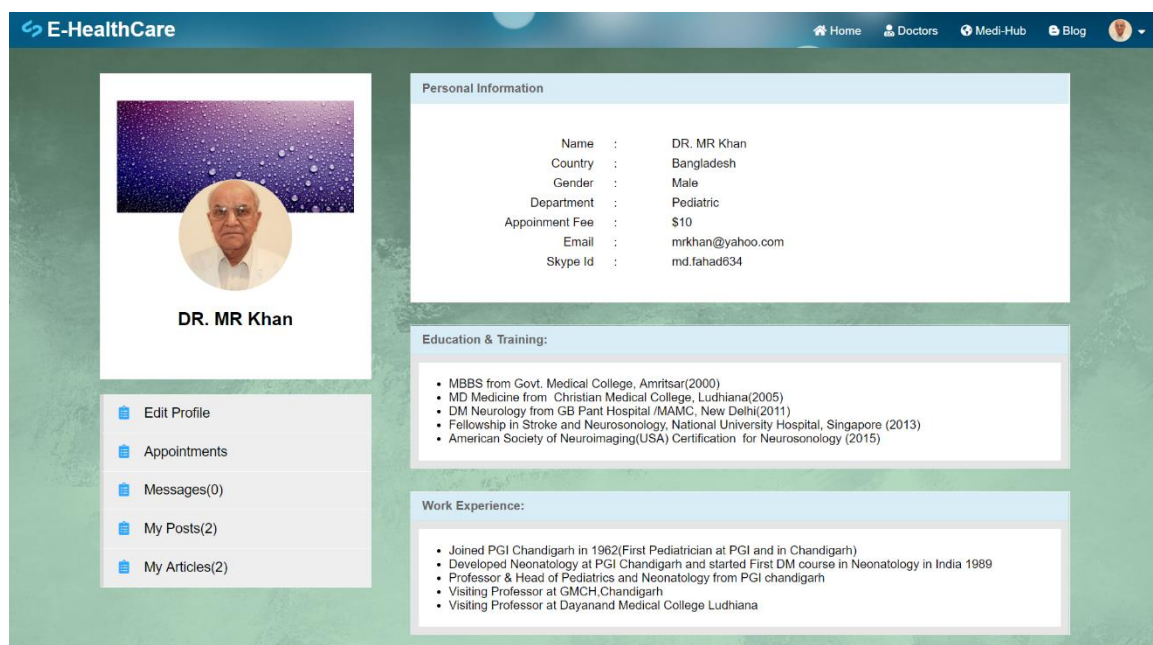


Figure 4.1.36: Doctor Profile

The Figure 4.1.37 shows doctors edit profile page of the web application. A doctor can update and edit his or her profile information's from here.

E-HealthCare Home Doctors Medi-Hub Blog

DR. MR Khan

- My Profile
- Appointments
- Messages(0)
- My Posts(2)
- My Articles(2)

Edit Personal Informations

Name : DR. MR Khan

Password :

Gender : Male

Country : Bangladesh

Appointment Fee : 10

Skype Id : md.fahad634

Picture : Choose File No file chosen

Department : Pediatric

Update

Education and Training

Work Experience

Award information

Chambers

Figure 4.1.37: Edit Profile

The Figure 4.1.38 shows appointment page of the web application. From here a doctor can add appointment schedule, view current appointment and see all appointments.

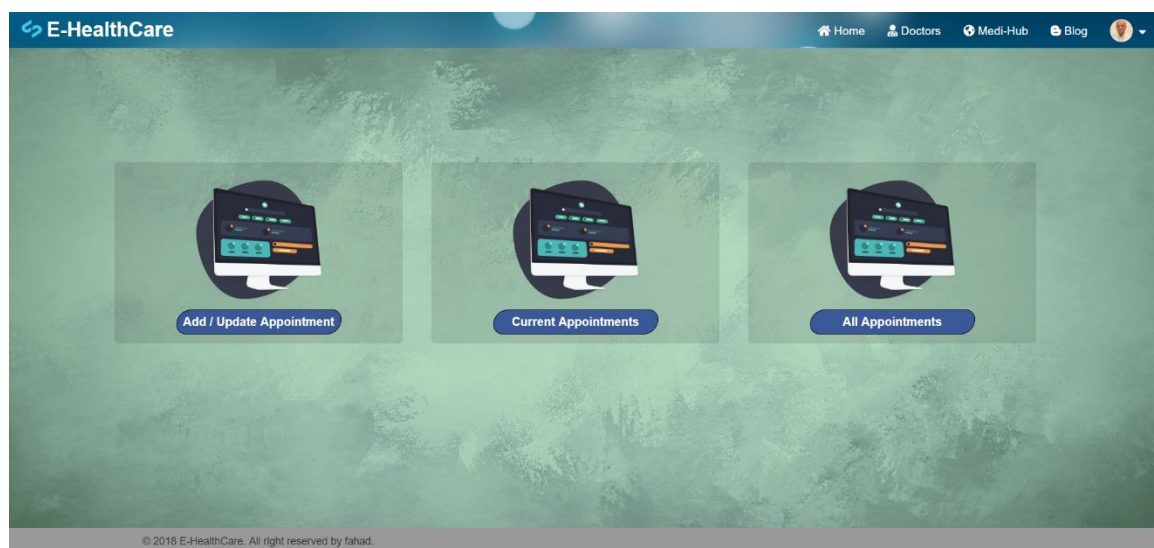


Figure 4.1.38: Appointment Page of Doctor

The Figure 4.1.39 shows add appointment page of the web application. From here a doctor can add or update appointment schedule.

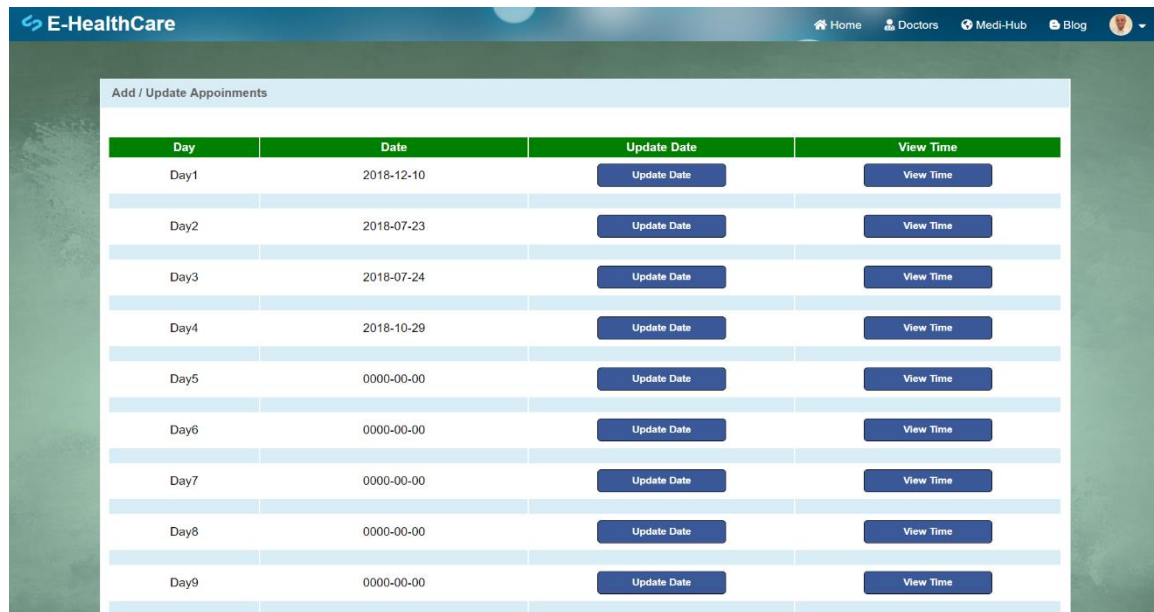


Figure 4.1.39: Add or Update Appointment Schedule

The Figure 4.1.40 shows current appointment page of the web application. From here a doctor can view current appointment.



Figure 4.1.40: Current Appointments

The Figure 4.1.41 shows admin login page of the web application. Only an admin can access this page by using a secret URL.

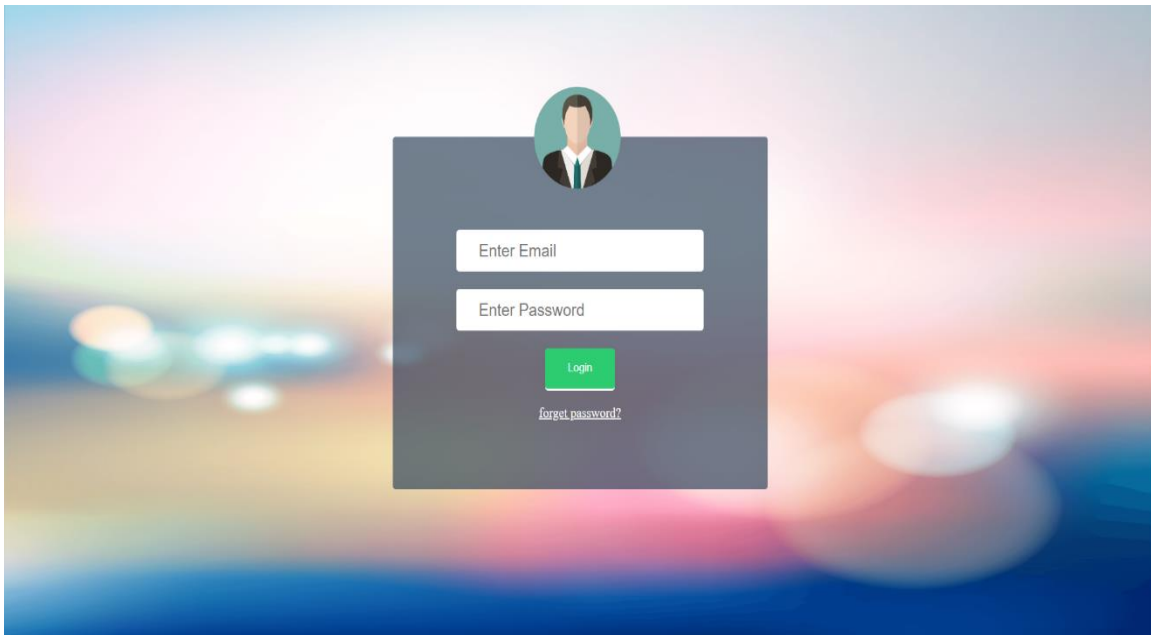


Figure 4.1.41: Admin Login

The Figure 4.1.42 shows admin dashboard of the web application. From this page admin can navigate to all other pages to control the web application.

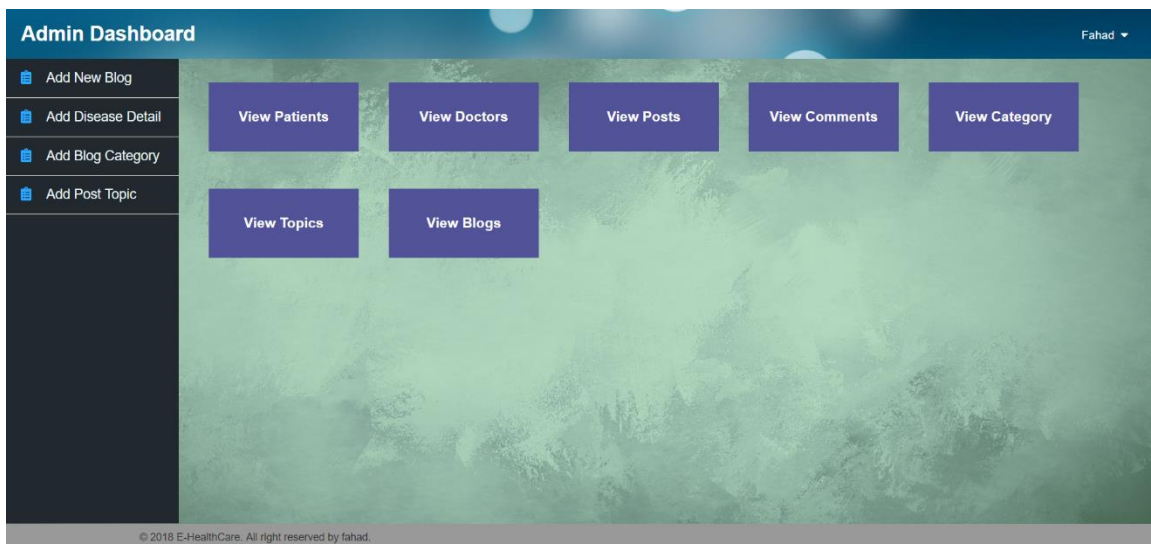
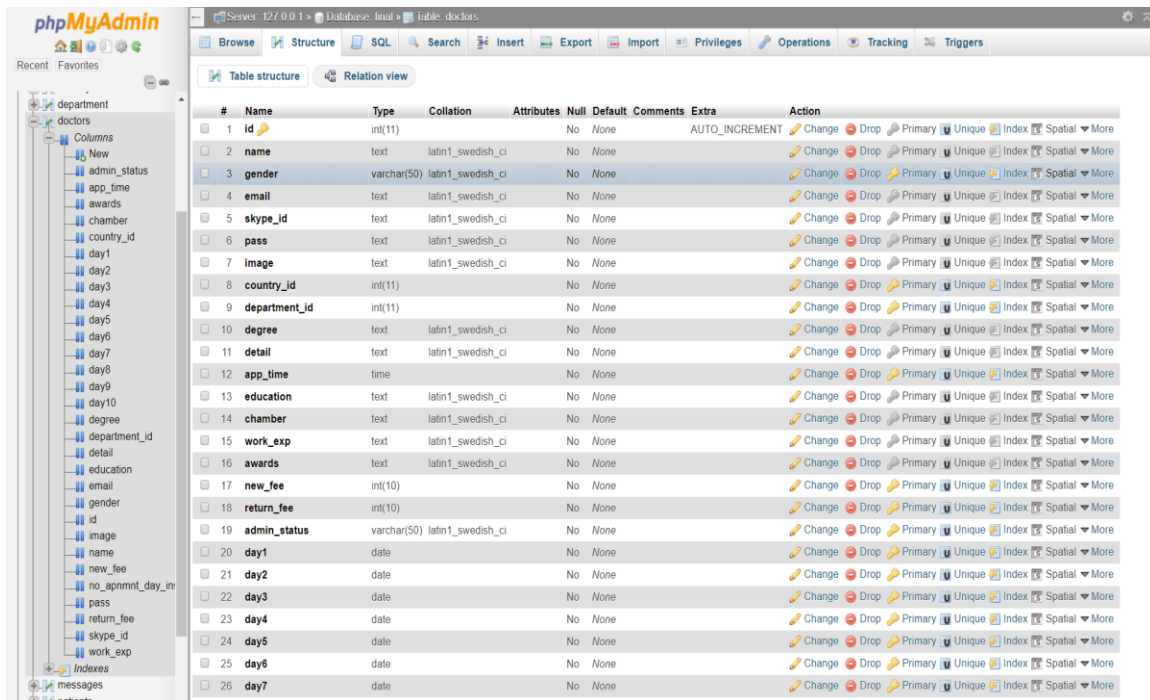


Figure 4.1.42: Admin Dashboard

4.2 Back-End Design

In an application back-end design is the part that work behind the user interface of the application. A user cannot directly interact with back-end design and can't see them. Front-end design is the only way that a user can interact with the back-end. In my android application I have used Java to process user given symptoms, generate related questions and detect disease. In my web application I have used PHP to execute all the operations and as database I have used MySQL. My applications database design are given below:

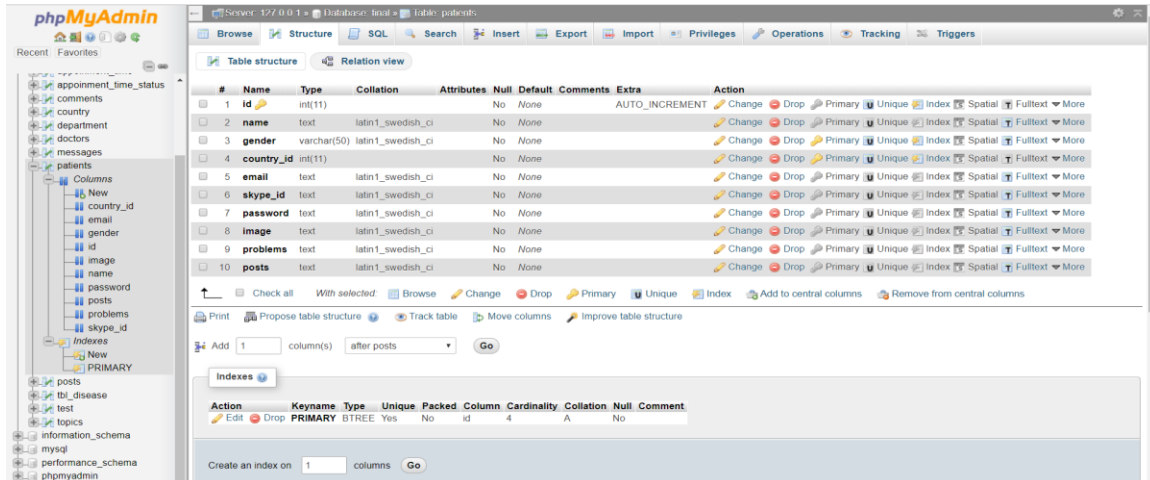
The Figure 4.2.1 shows the authorized doctors table in MySQL database. It contain all the doctor's information who are registered in my application. The stored information's are like name, is, password, email, country, department, education, work experience, awards, appointment dates, appointment fee, chamber detail etc.



#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	id	int(11)			No	None		AUTO_INCREMENT	Change Drop Primary Unique Index Spatial More
2	name	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
3	gender	varchar(50)	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
4	email	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
5	skype_id	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
6	pass	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
7	image	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
8	country_id	int(11)			No	None			Change Drop Primary Unique Index Spatial More
9	department_id	int(11)			No	None			Change Drop Primary Unique Index Spatial More
10	degree	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
11	detail	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
12	app_time	time			No	None			Change Drop Primary Unique Index Spatial More
13	education	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
14	chamber	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
15	work_exp	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
16	awards	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
17	new_fee	int(10)			No	None			Change Drop Primary Unique Index Spatial More
18	return_fee	int(10)			No	None			Change Drop Primary Unique Index Spatial More
19	admin_status	varchar(50)	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
20	day1	date			No	None			Change Drop Primary Unique Index Spatial More
21	day2	date			No	None			Change Drop Primary Unique Index Spatial More
22	day3	date			No	None			Change Drop Primary Unique Index Spatial More
23	day4	date			No	None			Change Drop Primary Unique Index Spatial More
24	day5	date			No	None			Change Drop Primary Unique Index Spatial More
25	day6	date			No	None			Change Drop Primary Unique Index Spatial More
26	day7	date			No	None			Change Drop Primary Unique Index Spatial More

Figure 4.2.1: Doctor Table

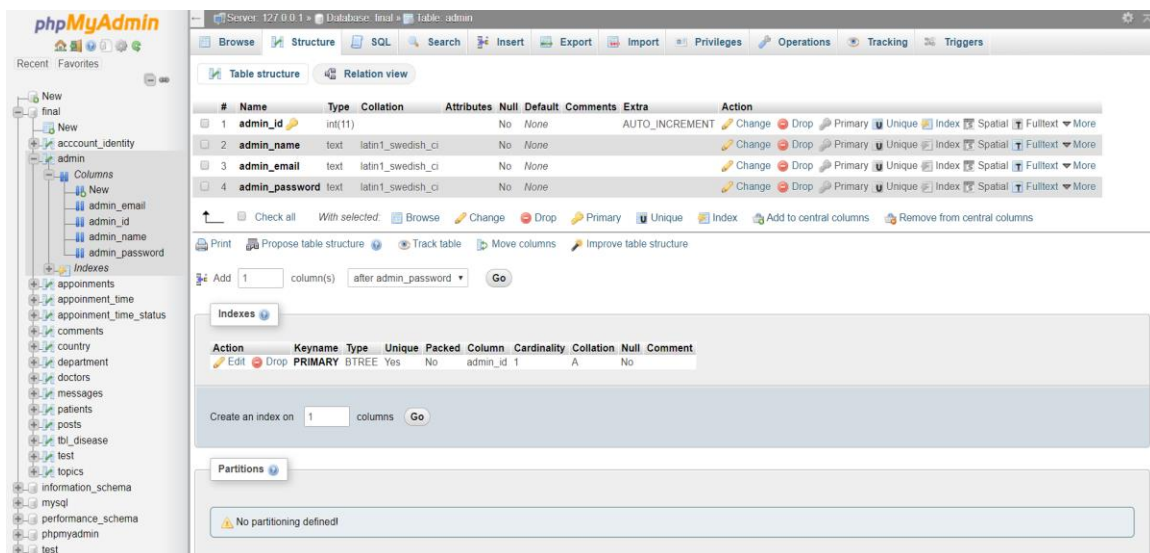
The Figure 4.2.2 shows the authorized patients table in MySQL database. It contain all the patient's information who are registered in my application. The stored information's are like name, is, password, email, country etc.



#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	id	int(11)			No	None		AUTO_INCREMENT	Change Drop Primary Unique Index Spatial Fulltext More
2	name	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext More
3	gender	varchar(50)	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext More
4	country_id	int(11)			No	None			Change Drop Primary Unique Index Spatial Fulltext More
5	email	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext More
6	skype_id	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext More
7	password	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext More
8	image	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext More
9	problems	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext More
10	posts	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext More

Figure 4.2.2: Patient Table

The Figure 4.2.3 shows the authorized admin table in MySQL database. It contain all the admins information who are registered in my application. The stored information's are like name, is, password, email.



#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	admin_id	int(11)			No	None		AUTO_INCREMENT	Change Drop Primary Unique Index Spatial Fulltext More
2	admin_name	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext More
3	admin_email	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext More
4	admin_password	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext More

Figure 4.2.3: Admin Table

The Figure 4.2.4 shows the appointments table in MySQL database. It contain all the appointment information that are appointed by the patients. The stored information's are like appointment id, patient email, doctor email, appointment date and time.

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	appointment_id	int(11)			No	None		AUTO_INCREMENT	Change Drop Primary Unique Index Spatial Fulltext More
2	patient_email	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext More
3	doctor_email	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext More
4	appointment_date	date			No	None			Change Drop Primary Unique Index Spatial Fulltext More
5	appointment_time	time			No	None			Change Drop Primary Unique Index Spatial Fulltext More

Figure 4.2.4: Appointment Table

The Figure 4.2.5 shows the appointments time table in MySQL database. It contain all the appointment time that are appointed by the patients. The stored information's are like doctor id, doctor email and available appointment time or individual date.

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	doctor_id	int(11)			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
2	doctor_email	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
3	day1time1	time			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
4	day1time2	time			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
5	day1time3	time			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
6	day1time4	time			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
7	day1time5	time			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
8	day1time6	time			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
9	day1time7	time			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
10	day1time8	time			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
11	day1time9	time			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
12	day1time10	time			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
13	day2time1	time			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
14	day2time2	time			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
15	day2time3	time			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
16	day3time1	time			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
17	day3time2	time			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
18	day3time3	time			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
19	day4time1	time			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
20	day4time2	time			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
21	day4time3	time			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More

Figure 4.2.5: Appointment Time Table

The Figure 4.2.6 shows the appointment status table in MySQL database. It contain every time slot status for each day. When a patient take an appointment on a date at a particular time then the time's status will be 1 else it will be 0.

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	doctor_id	int(11)			No	None		Primary Unique Index Spatial Fulltext Distinct values	Change Drop Primary Unique Index Spatial Fulltext Distinct values More
2	day1time1status	int(11)			No	None		Primary Unique Index Spatial Fulltext Distinct values	Change Drop Primary Unique Index Spatial Fulltext Distinct values More
3	day1time2status	int(11)			No	None		Primary Unique Index Spatial Fulltext Distinct values	Change Drop Primary Unique Index Spatial Fulltext Distinct values More
4	day1time3status	int(11)			No	None		Primary Unique Index Spatial Fulltext Distinct values	Change Drop Primary Unique Index Spatial Fulltext Distinct values More
5	day1time4status	int(11)			No	None		Primary Unique Index Spatial Fulltext Distinct values	Change Drop Primary Unique Index Spatial Fulltext Distinct values More
6	day1time5status	int(11)			No	None		Primary Unique Index Spatial Fulltext Distinct values	Change Drop Primary Unique Index Spatial Fulltext Distinct values More
7	day1time6status	int(11)			No	None		Primary Unique Index Spatial Fulltext Distinct values	Change Drop Primary Unique Index Spatial Fulltext Distinct values More
8	day1time7status	int(11)			No	None		Primary Unique Index Spatial Fulltext Distinct values	Change Drop Primary Unique Index Spatial Fulltext Distinct values More
9	day1time8status	int(11)			No	None		Primary Unique Index Spatial Fulltext Distinct values	Change Drop Primary Unique Index Spatial Fulltext Distinct values More
10	day1time9status	int(11)			No	None		Primary Unique Index Spatial Fulltext Distinct values	Change Drop Primary Unique Index Spatial Fulltext Distinct values More
11	day1time10status	int(11)			No	None		Primary Unique Index Spatial Fulltext Distinct values	Change Drop Primary Unique Index Spatial Fulltext Distinct values More
12	day2time1status	int(11)			No	None		Primary Unique Index Spatial Fulltext Distinct values	Change Drop Primary Unique Index Spatial Fulltext Distinct values More
13	day2time2status	int(11)			No	None		Primary Unique Index Spatial Fulltext Distinct values	Change Drop Primary Unique Index Spatial Fulltext Distinct values More
14	day2time3status	int(11)			No	None		Primary Unique Index Spatial Fulltext Distinct values	Change Drop Primary Unique Index Spatial Fulltext Distinct values More
15	day3time1status	int(11)			No	None		Primary Unique Index Spatial Fulltext Distinct values	Change Drop Primary Unique Index Spatial Fulltext Distinct values More
16	day3time2status	int(11)			No	None		Primary Unique Index Spatial Fulltext Distinct values	Change Drop Primary Unique Index Spatial Fulltext Distinct values More
17	day3time3status	int(11)			No	None		Primary Unique Index Spatial Fulltext Distinct values	Change Drop Primary Unique Index Spatial Fulltext Distinct values More
18	day4time1status	int(11)			No	None		Primary Unique Index Spatial Fulltext Distinct values	Change Drop Primary Unique Index Spatial Fulltext Distinct values More
19	day4time2status	int(11)			No	None		Primary Unique Index Spatial Fulltext Distinct values	Change Drop Primary Unique Index Spatial Fulltext Distinct values More
20	day4time3status	int(11)			No	None		Primary Unique Index Spatial Fulltext Distinct values	Change Drop Primary Unique Index Spatial Fulltext Distinct values More

Figure 4.2.6: Appointment Time Status

The Figure 4.2.7 shows the disease table in MySQL database. It contain all the information about diseases. The stored information's are like disease id, disease name and disease details.

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	disease_id	int(11)			No	None		AUTO_INCREMENT Primary Unique Index Spatial Fulltext	Change Drop Primary Unique Index Spatial Fulltext More
2	disease_name	text	latin1_swedish_ci		No	None		Primary Unique Index Spatial Fulltext	Change Drop Primary Unique Index Spatial Fulltext More
3	disease_detail	text	latin1_swedish_ci		No	None		Primary Unique Index Spatial Fulltext	Change Drop Primary Unique Index Spatial Fulltext More

Action	Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
Edit	PRIMARY	BTREE	Yes	No	disease_id_11	A		No	

Figure 4.2.7: Diseases Table

The Figure 4.2.8 shows the posts table in MySQL database. It contain all the queries that are posted by user to get answer of their queries. The stored information's are like post id, poster email, topic id, post title, post contents and postdate.

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	post_id	int(11)			No	None		AUTO_INCREMENT	Change Drop Primary Unique Index Spatial More
2	poster_email	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
3	topic_id	int(11)			No	None			Change Drop Primary Unique Index Spatial More
4	post_title	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
5	post_content	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
6	post_date	timestamp			No	CURRENT_TIMESTAMP			Change Drop Primary Unique Index Spatial More

Figure 4.2.8: Users Posts Table

The Figure 4.2.9 shows the comments table in MySQL database. It contain all the comments that are done by user in each posts. The stored information's are like comment id, post id, poster email, comment, commenter name, commenter email, commenter account type and comment date.

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	comment_id	int(11)			No	None		AUTO_INCREMENT	Change Drop Primary Unique Index Spatial More
2	post_id	int(11)			No	None			Change Drop Primary Unique Index Spatial More
3	poster_email	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
4	comment	varchar(255)	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
5	commenter_name	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
6	commenter_email	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
7	commenter_ac_type	text	latin1_swedish_ci		No	None			Change Drop Primary Unique Index Spatial More
8	date	timestamp			No	CURRENT_TIMESTAMP	ON UPDATE CURRENT_TIMESTAMP	ON UPDATE CURRENT_TIMESTAMP	Change Drop Primary Unique Index Spatial More

Figure 4.2.8: Users Posts Table

4.3 Interaction Design and UX

Interaction Design represents how a user interact with the application. The goal of interaction design is to confirm usability, accessibility and pleasure that a user can achieve by using a system. It defines which tool is best for which activity. We need to use those tools and technique so that the system can provide better user experience.

UX design refers to user experience which mainly concern about the experience that a user get when he or she use a system. The main goal of UX design is to improve the user experience by maintaining reliability

I have developed my project in a way that a user can achieve their goal in an easiest way. I have designed the interface as easy and clean as possible so that a user don't feel any trouble using it. I have used some material in user interface that make giving input to the application easy and accurate. I also focused on the security issue of the application so that a user can perform registration, login and payment safely which make the system simple, efficient, secure and easier to use.

4.4 Implementation Requirements

To develop a project successfully we need to use different types of tools and components which help to implement the project. In my project development I also used some tools and components. The tools and component that I have used to develop the project are given below.

Tools that are used in developing the android application:

Android Studio

As my project consist of an android application which will detect disease, I have to use android studio to develop the application. It is an IDE for developing android application. It includes an environment to develop code, troubleshooting, execution of code and many more features.

Emulator

To avoid running my android application in a physical device I have use emulator which is virtual device that act like a phone and it run the code that we write in android studio.

Android SDK

It is a very important tool in developing android application. It contains the libraries and simulator to develop and test the application.

Tools that are used in developing the web application:

- PHP for back-end design.
- XAMPP for virtual server.
- HTML and CSS for front-end design.
- JavaScript and jQuery for better user experience.

CHAPTER 5

Implementation and Testing

5.1 Implementation of Database

The reason behind implementing database is storing information's. It is an ordered collection of data which help to store and retrieve data more efficiently. In my project I have used MySQL database for its performance and easiness. To implement database I had to install XAMPP server which create a local web server for development and testing purpose. Then I have connected web server and the database to store and retrieve information's. I have used PHP programming language for server side scripting by which I can create, update, delete and retrieve data from my database.

My main database name is final. Under this database there are several table for storing different information's. They are:

- Account identity
- Admin
- Appointments
- Appointment Time
- Appointment Time Status
- Comments
- Country
- Department
- Doctors
- Messages
- Patients
- Posts
- Diseases
- Topics

Each of the table has different columns, primary key, foreign key and moreover different types of data. Each table has a unique primary key which is used as a foreign key in another table to connect both tables. In my application I dynamically insert, update, delete and view data of those database table using php query.

The Figure 5.1 shows all the tables of my applications database

Table	Action	Rows	Type	Collation	Size	Overhead
account_identity	Browse Structure Search Insert Empty Drop	1	InnoDB	latin1_swedish_ci	16 K B	-
admin	Browse Structure Search Insert Empty Drop	1	InnoDB	latin1_swedish_ci	16 K B	-
appointments	Browse Structure Search Insert Empty Drop	29	InnoDB	latin1_swedish_ci	16 K B	-
appointment_time	Browse Structure Search Insert Empty Drop	1	InnoDB	latin1_swedish_ci	16 K B	-
appointment_time_status	Browse Structure Search Insert Empty Drop	1	InnoDB	latin1_swedish_ci	16 K B	-
comments	Browse Structure Search Insert Empty Drop	7	InnoDB	latin1_swedish_ci	16 K B	-
country	Browse Structure Search Insert Empty Drop	11	InnoDB	latin1_swedish_ci	16 K B	-
department	Browse Structure Search Insert Empty Drop	17	InnoDB	latin1_swedish_ci	16 K B	-
doctors	Browse Structure Search Insert Empty Drop	12	InnoDB	latin1_swedish_ci	16 K B	-
messages	Browse Structure Search Insert Empty Drop	0	InnoDB	latin1_swedish_ci	16 K B	-
patients	Browse Structure Search Insert Empty Drop	4	InnoDB	latin1_swedish_ci	16 K B	-
posts	Browse Structure Search Insert Empty Drop	5	InnoDB	latin1_swedish_ci	16 K B	-
tbl_disease	Browse Structure Search Insert Empty Drop	11	InnoDB	latin1_swedish_ci	32 K B	-
test	Browse Structure Search Insert Empty Drop	0	InnoDB	latin1_swedish_ci	16 K B	-
topics	Browse Structure Search Insert Empty Drop	21	InnoDB	latin1_swedish_ci	16 K B	-
15 tables	Sum	141	InnoDB	latin1_swedish_ci	256 K B	0

Figure 5.1: All Table

5.2 Implementation of Front-end Design

Front-end implementation is the most important part of an application development because when a user open the only thing of application that the user can see is its front-end design. So I had to implement front-end of my applications very carefully so that user can get a great experience using it. I have designed the front-end in such a way that my application can run in any device.

To implement the front-end of the android application I have use XML, material design and java. In material design I have used Collapsing toolbar, Splash screen, Search view, Card view, Alert dialog, Spinner, Drop-Down List, Auto complete text view etc.

To implement the front-end of the web application I have use HTML, CSS, JavaScript, jQuery and Ajax. In this application I have added Drop Down navigation bar, Image overlay, Auto Complete textbox, Image popup etc.

5.3 Implementation of Interaction

To build successful application there is no alternative of implementing interactive user interface (UI). I have used icons, button and instruction to make the application interactive which help users to find what they want. I have used some material in user interface that make giving input to the application easy and accurate. I have considered the following criteria for implementing the interaction of my system

- Users satisfaction
- Making the system easy to navigate

5.4 Testing Implementation

The process of testing the implementation of the system is known as testing implementation. In this process of testing a tester test the whole system in different use case. It ensure the quality and proper implementation of the system

Table 5.1 shows the implementation testing of the android application. This table shows all the test case I have performed with all the details which are test case, test input, expected output, actual output, result and test date.

Test Case	Test Input	Expected Output	Actual Output	Result	Test Date
Install application	Tested on various Android version	Successfully install	Installed successfully	Passed	2/11/2018
Open application	Clicked on installed application	Launch the application correctly and show home page	Showed the home page successfully	Passed	2/11/2018
Open disease detector	Clicked on Disease Detector button	Opened the disease detector activity correctly	Opened the activity successfully	Passed	2/11/2018
Select age	Clicked on age spinner	Age group show	Selected successfully	Passed	2/11/2018

Select gender	Clicked on radio button	One option selected	Selected successfully	Passed	2/11/2018
Select region	Clicked on region spinner	Regions showed	Selected successfully	Passed	2/11/2018
Add symptom	Clicked on add symptom button	Showed list of searchable symptoms	Sowed successfully	Passed	2/11/2018
Search and select symptom	Searched by symptom from the list	Related symptoms Showed	Showed and added successfully	Passed	2/11/2018
Generate question for specific symptom	Selected a specific symptom	Generated and showed related question	Generated successfully	Passed	2/11/2018
Show users selected information's	Filled up all the field	Selected information's showed	Showed successfully	Passed	2/11/2018
Detect disease	Symptom added and clicked DD button	Detected disease showed	Showed successfully	Passed	2/11/2018
View disease details	Clicked disease name	Disease detail showed	Showed successfully	Passed	2/11/2018

Table 5.2 shows the implementation testing of the web application for patients

Test Case	Test Input	Expected Output	Actual Output	Result	Test Date
Access the webpage	Wrote the URL into the address bar of browser	Access the web page and show home page	Showed the homepage successfully	Passed	2/11/2018
Create patient account with	Clicked on Register button and provide invalid information's	Show error message	Showed successfully	Passed	2/11/2018

invalid information					
Create patient account with valid information	Clicked on Register button and provide valid information's	Create account successfully	Showed confirmation message	Passed	2/11/2018
Login patient with invalid information	Clicked on login button and provide valid information's	Show error message	Showed successfully	Passed	2/11/2018
Login patient with valid information	Clicked on login button and provide valid information's	Login successfully	Logged in and showed user successfully	Passed	2/11/2018
Search disease detail	Wrote disease name in the search bar	Show matched disease and show detail for selected disease	Showed successfully	Passed	2/11/2018
View available doctors	Clicked the navigation button called doctors	Show all the registered doctors list	Showed successfully	Passed	2/11/2018
View doctor's profile	Clicked the view profile button	Show profile details of selected doctor	Showed successfully	Passed	2/11/2018
Take doctor appointment	Clicked the appointment button in a doctor profile	Show appointment options for selected profile	Showed successfully	Passed	2/11/2018
Show payment option	Select a date and time of the Doctor	Show payment option	Showed successfully	Passed	2/11/2018
Pay doctor fee	Click on Pay With PayPal button	Show PayPal login page	Showed successfully	Passed	2/11/2018
Done payment	Clicked on pay	Payment done and appointment stored in database	Appointment booked successfully	Passed	2/11/2018

View my appointments	Clicked Appointments button	Show logged in users appointments	Showed successfully	Passed	2/11/2018
Call, send message, send files to doctor	Click Start Communication button	Show a pager and a chat box containing call ,message and file sharing options	Showed and communicated successfully	Passed	2/11/2018
View users query posts	Clicked the navigation button called MediHub	Show all users query posts	Showed successfully	Passed	2/11/2018
Create post	Wrote query and pressed Post to Timeline button	Submit Post and show on the top	successfully submitted and Showed	Passed	2/11/2018
View individual post and comments	Clicked View Complete Post and Comments button	Show complete post and all comment for the post	Showed successfully	Passed	2/11/2018
Create comment	Wrote comment and pressed Submit button	Submit comment and show on the top	successfully submitted and Showed	Passed	2/11/2018
View poster and commenter profile	Clicked the name showed right side of the post and comment	Go to clicked profiles page	Showed successfully	Passed	2/11/2018
View my profile	Clicked My Account button	Show logged in users profile	Showed successfully	Passed	2/11/2018
Edit my profile	Clicked Edit Profile button and insert updated information	Show page to insert new information and update informations	Updated Successfully	Passed	2/11/2018
Sign out	Click the Sign Out button	Logout from the account	Logged out successfully	Passed	2/11/2018

Table 5.3 shows the implementation testing of the web application for doctors

Test Case	Test Input	Expected Output	Actual Output	Result	Test Date
Access the webpage	Wrote the URL into the address bar of browser	Access the web page and show home page	Showed the homepage successfully	Passed	2/11/2018
Create doctor account with invalid information	Clicked on Register button and provide invalid information's	Show error message	Showed successfully	Passed	2/11/2018
Create doctor account with valid information	Clicked on Register button and provide valid information's	Create account successfully	Showed confirmation message	Passed	2/11/2018
Login doctor with invalid information	Clicked on login button and provide valid information's	Show error message	Showed successfully	Passed	2/11/2018
Login doctor with valid information	Clicked on login button and provide valid information's	Login successfully	Logged in and showed user successfully	Passed	2/11/2018
Search disease detail	Wrote disease name in the search bar	Show matched disease and show detail for selected disease	Showed successfully	Passed	2/11/2018
View available doctors	Clicked the navigation button called doctors	Show all the registered doctors list	Showed successfully	Passed	2/11/2018
View doctor's profile	Clicked the view profile button	Show profile details of selected doctor	Showed successfully	Passed	2/11/2018

View users query posts	Clicked the navigation button called MediHub	Show all users query posts	Showed successfully	Passed	2/11/2018
Create post	Wrote query and pressed Post to Timeline button	Submit Post and show on the top	successfully submitted and Showed	Passed	2/11/2018
View individual post and comments	Clicked View Complete Post and Comments button	Show complete post and all comment for the post	Showed successfully	Passed	2/11/2018
Create comment	Wrote comment and pressed Submit button	Submit comment and show on the top	successfully submitted and Showed	Passed	2/11/2018
View poster and commenter profile	Clicked the name showed right side of the post and comment	Go to clicked profiles page	Showed successfully	Passed	2/11/2018
View my profile	Clicked My Account button	Show logged in users profile	Showed successfully	Passed	2/11/2018
Edit my profile	Clicked Edit Profile button and insert updated information	Show page to insert new information and update informations	Updated Successfully	Passed	2/11/2018
View my appointments	Clicked Appointments button	Show logged in users appointments	Showed successfully	Passed	2/11/2018
View patients profile	Clicked patients from the appointment list	Show patients profile	Showed successfully	Passed	2/11/2018
Call, send message, send files to patient	Click Start Communication button	Show a pager and a chat box containing call ,message and file sharing options	Showed and communicated successfully	Passed	2/11/2018

Add new appointment schedule	Clicked on Add Appointment button and insert new schedule	Add new schedule successfully	Show new schedule successfully	Passed	2/11/2018
Update existing appointment schedule	Clicked on Update Appointment button insert new schedule	Update schedule successfully	Show updated schedule successfully	Passed	2/11/2018
Sign out	Click the Sign Out button	Logout from the account	Logged out successfully	Passed	2/11/2018

Table 5.4 shows the implementation testing of the web application for admin

Test Case	Test Input	Expected Output	Actual Output	Result	Test Date
Access the webpage	Wrote the secret URL into the address bar of browser	Access the web page and show home page	Showed the homepage successfully	Passed	2/11/2018
Create admin account with invalid information	Clicked on Register button and provide invalid information's	Show error message	Showed successfully	Passed	2/11/2018
Create admin account with valid information	Clicked on Register button and provide valid information's	Create account successfully	Showed confirmation message	Passed	2/11/2018
Login admin with invalid information	Clicked on login button and provide valid information's	Show error message	Showed successfully	Passed	2/11/2018

Login admin with valid information	Clicked on login button and provide valid information's	Login successfully	Logged in and showed admin panel successfully	Passed	2/11/2018
View all doctors	Clicked View Doctors button	Show all the registered doctors list	Showed successfully	Passed	2/11/2018
Delete doctor	Clicked Delete button for a doctor	Ask for confirmation and delete	Deleted successfully	Passed	2/11/2018
View all patients	Clicked View patients button	Show all the registered patients list	Showed successfully	Passed	2/11/2018
Delete patient	Clicked Delete button for a patient	Ask for confirmation and delete	Deleted successfully	Passed	2/11/2018
View all query posts	Clicked on the view Post button	Show all users query posts	Showed successfully	Passed	2/11/2018
Delete all query posts	Clicked on the Delete Post button	Ask for confirmation and delete selected post	Deleted successfully	Passed	2/11/2018
View all comments	Clicked on the view Comments button	Show all users comments	Showed successfully	Passed	2/11/2018
Delete all comments	Clicked on the Delete comment button	Ask for confirmation and delete selected comment	Deleted successfully		
View individual post and comments	Clicked View button in individual post	Show complete post and all comment for the post	Showed successfully	Passed	2/11/2018

View all post topics	Clicked on the view Topic button	Show all posts comments	Showed successfully	Passed	2/11/2018
View all disease	Clicked on the View Disease button	Show all Disease	Showed successfully	Passed	2/11/2018
Delete disease	Clicked on the Delete Disease button	Ask for confirmation and delete	Deleted successfully	Passed	2/11/2018
Insert disease	Clicked on the Insert Disease button and insert name and details	Insert into database and show	Inserted successfully	Passed	2/11/2018
Update disease	Clicked on the update Disease button and insert new name and details	Update the database	Updated successfully	Passed	2/11/2018
Sign out	Click the Sign Out button	Logout from the account	Logged out successfully	Passed	2/11/2018

Some screen shot of testing the system is given below:

Figure 5.4.1 shows the testing of disease detection. In this section the user has inserted some symptoms and after pressing the detect button the application detect the disease that math with users symptoms.

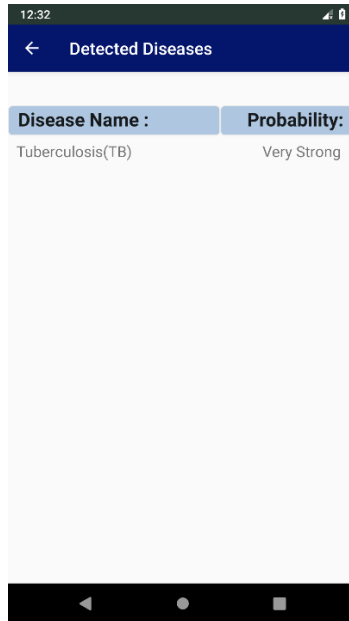


Figure 5.4.1: Disease Detection

Figure 5.4.2 shows the testing of the output of nutrition checker

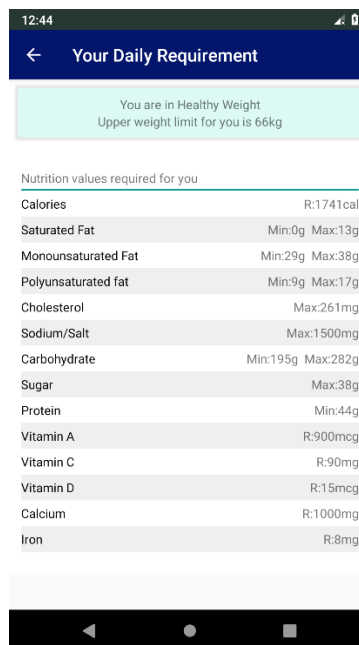


Figure 5.4.2: Nutrition Checker

Figure 5.4.3 shows the testing of video tutorial of first aid guide. User can view video tutorial inside the application

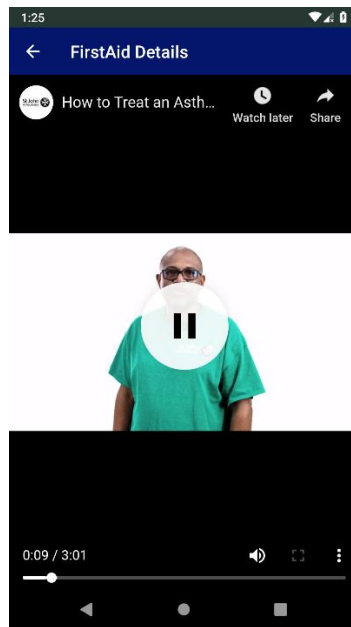


Figure 5.4.3: First Aid

Figure 5.4.4 shows the testing of doctor appointment. In this section the user has selected a specific doctor and pressed the appointment button. Then the application shows available appointment time for available dates.

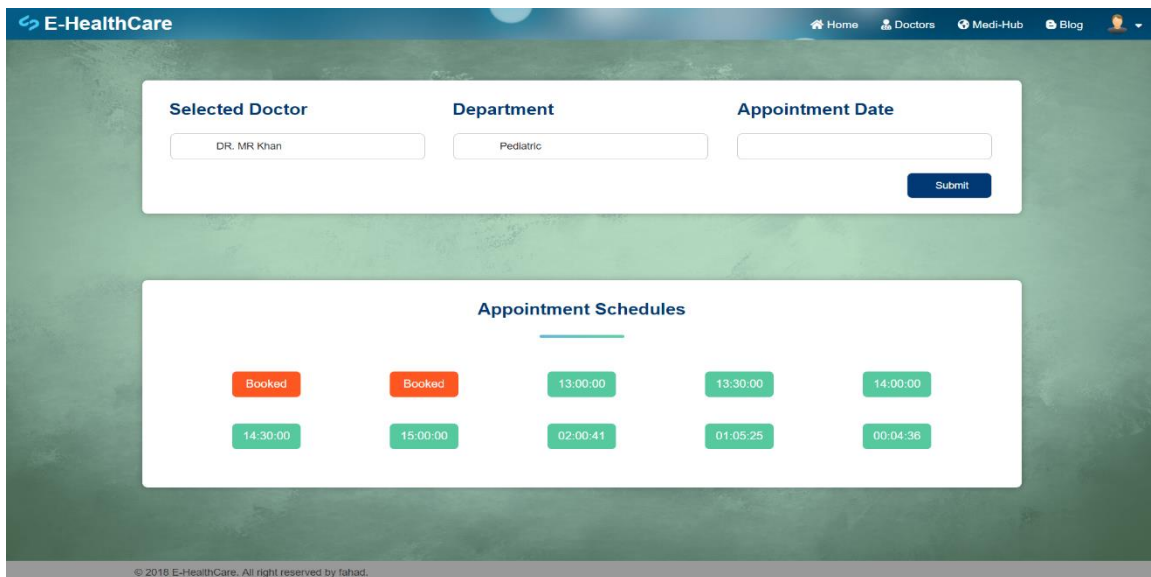


Figure 5.4.4: Selection of appointment date and time

Figure 5.4.5 shows the testing of payment option for appointment. When a user try to take appointment of a doctor without being logged in then the application show the warning and stop the user from taking further action.

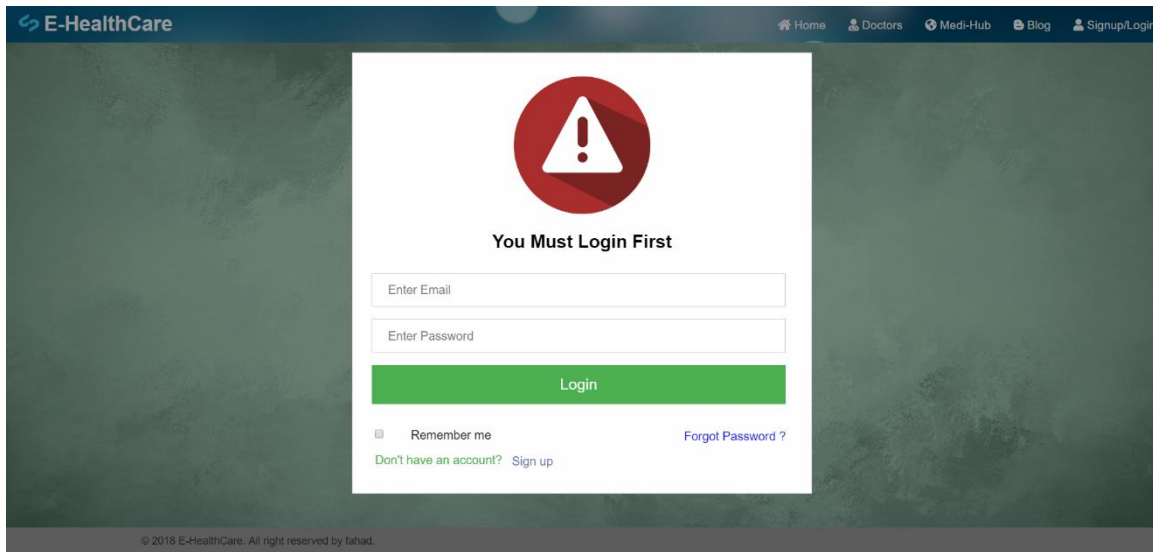


Figure 5.4.5: Warning for not being logged in

Figure 5.4.6 shows the testing of payment option for appointment. When a user select doctor, appointment date and appointment time being logged in then the application show available payment options for prying appointment fee and confirm appointment.

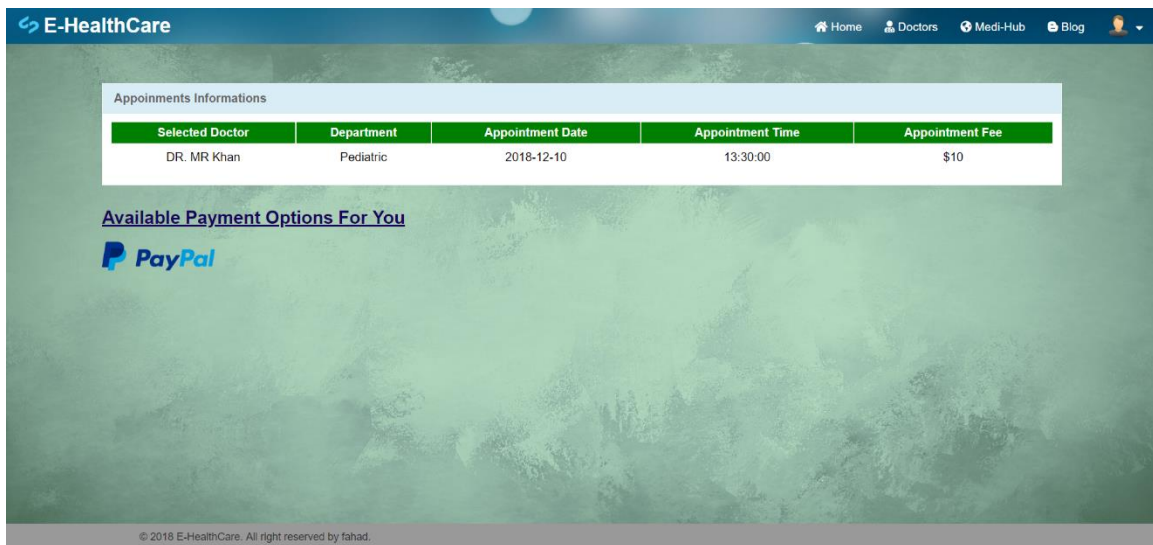


Figure 5.4.6: Payment option

Figure 5.4.7 shows the testing of appointment confirmation. When user complete payment then the application show this confirmation message and store the appointment information in the database.

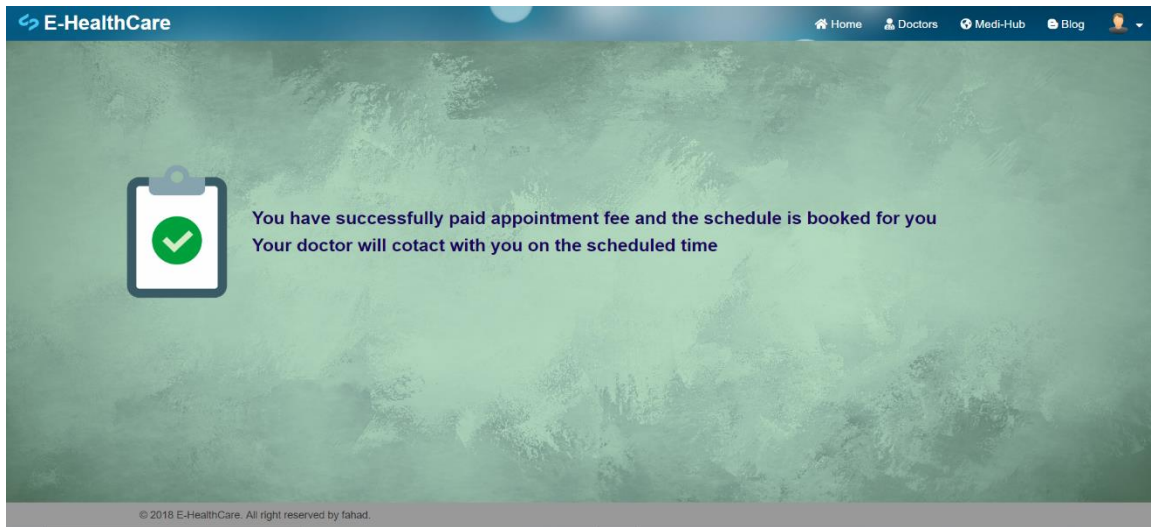


Figure 5.4.7: Payment and appointment confirmation

Figure 5.4.8 shows the testing of doctor consultation via video call. When a user take an appointment then the appointment detail is send to the doctor account and on the consultation time the doctor will call the patient.

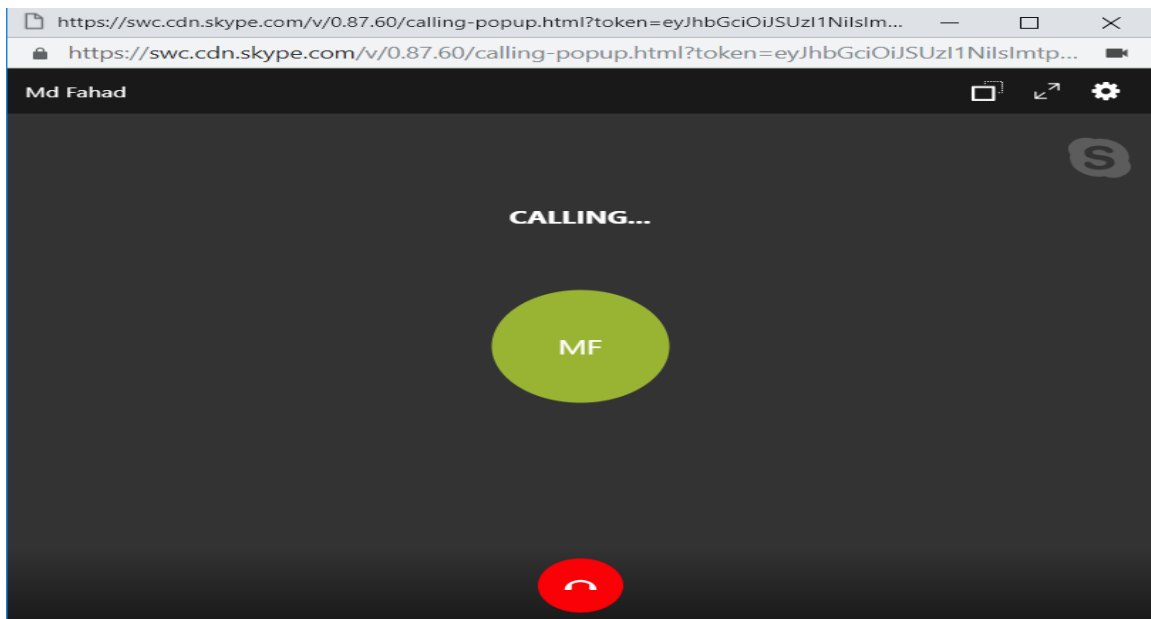


Figure 5.4.8: Doctor Consultation via call

5.5 Test Results and Report

The representation of test result in a formal way is known as test report. I have tested the system under different conditions which help to determine whether the system satisfy all re requirement or not. The report contain the evaluation result of the system. In chapter 5.4 I showed many test case, user input, actual output and expected output which shows that my application passed in all the case. I also perform some usability test by both doctor and patient user so that I can measure the user satisfaction usability and accuracy of my applications. By usability test I have checked following features

- How easy to operate the applications?
- How fast they work?
- How reliable the application are?
- How accurate the output result?

So finally it can be said that from testing the applications in different test case and usability test from different user it can be say that

- The application is easy to use
- The application is reliable
- The application is user friendly
- The output result is accurate
- The application is usable in multi devices.

CHAPTER 6

Conclusion and Future Scope

6.1 Discussion and Conclusion

Complete Health Solution is a combination of both android application and web application which will help to detect disease using their symptoms and patients can get doctor's appointment, consult with doctor with video and audio call, send medical checkup report, get details about diseases, get answer of medical related queries and get latest health and medical science news and articles. The main reason behind the project is to ensure general people's better health without wasting much money and effort and make treatment effective. I have tried to keep the applications as simple as possible so that user can use these application without any trouble. I can update the application any time as user requirement very easily. My application is successfully tested to ensure great user experience.

6.1 Scope for Further Development

Though I have tried my best to make this project as a complete package that will be helpful for detecting disease and worldwide doctor consultation but still there are some scope for further development to enhance the feature of this project. Some of the features that can be developed in future are given below:

- Will implement face recognition technique to verify doctors accounts
- Will add real time ambulance service in the android application
- Will suggest medicines based on detected disease
- Will suggest for medical checkup based on detected disease
- Will suggest doctors based on detected disease

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APPENDIX

Project Reflection: Through this project I have tried to help those people who don't have easy access to doctors and who don't usually consult with doctor at the beginning of their health problem. These people can detect their disease using their symptoms through my application "Doctor Android". This project consist of another web application called "E-HealthCare" which allow user for worldwide doctor consultation through video and audio call and patient can send their medical checkup report through this application. It is also useful for doctors and medical researchers where they can post any medical related question and experts will answer them. Latest health and medical science news and articles will be available there.

To implement this project I have to go through many difficulties and I have learned many things by implementing this project. I believe that this project will help people to detect and cure their disease through doctor consultation.

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