

"Disease Diagnosis Using Android"

Project Report

Submitted in partial fulfillment of the requirements for the degree of

Bachelor of Engineering

by

Syed Mohd Atif Hanif Hazara (12CO60)

Deshmukh Mohsin Mahmood Goher (13CO77)

Shaikh Saman Mohammad Umar Asma (13CO64)

Rizvi Irfan Shabihul Hasan Nasrin Fatima (12CO55)

Supervisor

Prof. Sameer Panwala

Co-Supervisor

Prof. Irfan Jamkhandikar



Department of Computer Engineering,

School of Engineering and Technology

Anjuman-I-Islam's Kalsekar Technical Campus

Plot No. 2 3, Sector -16, Near Thana Naka, Khanda Gaon,

New Panvel, Navi Mumbai. 410206

Academic Year : 2015-2016

CERTIFICATE



Department of Computer Engineering,
School of Engineering and Technology,
Anjuman-I-Islam's Kalsekar Technical Campus
Khanda Gaon, New Panvel, Navi Mumbai. 410206

This is to certify that the project entitled *Disease Diagnosis Using Android* is a bonafide work of **Syed Mohd Atif Hanif Hazara**(12CO60), **Deshmukh Mohsin Mahmood Goher**(13CO77), **Shaikh Saman Mohammad Umar Asma**(13CO64), **Rizvi Irfan Shabihul Hasan Nasrin Fatima**(12CO55) submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **Bachelor of Engineering in Department of Computer Engineering.**

Prof. Sameer Panwala

Supervisor/Guide

Prof. Irfan Jamkhandikar

Co-Supervisor/Guide

Prof. Tabrez Khan

Head of Department

Dr. Abdul Razak Honnutagi

Director

Project Approval for Bachelor of Engineering

This project entitled *Disease Diagnosis Using Android* by *Syed Mohd Atif Hanif Hazara (12CO60)*, *Deshmukh Mohsin Mahmood Goher (13CO77)*, *Shaikh Saman Mohammad Umar Asma (13CO64)*, *Rizvi Irfan Shabihul Hasan Nasrin Fatima (12CO55)* is approved for the degree of *Bachelor of Engineering in Department of Computer Engineering*.

Examiners

1.

2.

Supervisors

1.

2.

Chairman

.....

Declaration

We declare that this written submission represents our ideas in our own words and where others ideas or words have been included, We have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Syed Mohd Atif Hanif Hazara(12CO60)

Deshmukh Mohsin Mahmood Goher(13CO77)

Shaikh Saman Mohammad Umar Asma(13CO64)

Rizvi Irfan Shabihul Hasan Nasrin Fatima(12CO55)

Abstract

Title: Disease Diagnosis Using Android.

Disease diagnosis / Medical diagnoses is the process of determining which disease or condition explains a person's symptoms and signs. It is most often referred to as diagnosis with the medical context being implicit. The information required for diagnosis is typically collected from a case history and physical examination of the person seeking medical care. Diagnosis is often challenging, because many signs and symptoms are non-specific. The term Diagnosis refers to determination of the nature of a cause of a disease. In computer science it is typically used to determine the cause of symptoms and solutions. Our system enables to deliver health care, diagnose patients, provide therapy, suggest medicines and gives health tips related to users disease. The main aim is to provide expert-based health care to understaffed remote sites and to provide advanced emergency to the user that is using the application.

Syed Mohd Atif Hanif Hazara(12CO60)

Deshmukh Mohsin Mahmood Goher(13CO77)

Shaikh Saman Mohammad Umar Asma(13CO64)

Rizvi Irfan Shabihul Hasan Nasrin Fatima(12CO55)

B.E. (Computer Engineering)

University of Mumbai.

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Keywords And Glossary

Keywords :

Diagnosis, Disease,Module,Software,Symptomate,Therapy

Glossary :

B

Bloating: Bloating is any abnormal general swelling, or increase in diameter of the abdominal area.

Boon: Boon means something beneficial to a specific person, entity, or cause.

D

Diagnose:To determine the identity of (a disease, illness, etc.) by a medical examination.

Data Mining:goal of the data mining process is to extract information from a data set and transform it into an understandable structure for further.

E

Emulator:In computing, an emulator is hardware or software that enables one computer system(called the host) to behave like another computer system (called the guest).

F

Fatigue:also called exhaustion, tiredness, languidness, languor, lassitude, and list- lessness) is a subjective feeling of tiredness which is distinct from weakness, and has a gradual onset.

M

Malfunctioning:A malfunction is the state of something that functions wrongly or does not function at all.

N

Nausea:Nausea is a sensation of unease and discomfort in the upper stomach with an involuntary urge to vomit.

S

Substantial:Large in amount, size, or number.

T

Telemedicine:Telemedicine is the use of telecommunication and information technologies in order to provide clinical health care at a distance.

Chapter 1

Project Overview

1.1 Introduction

Disease diagnosis is the process of determining which disease or condition explains a person's symptoms and signs. The information required for diagnosis is typically collected from a history and physical examination of the person seeking medical care.

The main aim is to provide the expert-based health care to under-served population of rural areas developing countries where the doctors are not easily available it is more likely to use by tech- friendly people who are very busy in there schedule. Also the other areas where there is need for uniform health-care access include remote military bases security health-care facilities.

The idea of this project is to act as a facilitator by recording all the data entered by the patient i.e. symptoms entered by the user and case history given by the user's and to diagnose the diseases of patient to greater extent if possible and help them cure their disease by consulting with experts .This project aims to change the structure of the current health-care system. Medical care will be delivered easily to the patient. This could reduce cost of patient for visiting doctors or to consult the doctor will also save the time of the patient.

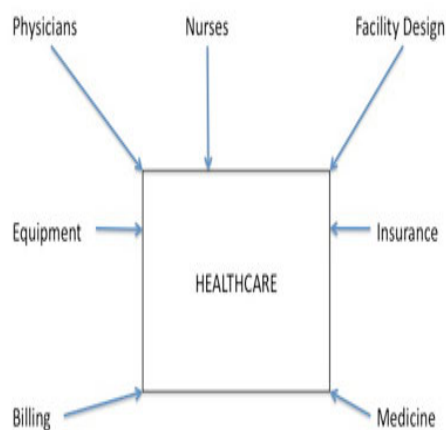


Figure 1.1: Health-care system

1.1.1 Motivation

We have got motivated from lack of medical facilities in rural areas. People living in rural areas have to travel long distances for getting treatment. For example, people suffering from cold or cough, having mild fever, minor injuries, pain in the joints, etc have to travel a long distance to consult to a doctor. Our project will help them to diagnose their minor diseases similar to consultancy of doctor with just one click. We have also got inspired for opting for this project from the people who travel daily long distance for their job or daily chores. So they don't get time for proper medication or even to visit a doctor. As a result they face health issues by not getting proper treatment. Also people get wrong recommendation of medicine, leading to more severe problems. This project will help people to get treatment on time and to get accurate medicine for their symptoms

1.2 Objective and Scope

1.2.1 Objective Of Project

Objective of this project is to provide ease of diagnosing disease in users hand. This project would be basically taking symptoms from the patient or the related user and then taking the case history which would be used for proper analysing of the condition that the user might be suffering from and act as a facilitator to forward the data to expert if required. Hence this would serve the people suffering from any kind of diseases or problems.

1.2.2 Scope Of Project

This project will help to provide expert-based health care to understaffed, remote sites and to provide emergency care. The use of our project would minimize unnecessary patient transfer, avoiding the cost of the transportation from a remote site. The diagnosing of the patient can be done with just one click hence this would be boon to medical field.

1.3 System Architecture

Our project is basically designed for medical patients which is suffering from any kind of disease. Our project is a health care based system which is specially designed for medical patients. Our project will be acting as a facilitator and will forward the data to expert and case history of the patient. The application would start with basic registration formality. Our project starts with a Registration form then taking certain user related details such as gender, weight of the user and then the user will be asked for disease the user might be suffering from, then returning the symptoms. As our application works on client-server architecture the symptoms

would be retrieved from the database stored on the server, Similarly the case history of a condition is taken through asking various question's regarding that condition and then storing those user selected answer's in the database for processing. The application would also recommend the diet to be followed for healthy lifestyle in disease diagnosis.

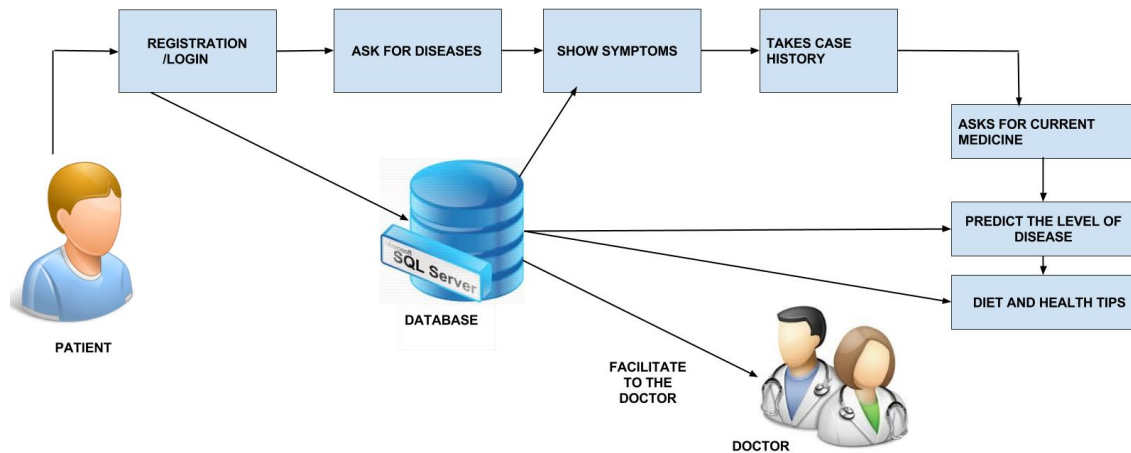


Figure 1.2: System Architecture of Disease Diagnosis using Android.

1.4 Organization of the Project

The remaining part of the project is organized as follows.:

Chapter 2 presents a review of related work.

Chapter 3 introduces the Software and Hardware Requirement of the project.

Chapter 4 proposes the Project Design of the Project. It represents the various use case diagrams and screen-shots of the project.

Chapter 5 introduces with some basic assumptions and Dependencies of our work.

Chapter 6 includes the results and discussion of the project.

Chapter 7 includes Project time line chart of the project.

Chapter 8 includes the task distribution

Chapter 9 includes conclusion and future scope

Chapter 2

Review Of Literature

2.1 Applying Telecommunication technology to Health-Care Delivery

2.1.1 Description

The term telemedicine refers to the utilization of telecommunication technology for medical diagnosis, treatment, and patient care. Telemedicine enables a physician or specialist at one site to deliver health care, diagnose patients, give intra-operative assistance, provide therapy, or consult with another physician or paramedical personnel at a remote site. Thus, the aim of telemedicine is to provide expert-based health care to understaffed remote sites and to provide advanced emergency care through modern telecommunication and information technologies. This article briefly describes the current status of telemedicine, including its implementation, acceptance, patient satisfaction, service and applications, system configuration and requirements, and research issues to be resolved.

2.1.2 Weaknesses

- The communication requirement is predicated on real-time and store-and-forward modes of operation. The real-time interactive mode requires the transmission of large amount of information in a short time.
- The equipment costs for telemedicine system can vary widely.
- Telemedicine-related technical issues include schemes for flexible bandwidth allocation, efficient, compression algorithms for data and imaging, intelligent interface, uniform data transmission standards, system and transmission medium reliability and security.

► Click, Consult, Treat

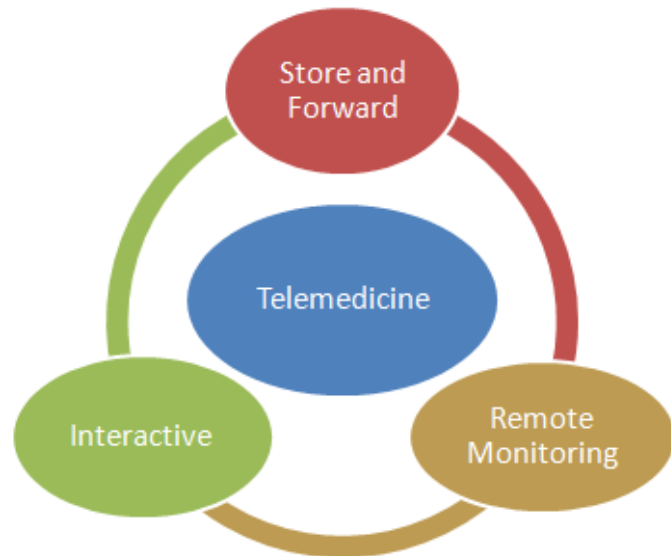


Figure 2.1: Telemedicine

2.1.3 How to Overcome

- By maintaining the database of the Diseases related medicines. So that whenever the patient enters his symptoms the system could come with diseases related to symptoms of the patient from the Database.
- There will not be any equipment cost only hand-held device would be enough to support our system.
- There will be no issue of Bandwidth, transmission compression in our system.

2.2 Future Delivery Of Health Care: Cyber care

2.2.1 Description

Health-care system reforms can change the structure of the current U.S. health-care system, from centralized large hospitals to a distributed, networked healthcare system.[1] In their model, medical care is delivered locally in neighborhoods and individual homes, using computer technologies like telemedicine, to link patients and primary care providers to tertiary medical providers. This decentralization could reduce costs enough to provide all citizens with medical insurance coverage; it would benefit patients and providers; and as a dual-use system, it would better protect the country's resources and citizens in an event of biological terror or natural disasters.

2.2.2 Weaknesses

- Medical information published on the Internet is not guaranteed to be accurate, correct, or statistically significant. So, as they move to a distributed medical information network.
- The average person has too much e-mail, paperwork, and information to cope with in daily life.
- Patient medical records are often not cohesive; a patients dental, medical, and psychological records may be stored on different systems, and their medical records from various life stages (childhood, college, career, and retirement) are often separate.

2.2.3 How to Overcome

The above listed weaknesses can be over come in following ways We overcome this problem by confirming the medical information by the doctor before publishing on the internet. In future this can be overcome by making the system to work more efficiently which will reduce the overload of a person. All the distributed system will be connected to a single centralized system and later will be implemented by using Artificial Intelligence.

2.3 Doctors Orders: Healthcare Apps and Self-Monitoring

2.3.1 Description

In doctor's order:health care Apps and self monitoring,using this app and a wireless sensor attached to the patients body, Topol (the publisher) was able to monitor his blood glucose in IT Pro July/August 2014 real time. Although patient self monitoring has been shown to be effective in both wellness programs and early diagnosis, some physicians are reluctant to include patient reported parameters in the patient medical record.

2.3.2 Weaknesses

- Letting patients remotely report parameters, such as vital signs or glucose readings, instead of requiring an office visit can save time and money, but many insurance plans wont reimburse patients for these telehealth functions
- how will we address potential privacy concerns.patient will feel the technology is too invasive or have concerns about who else can access he data

2.3.3 How to Overcome

- Once it is proven that this lowers cost and yields better outcomes, I believe the health insurance will be entirely supportive.
- There needs to be assurance to each and every individual that his or her data will be made as secure as possible it cannot be guaranteed and that the data will not be sold or used for any purpose without the individuals explicit permission.

2.4 Ultrasound? Fetal Monitoring? Spectrometer ?There is an App for That!

2.4.1 Description

A Web site devoted to helping other health-care providers not only to find useful apps and devices but also to understand what is happening in mobile health technology. A phone peripheral like this could make a real difference in rural settings and developing countries where imaging machines are often lacking. Even in areas where computers and Internet access are luxuries beyond reach, cell phones are ubiquitous

2.4.2 Weaknesses

- It is very much costly for an individual to buy ultrasound machine for this use
- The use of ultra sound machines is not easy and its difficult to understand the reports that is being generated

2.4.3 How to Overcome

- The hospitals or remote military service can buy this product for instant help or the areas were the hospital's provide paramedical help can also buy this product hence for an individual its costly but for a hospital its not.
- The physicians section should be provided in tha Application online so that the reports generated will be easily understandable to a normal user or patient.

2.4. Ultrasound? Fetal Monitoring? Spectrometer ?There is an App for That!



Figure 2.2: Ultra-Sound Using Mobile Device

Chapter 3

Requirement Analysis

3.1 Software Requirements:

- **Android Studio 1.01:** Android Studio is an Integrated Development Environment (IDE) for developing for the Android platform.
- **Haxm:** The Intel Hardware Accelerated Execution Manager (Intel R HAXM) is a hardware assisted virtualization engine (hypervisor) that uses Intel Virtualization Technology (Intel R VT) to speed up Android app emulation on a host machine.
- **Android Ndk:** The NDK is a toolset that allows you to implement parts of your app using native-code languages such as C and C++. Typically, good use cases for the NDK are CPU intensive applications such as game engines, signal processing, and physics simulation.
- **Virtual Device:** In Android Virtual Device (AVD) is an emulator configuration that lets you model an actual device by defining hardware and software options to be emulated by the Android Emulator. The easiest way to create an AVD is to use the graphical AVD Manager, which you launch from Android Studio by clicking Tools > Android > AVD Manager. You can also start the AVD Manager from the command line by calling the `android` tool with the `avd` options, from the `<sdk>/tools/` directory.

3.2 Hardware Requirement :

For Android Studio:

Windows: Microsoft R Windows R 8/7/Vista (32 or 64-bit) 2 GB RAM minimum, 4 GB RAM recommended 400 MB hard disk space At least 1 GB for Android SDK, emulator system images, and caches 1280 x 800 minimum screen resolution Java Development Kit (JDK) 7 Optional for accelerated emulator: Intel R processor with support for Intel R VT-x, Intel R EM64T (Intel R 64) Execute Disable (XD) Bit functionality.

Linux: GNOME or KDE desktop GNU C Library (glibc) 2.15 or later 2 GB RAM minimum, 4 GB RAM recommended 400 MB hard disk space At least 1 GB for Android SDK, emulator system images, and caches 1280 x 800 minimum screen resolution.

Chapter 4

Project Design

4.1 Design Approach

Design is the first step in the development phase for any techniques and principles for the purpose of defining a device, a process or system in sufficient detail to permit its physical realization. Once the software requirements have been analyzed and specified the software design involves three technical activities design, coding, implementation and testing that are required to build and verify the software. The design activities are of main importance in this phase, because in this activity, decisions ultimately affecting the success of the software implementation and its ease of maintenance are made. These decisions have the final bearing upon reliability and maintainability of the system. Design is the only way to accurately translate the customer requirements into finished software or a system. Design is the place where quality is fostered in development. Software design is a process through which requirements are translated into a representation of software. Software design is conducted in two steps. Preliminary design is concerned with the transformation of requirements into data.

4.2 Software Architectural Designs

Our system is follow the three tier architecture . First tier consist of GUI, Comparision tier and the Database.

1.GUI: The GUI(Graphical User Interface) in our project deals with the interface for the user where the user just registers with few details like gender,age etc. The GUI provides a platform for the user to communicate with the database.

2.Comparison block: The comparison block is the block where the actual processing of our project is done. This block connects the GUI to the database i.e. It acts as a connector as well as communicator which connects the database and helps in transfer of data between the GUI and the database. It's main function is to index the products in our database and do the comparison

on the basis of the product price and other aspects.

3.Database: Database tier is the tier used for the storage of data. This tier contains all the data that is need for the processing of the whole project. The data in this tier is related to the health tips and case history.

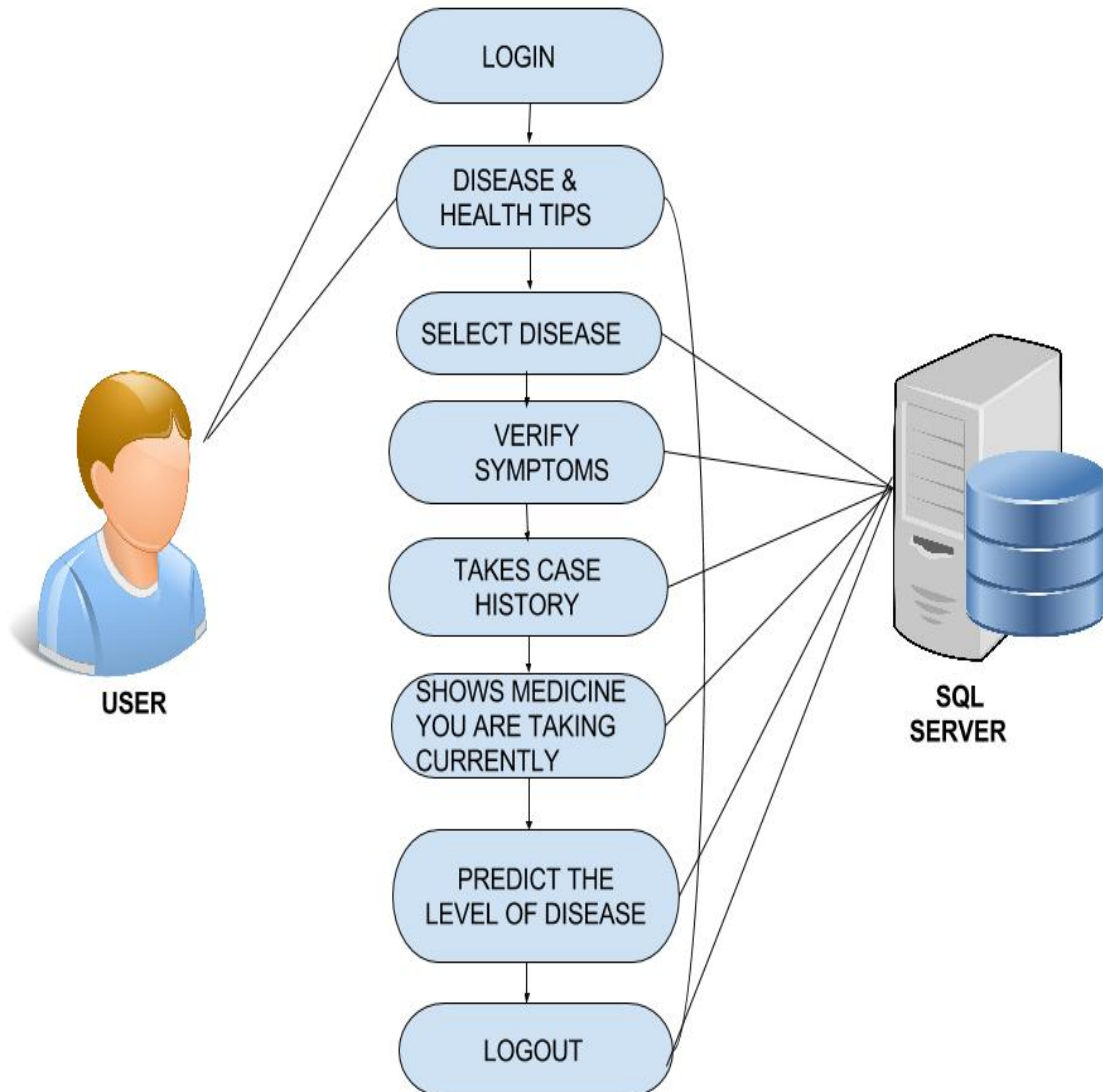


Figure 4.1: Use case of Disease Diagnosis using Android

4.2.1 Project Designs

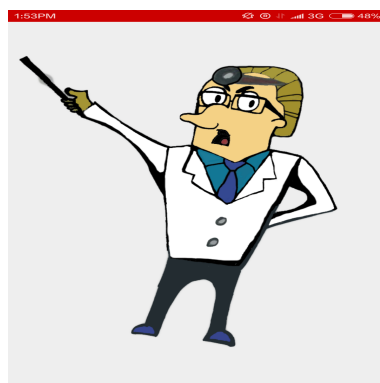


Figure 4.2: Front Design

Firstly, a splash screen appears where an image of a doctor pop ups initiating our application.

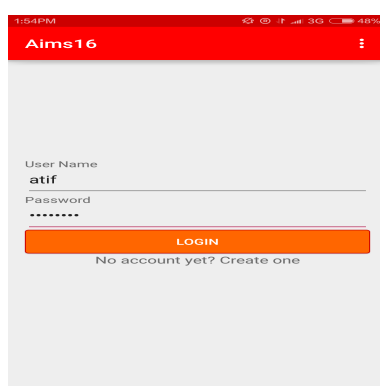


Figure 4.3: Login-Form Design

This is the GUI for Login into our application which authenticates the user.

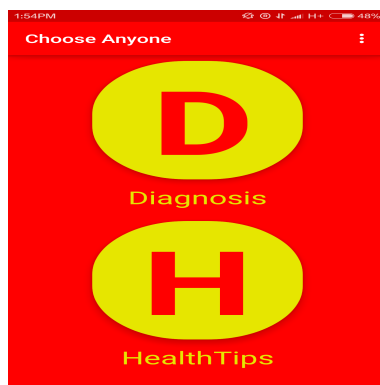


Figure 4.4: Disease Module Design

After Login a screen appears that helps the user to interact with our app by either selecting diagnose a disease or provide health-tips.

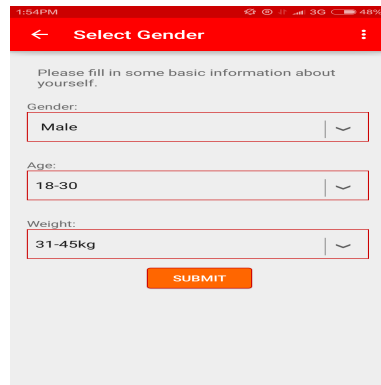


Figure 4.5: Question Module Design

This is the module to get the details of the patient like gender,age,weight.



Figure 4.6: Ask for Disease Module Design

This screen ask the user to select their disease and respective symptoms.

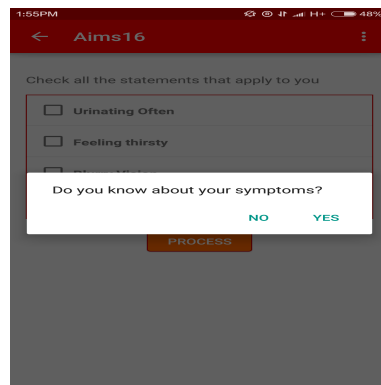


Figure 4.7: Knowing your Symptoms Design

This screen helps the user to know the symptoms if they are unaware about it.

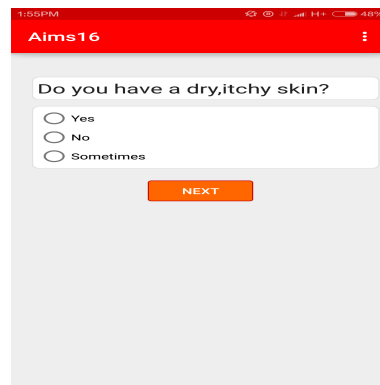


Figure 4.8: Asking for Symptoms Design

This module helps the user to identify their symptoms by asking certain queries.

4.2.2 Component Diagram of Disease Diagnosis using Android

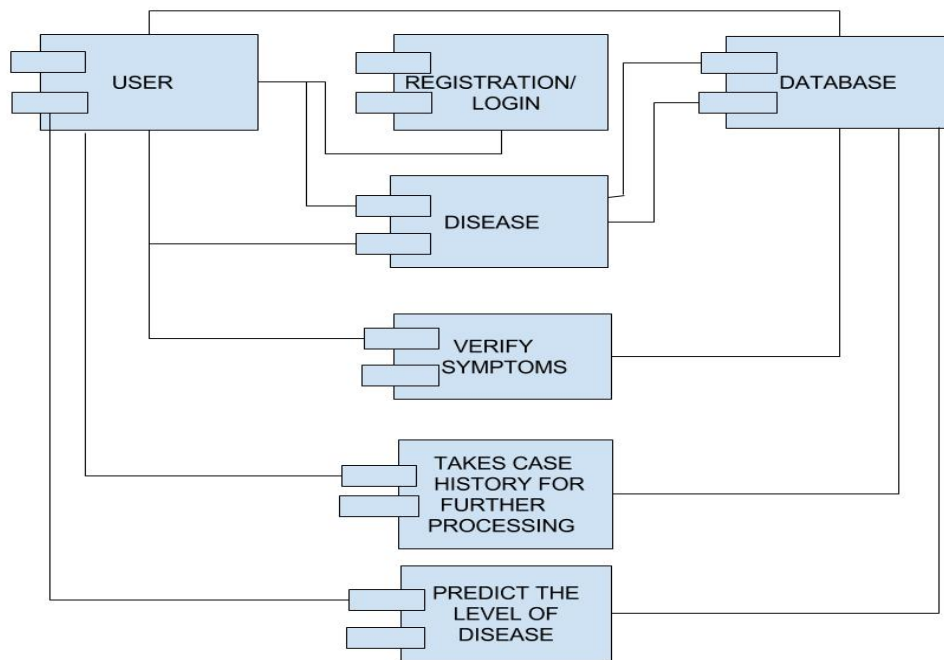


Figure 4.9: Component Diagram of Disease Diagnosis using Android.

4.2.3 Deployment Diagram of Disease Diagnosis using Android

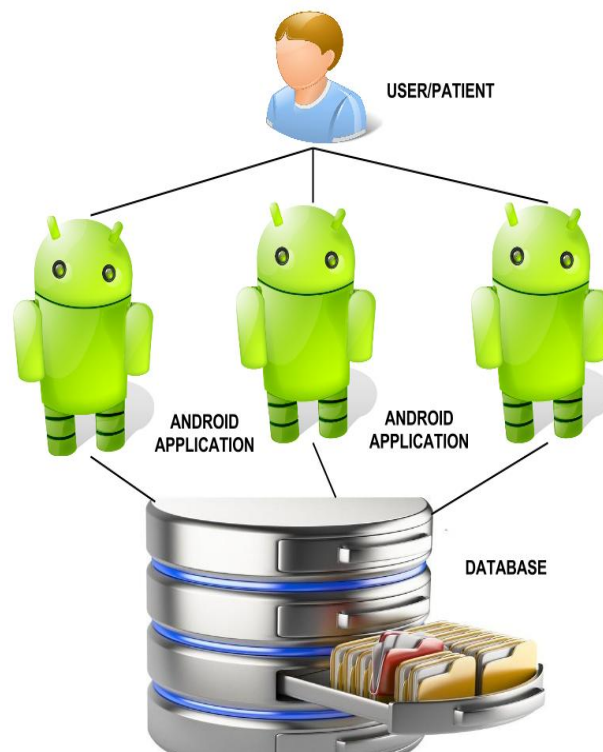


Figure 4.10: Deployment Diagram of Disease Diagnosis using Android

4.2.4 State Chart Diagram of Disease Diagnosis using Android

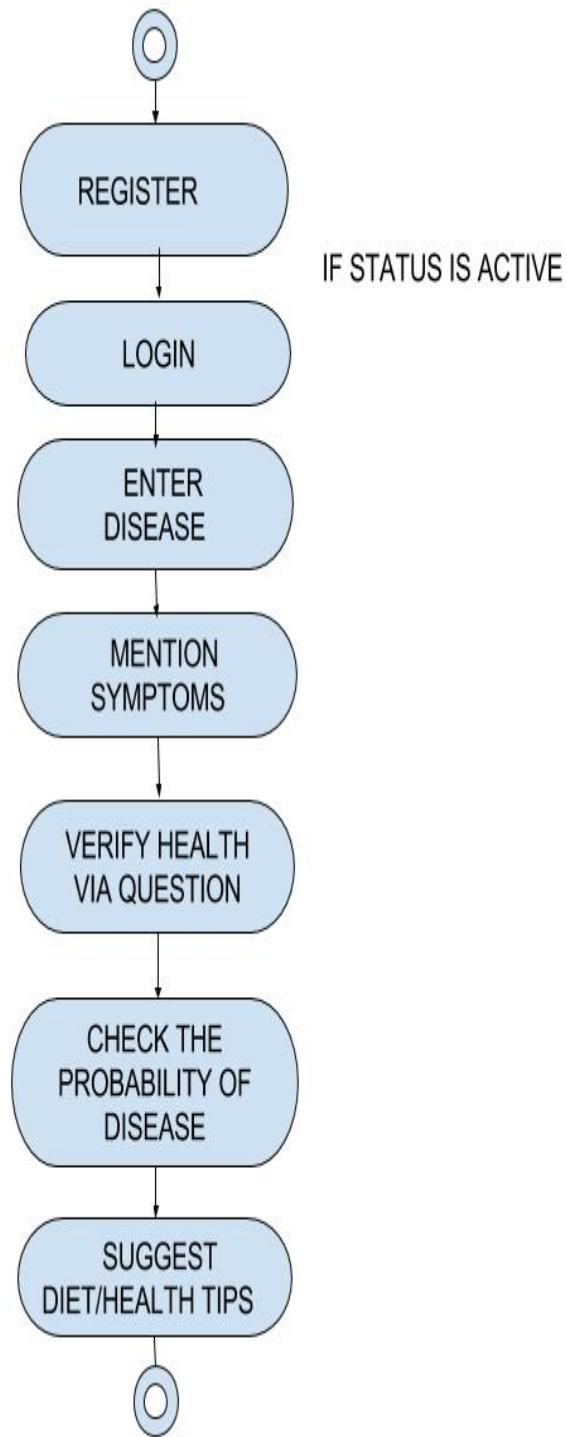


Figure 4.11: State Chart Diagram of Disease Diagnosis using Android

4.2.5 Activity Diagram of Disease Diagnosis using Android

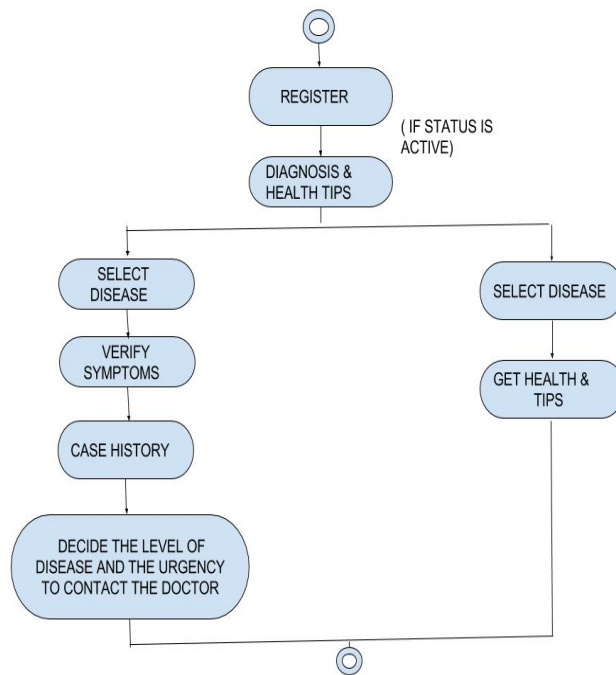


Figure 4.12: Activity Diagram of Disease Diagnosis using Android

4.2.6 Sequence Diagram of Disease Diagnosis using Android

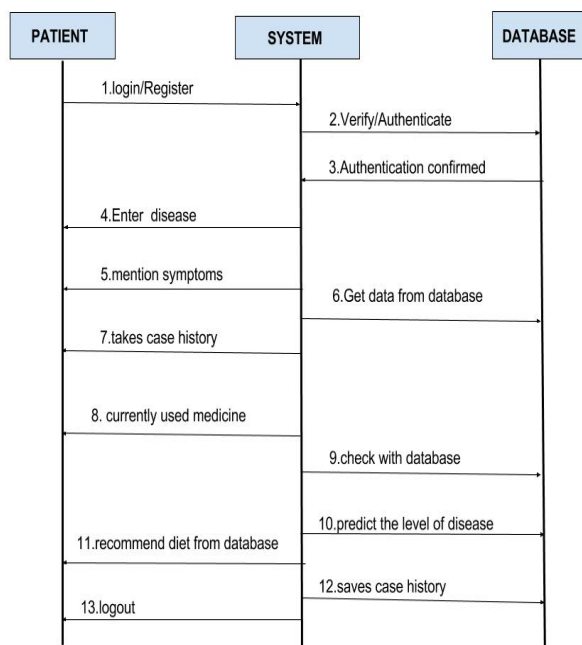


Figure 4.13: Sequence Diagram of Disease Diagnosis using Android

Chapter 5

Implementation Details

5.1 Assumptions And Dependencies

5.1.1 Assumptions

The following Assumption was taken into consideration:

- Our project is a health-care based system the aim of the project is to provide health-care services to the user. The application will be asking the disease then processing the selected symptoms which will be considered as an input and will predict the level of disease which will be acting as an output for the user it also provides diet tips for a healthy life.

5.1.2 Dependencies

The dependencies are as follows:

- For backend processing, online server and SQLite is being used. The backbone structure of the system is developed by making use of online server and SQLite. In creation of our system Online server, Phpmyadmin, SQLite, Java is used. SQLite is the database used for android application to store and parse the data.
- Decision tree is used to find the level of disease through user entered inputs. It works on data stored in database and from these data it find the most probable value.

5.2 Implementation Methodologies

Different modules of our project are user validation and verification, complete details, Disease and Symptoms from the database, verifying health of patient via case history. Disease Diagnosis is created using android, Java, SQLite, Online Server. Other modules include recommending health tips or diet according to disease and condition of patient. The system also act as a facilitator which sends selected input to the doctor indeed saving time of both user and doctor.

5.3 Modular Description of Project

5.3.1 Detailed Analysis and Description of Project

Registration or Login Module: If the new user want to interact with our system he needs to simply register into our system by completely filling details i.e. validation. If the user is already existing he needs to login i.e Verification.

Diseases and Symptoms Module: After successful login the user need to check for the diseases he/she might be suffering from. Different Diseases are parsed from the online database for user to ease the task. After selection of disease user needs to check the symptoms in a list just to ease the processing of the system.

Question Module: This module is simply asking the certain question to user to verify the condition. This is done to get the current status of user with help of their response. The idea evolved from the Turing machine called ELISA which actually interact with the user like human to get their status.

Case History Module: This module is used to take all the data from the user for diagnosis purpose. It simply consist of Online server where the database is hosted using phpmyadmin and also the SQLite which the database used inside the system.

Recommend Diet: After diagnosing the user/patient, getting all the status now there is recommendation of diet or health tips for user to improve or maintain health. This recommendation is done using SQLite database where all the data related to diet is stored. Once the user click he gets all the diet which can help in improving their health .

5.3.2 Usecase Report

Title:	Disease Diagnosis using Android
Description:	Our system enables to deliver health care, diagnose patients, provide therapy and gives health tips related to users disease. The main aim is to provide expert-based health care to understaffed remote sites and to provide advanced emergency.
Primary Actor:	Patient or User
Post conditions:	Gets recommendation of health tips and probability of level of disease
Frequency of Use:	User can use any number of time
System Requirement:	Normal. No Specific Requirement

Table 5.1: Usecase Report

5.4 Class Diagram

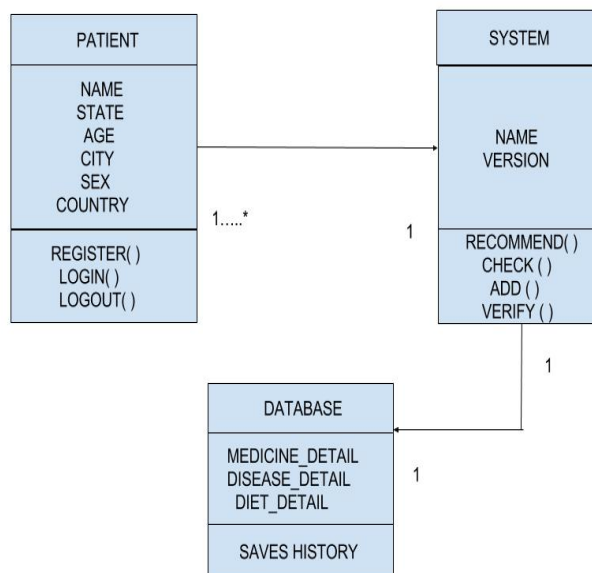


Figure 5.1: Class Diagram of Disease Diagnoses using Android.

5.4.1 Class Diagram Report

Title:	Disease Diagnosis using Android
Description:	Our system enables to deliver health care, diagnose patients, provide therapy and gives health tips related to users disease. The main aim is to provide expert-based health care to understaffed remote sites and to provide advanced emergency.
Primary Actor:	Patient or User
Preconditions:	Enter Symptoms related to Disease.
Post conditions:	Gets recommendation of health tips and probability of level of disease
Comparative Application :	<ol style="list-style-type: none"> 1. Never, gets best recommendation of diet related to disease. 2. Never, acts as an facilitator
Frequency of Use:	User can use any number of time.
Database:	Everything is stored in the database and recommendation of best medicine is based on data mining and related health tips is also provided from the database

Table 5.2: Class Diagram Report

Chapter 6

Results and Discussion

6.1 Test cases and Result

We have tested our application by considering following test cases:

6.1.1 Unit Testing

We begin with registration and login part, in which we have thoroughly checked all the input boxes and verified that each value is successfully entered into the database. Secondly, we have also cross-checked that login is done successfully. After that, we have also verified that diseases are coming into the spinner correctly and also validate that symptoms according to related diseases are fetched properly from the online database. Example, Below picture shows the validation and verification process

The screenshot shows the phpMyAdmin interface for a database named 'u352879774_aims1'. The selected table is 'Signup'. The table structure is as follows:

	name	email	state	city	contact	password
<input type="checkbox"/>	sakshi	sakshi35@gmail.com			9678466900	sdhoni
<input type="checkbox"/>	saman	samanshaikh44@gmail.com			7809543210	sammans
<input type="checkbox"/>	mohsin	mohsin.deshmukh@gmail.com			8876545670	deshmukh
<input type="checkbox"/>	atif	sayedatif86@gmail.com			9594694890	atif1234
<input type="checkbox"/>	irfan	rizviirfan1994@gmail.com			9988776655	rizvi1994
<input type="checkbox"/>	majid	majid.deshmukh@gmail.com	Maharashtra	Mumbai Suburban	9870224759	deshmukh
<input type="checkbox"/>	Amit	amitpatil@gmail.com	Maharashtra	Navi Mumbai	9870654321	suresh123
<input type="checkbox"/>	aasim	aasimmkd@gmail.com	Maharashtra	Thane	8899765432	mukadam
<input type="checkbox"/>	saraswati	saras@gmail.com	Maharashtra	Navi Mumbai	9807654321	engineer
<input type="checkbox"/>	sachin	isrkadam@gmail.com	Maharashtra	Mumbai	1234567891	qwerty
<input type="checkbox"/>	sachin	isrkadam@gmail.com	Maharashtra	Mumbai	1234567891	qwerty

Figure 6.1: User Validation

The screenshot shows the phpMyAdmin interface for a database named 'u352879774_aims1'. The selected table is 'class'. The table structure is as follows:

	Id	Disease	sym1	sym2	sym3	sym4	Med1	Med2	Med3
<input type="checkbox"/>	1	Diabetes	Urinating Often	Feeling thirsty	Blurry Vision	Cuts that heal slow	ABC	XYZ	MNO
<input type="checkbox"/>	2	Thyroid	Weight gain or loss	Change in Heart rate	Swelling in Neck	Hair Loss			

The SQL query shown in the screenshot is: `SELECT * FROM `class` ORDER BY `class`.`Id` ASC LIMIT 0, 30`

Figure 6.2: Saving Symptoms and Disease

Chapter 7

Project Time Line

7.1 Project Time Line Matrix

	ID	Name	Duration	Start	Finish	Predecessors	Resource Names	13 Dec			
								F	S	M	T
1		Requirement Gather...	7 days	14/12/15 8:00 AM	22/12/15 5:00 PM						
2		Confirm Requiremnt	7 days	23/12/15 8:00 PM	1/1/16 5:00 PM						
3		Front-end user inter...	10 days	2/1/16 8:00 AM	15/1/16 5:00 PM						
4		Back-end database ...	10 days	15/1/16 8:00 AM	28/1/16 5:00 PM						
5		Front End Coding	10 days	28/1/16 8:00 AM	10/2/16 5:00 PM						
6		Database creation	10 days	10/2/16 8:00 AM	23/2/16 5:00 PM						
7		Coding for Screens,t...	9 days	24/2/16 8:00 AM	7/3/16 5:00 PM						
8		Creation of test cases	9 days	8/3/16 8:00 AM	18/3/16 5:00 PM						
9		Unit testing	6 days	19/3/16 8:00 AM	28/3/16 5:00 PM						
10		System testing	7 days	29/3/16 8:00 AM	6/4/16 5:00 PM						
11		Alpha and Beta testi...	6 days	6/4/16 8:00 AM	13/4/16 5:00 PM						
12		Deployment	2 days	14/4/16 8:00 AM	15/4/16 5:00 PM						

Figure 7.1: Time Line Matrix

7.2 Project Time Line Chart

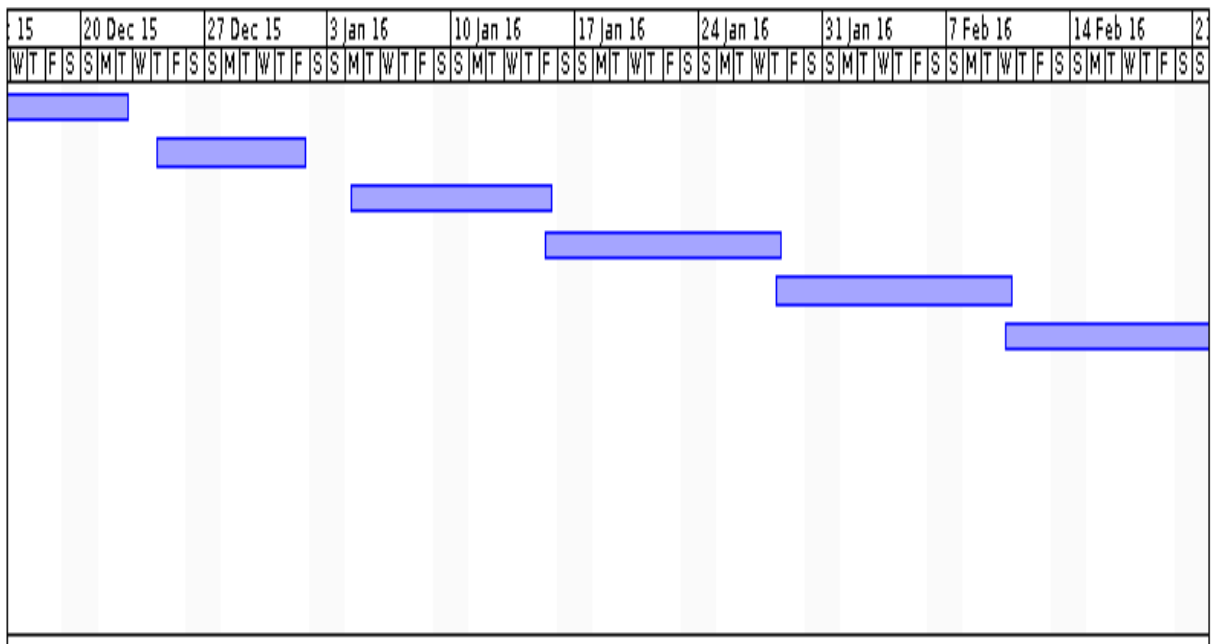


Figure 7.2: Time Line Chart

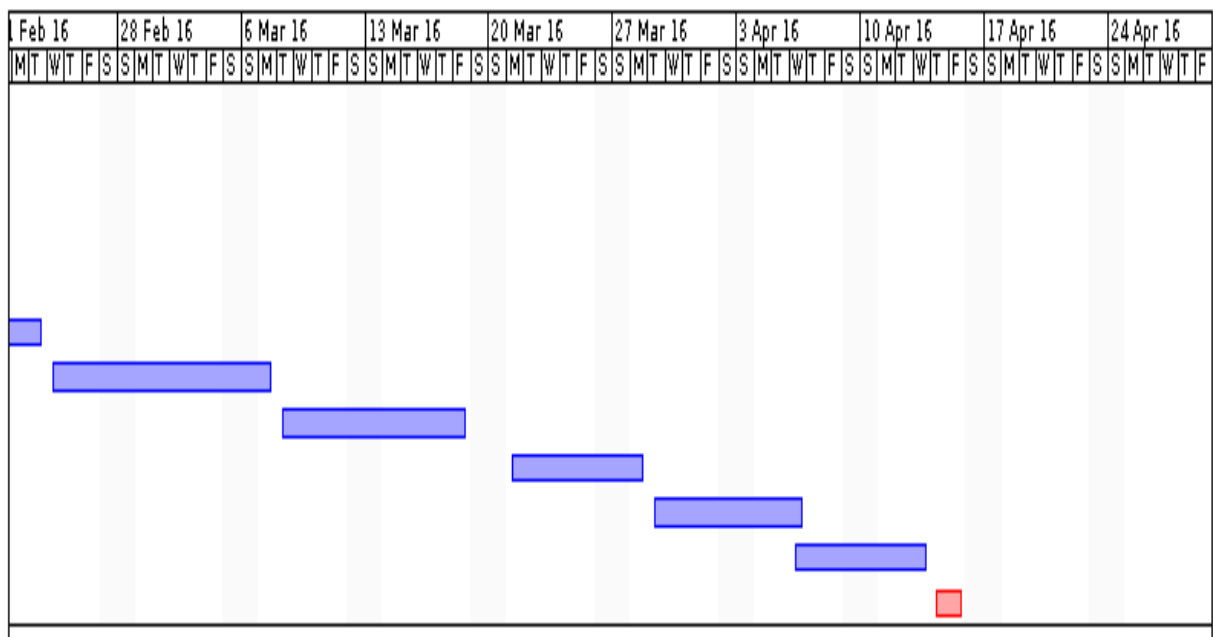


Figure 7.3: Time Line Chart

Chapter 8

Task Distribution

8.1 Distribution of Workload

8.1.1 Scheduled Working Activities

Activity	Time Period	Comment
Requirement Gathering	07 Days	Requirement gathering has took placed through searching on internet and taking the ideas, sharing the views among group members.
Planning	04 Days	Planning has done by Reviewing of literature of IEEE papers and by taking the walk through.
Design	04 Days	Designing has done by creating UML diagram, By creating Charts,
Implementation	72 Days	Implementation has done First creating the small modules of Application to Database.
Testing	05 Days	Testing has done by performing unit testing, alpha & Beta Testing, integrated testing and system testing.
Deployment	01 Day	Deployment has done by gathering various modules and database together in the Application.

Table 8.1: Scheduled Working Activities

8.1.2 Members activities or task

Member	Activity	Time Period	Start Date	End Date	Comment
M1, M2, M3, M4	Requirement Gathering	3 Days	14/12/15	16/12/15	M1 and M2 has performed the searching for project requirement on the internet by reviewing the related literature and by analysing the related project which is already available in the market. Regularly inform to the other member of team.
M1, M2, M3, M4	Analysing of the requirement	3 Days	18/12/15	20/12/15	M1, M2, M3, M4 done the requirement analysing of project by sharing the ideas, and by discussing on related information which is gather by the M1, And M2. M3 and M4 has created the list of requirement after every meeting
M1, M2, M3, M4	Finalizing the requirement	1 Day	21/12/15	22/12/15	Whole team finalize the requirement. M1 and M4 has created a list of finalise requirement.
M1, M2, M3, M4	Planning	4 Days	23/12/15	26/12/15	Planning has done by walk through and by analysing the available Application in the market.. M2 and M3 creates a list of function which will be implement in the project. Each and every module were discuss in every group meeting and M1 and M2 creates a blue print for project .

M1, M2	Front End design	4 Days	27/12/15	30/12/15	M1 and M2 creates the UML diagram for front end of the system and data flow diagrams and informed to the whole team regularly.
M3, M4	Back End design	4 Days	31/12/15	03/01/16	M3 and M4 creates the UML diagram for back end of the system and data flow diagrams and informed to the whole team regularly.
M3, M4	Installation of tools and technology for Software Requirement	1 Days	04/01/16	05/01/16	M3 and M4 installed the all the require tools which is use for running of the project.
M1, M2	Installation of tools and technology for Hardware Requirement	3 Days	06/01/16	09/01/16	M3 and M4 installed all the require tools which is use for Hardware Requirement.
M3, M4	Implementation of GUI	5 Days	10/01/16	15/01/16	M3 and M4 creates the GUI of the project and informed to other member.
M1	Implementation of Small modules	20 Days	16/01/16	04/02/16	M1 implemented the Small modules and discuss on it with other team member
M2	Implementation and gathering of modules	20 Days	05/02/16	23/02/16	M2 implemented and discuss on it with other team member
M1, M2	database connectivity with GUI	10 Days	24/02/16	04/03/16	M1 and M2 makes the connection among Database and GUI. M1 and M2 Explain the codes to the other member of team.

M3, M4	smaller modules connectivity with GUI	10 Days	05/03/16	14/03/16	M3 and M4 makes the connection with GUI and discuss on it with other team member regularly.
M1, M2	Database connectivity	5 Days	15/02/16	19/02/16	M1 and M2 created the database connectivity .
M3, M4	GUI Connectivity	4 Days	20/03/16	23/03/16	M3 and M4 created the connectivity GUI with database
M1, M2	Implementation of different algorithm.	5 Days	24/03/16	28/03/16	M1 and M2 implemented the Naive Bayes algorithm regularly updates to the other member of team.
M3, M4	Data gathering into database	2 Days	28/03/16	30/03/16	M3 and M4 gather the data of different health-tips and also made the collection into the database.
M1, M2	Connectivity of Database	5 Days	31/03/16	04/04/16	M1 and M2 created the connectivity and they explain the code to other member of team.

M4	Connectivity of the database	2 Days	05/04/16	07/04/16	M1 makes the connectivity with database. And informed to the other member of team.
M3,M4	Implementation and gathering of modules.	2 Days	08/04/16	10/04/16	M3 and M4 implemented small modules and discussed with the members of team.
M1, M2, M3, M4	Integration of all modules	1 Day	11/04/16	11/04/16	M1, M2,M3 and M4 integrated all the module. Implemented whole system properly.
M1,M2	Unit testing	1 Day	12/04/16	12/04/16	M1 and M2 performed the unit testing and noted down results and discuss with other member of team.
M3, M4	Functional testing	1 Day	12/04/16	13/04/16	M3 and M4 performed the functional testing and noted down results and discuss the result of testing with other member.
M1, M2, M3, M4	Deployment testing	1 Day	14/04/16	15/04/16	

Chapter 9

Conclusion and Future Scope

9.1 Conclusion

This project is well suited for providing care to under-served communities in rural areas. The project offers considerable potential benefits to the user. It is an effective means of providing acute treatment to people living in rural areas and people who are busy in day to day life. Our Disease Diagnosis System provides solutions for the day to day needs and requirements in this fast moving and busy world. By recommending effective medicine based on conditions, it would lead to proper treatment and fast recovery.

9.2 Future Scope

In the future, this app can be modified as a disease diagnosis using machine learning, which would be more precisely diagnosing the condition by making help of decision tree. The integration of this system with doctors and specialists can lead to achieve high performance and accurate diagnosis and can be a boon for various users who do not have ease of access to the doctors in their region. We can integrate with doctors and specialists so that user/patient can get on spot treatment at their place. We can host this project on a large scale by integrating with hospitals. Various modern telecommunication techniques can be integrated with this project at later stages. It will help physicians to work from anywhere.

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Own Publication

[9] Rizvi Irfan, Syed Atif, Shaikh Saman, Deshmukh Mohsin, Prof Irfan Jamkhandikar, Prof Sameer Panwala, *Analysis of Disease Diagnosis Using Artificial Intelligence*, International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)2015



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Analysis of Disease Diagnosis using Artificial Intelligence

Rizvi Irfan Shabihul Hasan, Syed Mohammed Atif, Shaikh Saman Umar, Deshmukh Mohsin Mahmood,

Prof Irfan Jamkhandikar, Prof Sameer Panwala

B.E Student, Dept. of Computer Engineering, AIKTC, New Panvel, Mumbai University, India

B.E Student, Dept. of Computer Engineering, AIKTC, New Panvel, Mumbai University, India

B.E Student, Dept. of Computer Engineering, AIKTC, New Panvel, Mumbai University, India

B.E Student, Dept. of Computer Engineering, AIKTC, New Panvel, Mumbai University, India

Assistant Professor, Department of Computer, AIKTC, New Panvel, Mumbai University, India

Assistant Professor, Department of Computer, AIKTC, New Panvel, Mumbai University, India

ABSTRACT: The term Diagnosis refers to determination of the nature of a cause of a disease. In computer science it is a typically used to determine the cause of symptoms and solutions. Our system enables to deliver health care, diagnose patients, provide therapy, or make the patient to consult with physician for major diseases at a remote site or areas with lack of medical facilities. The Aim is to provide expert-based health care to understaffed remote sites and to provide advanced emergency. This article briefly describes the system architecture, Literature Review, H/w and S/w Requirement, its Implementation module, etc.

KEYWORDS: Diagnosis, Disease, Module, Insurance, Software, Symptomate, Therapy

I. INTRODUCTION

The term diagnosis, is the identification of a certain phenomenon. In computer science it is typically used to determine the cause of symptoms and solutions. Disease diagnoses provide patients or users to inspect their disease by simply entering their symptoms into the system and the system will provide user with the name of the medicines if the problem is minor. This could reduce the cost of the patient for visiting doctors or to consult a doctor & will also save the time of the patient. Our aim is to provide excellent health-care based system. Hence this will be a new era into health-care based system and this will change the old practice totally.

II. RELATED WORK

In [3] Author describe about how Telemedicine enables a physician or specialist at one site to deliver health care, diagnose patients, give intra-operative assistance, provide therapy, or consult with another physician or paramedical personnel at a remote site. Thus, the aim of telemedicine is to provide expert-based health care to understaffed remote sites and to provide advanced emergency care through modern telecommunication and information technologies. Describes the current status of telemedicine including implementation, acceptance, Patient satisfaction, service and application, system configuration and requirements. In [1] author describes how Health-care system reforms can change the structure of the current U.S. health-care system, from centralized large hospitals to a distributed, networked health care system. In our model, medical care is delivered locally in neighborhoods and individual homes, using computer technologies like telemedicine, to link patients and primary care providers to tertiary medical providers. Health-care system reforms can

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change the structure of the current U.S. health-care system, from centralized large hospitals to a distributed, networked healthcare system. In our model, medical care is delivered locally in neighborhoods and individual homes, using computer technologies like telemedicine, to link patients and primary care providers to tertiary medical providers.

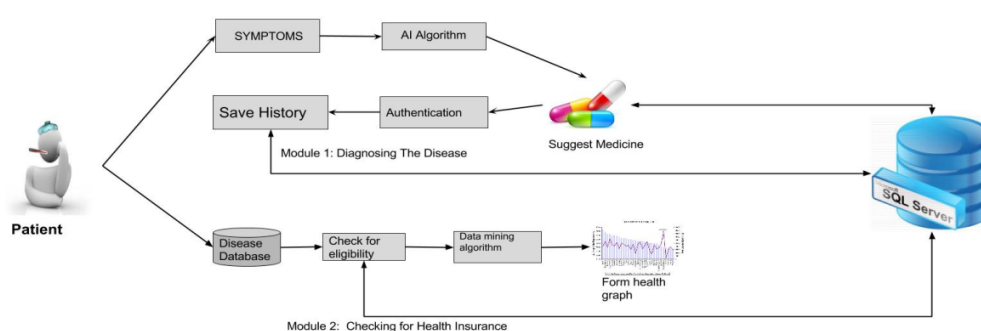
A system name SYMPTOMATE checks the symptoms of the patient and provides necessary suggestion to the user. SYMPTOMATE is an application for checking the symptoms that will help you to find out about your symptoms. You have to just enter about your symptom and it will provide a list of diseases related to it and will recommend for doctors. It is done by simply typing or selecting the symptoms from which the patient is suffering. Then it uses AI to detect the symptoms. After checking for the symptoms, it will advise to visit the specialist. It also provides report on the patient email after analyzing the disease.

III. PRESENTATION OF THE MAIN CONTRIBUTION OF THE PAPER/SCOPE OF THE RESEARCH

Our scope of the project is to build a technology which changes the old concept of visiting doctors, taking appointment, waiting in queue, people should also leave old hectic practices and start a new easier one as India is going towards a digital world. +9+e and the people who live in rural areas have to travel long distance and come to cities, just to consult a doctor because there are no proper treatment available in their areas. Such people can use this system efficiently. Basically, the system would recommend the user related medicine according to the symptom entered by the user. The system might also suggest to visit a doctor if the symptoms are critical.

IV. PROPOSED METHODOLOGY & DISCUSSION

The project consist of two modules. First is the main module which is of disease diagnosis and second is the health insurance eligibility checking module.



Disease Diagnosis Module

This module starts with patient registering on the system then after registering user enter his/her symptoms for checking. Basically it will act as a symptom checker. The system checks for the symptoms by using various AI algorithm and return with desired result by displaying diseases the user might suffer from. If symptoms are not serious then for time being system will recommend some medicine or otherwise it will suggest to visit the nearest physician. The symptoms entered by the user will get authenticated by doctors. It would save the symptoms for future references.



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Checking Eligibility For Health Insurance

In This Module, all the diseases are predefined in the database and the data will be mined based on the symptoms. Eligibility will be checked of the patient for providing the health care insurance. The Data from the patient's database will be mined by insurance company using various Data mining algorithm. Once the data is mined a Health graph will be formed of respective patient. At last, the physical status of the patient will be concluded.

V. IMPLEMENTATION OF METHODOLOGY

The proposed system will be implemented as an Android Based Application. Due to the current trend of smart phone. The android application will be best suited. The application will be built using android IDE. The application will be working on all the above version of jellybean (4.0). The application will be synchronized with the database stored at the webserver. Database will be used as the main asset of this application. Database will be maintaining all the disease related medicine and a predefined condition for checking the eligibility for insurance. The system would fetch required details from the web server. This application will be most suited for tech friendly people who likes to do everything on hand and people traveling from cities to rural areas. Hence an android application of disease diagnosis is a boon to the society.

VI. CONCLUSION

This project is well suited for providing care to under-served communities in rural areas. The project offers considerable potential benefits to the user. It is an effective means of providing acute treatment to people living in rural areas and people does who are busy in day to day life. The idea would be helping the needy who can't afford travelling long distance just to consult for minor diseases. This project will be a boon for the rural people who have to travel a long distance for their treatment and also for the areas with lack of medical facilities

ACKNOWLEDGEMENT

I would like to take the opportunity to express my sincere thanks to my guide Prof. Sameer Panwala, Assistant Professor, Department of Computer Engineering, AIKTC, School of Engineering, Panvel for his invaluable support and guidance throughout my project research work. Without his kind guidance & support this was not possible.

We are grateful to him for his timely feedback which helped me track and schedule the process effectively. His time, ideas and encouragement that he gave is help me to complete my project efficiently.

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BIOGRAPHY

Rizvi Irfan Shabihul hasan is pursuing Final Year in Computer Engineering from Anjuman-I-Islam's Kalsekar Technical Campus, New Panvel, Mumbai University, India. Interested in web development.

Syed Mohammed Atif is Pursuing Final Year in Computer Engineering from Anjuman-I-Islam's Kalsekar Technical Campus, New Panvel, Mumbai University, India. Interested in programming and hand-held application development.

Shaikh Saman Mohammad Umar is Pursuing Final Year in Computer Engineering from Anjuman-I-Islam's Kalsekar Technical Campus, New Panvel, Mumbai University, India. Interested in Java Development & Web Development.

Deshmukh Mohsin Mahmood is Pursuing Final Year in Computer Engineering from Anjuman-I-Islam's Kalsekar Technical Campus, New Panvel, Mumbai University, India. Interested in Java Development & Web Development.

Sameer Panwala is Assisstant Professor in Computer Department, Anjuman-I-Islam Kalsekar Technical Campus, New Panvel, Mumbai University. He received his Bachelor of Engineering (B.E) degree in 1996 from Mumbai University, India.

Irfan Jamkhandikar is Assisstant Professor in Computer Department, Anjuman-I-Islam Kalsekar Technical Campus, New Panvel, Mumbai University. He received his Bachelor of Engineering (B.E) degree in 2011 from Mumbai University, India. Data warehouse and Data Mining, Robotics and Artificial Intelligence, Java Development, Theory of Computer Science, Discrete Structures

Chapter 10

Appendix I

10.1 What is Telemedicine ?

Formally defined, telemedicine is the use of medical information exchanged from one site to another via electronic communications to improve a patients clinical health status. Telemedicine includes a growing variety of applications and services using two-way video, email, smart phones, wireless tools and other forms of telecommunications technology.

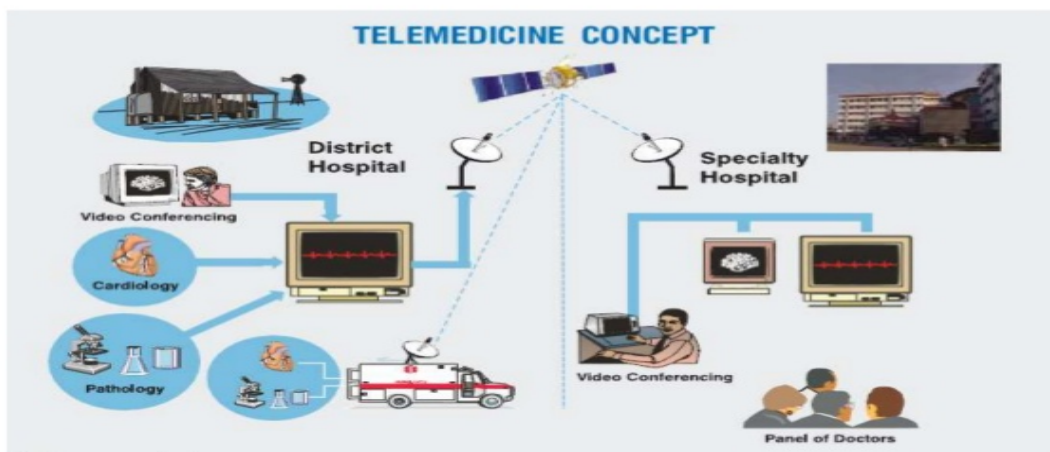


Figure 10.1: Telemedicine concept

10.1.1 What Services Can Be Provided By Telemedicine?

Sometimes telemedicine is best understood in terms of the services provided and the mechanisms used to provide those services. Here are some examples:

- Primary care and specialist referral services may involve a primary care or allied health professional providing a consultation with a patient or a specialist assisting the primary care physician in rendering a diagnosis. This may involve the use of live interactive video or the use of store and forward transmission of diagnostic images, vital signs and/or video clips along with patient data for later review.
- Remote patient monitoring, including home telehealth, uses devices to remotely collect and send data to a home health agency or a remote diagnostic testing facility (RDTF) for interpretation. Such applications might include a specific vital sign, such as blood glucose or heart ECG or a variety of indicators for home bound patients. Such services can be used to supplement the use of visiting nurses.
- Consumer medical and health information includes the use of the Internet and wireless devices for consumers to obtain specialized health information and on-line discussion groups to provide peer-to-peer support.
- Medical education provides continuing medical education credits for health professionals and special medical education seminars for targeted groups in remote locations.

10.1.2 What Delivery Mechanisms Can Be Used?

- Networked programs link tertiary care hospitals and clinics with outlying clinics and community health centers in rural or suburban areas. The links may use dedicated high-speed lines or the Internet for telecommunication links between sites. ATA estimates the number of existing telemedicine networks in the United States at roughly 200 providing connectivity to over 3,000 sites.
- Point-to-point connections using private high speed networks are used by hospitals and clinics that deliver services directly or outsource specialty services to independent medical service providers. Such outsourced services include radiology, stroke assessment, mental health and intensive care services.
- Monitoring center links are used for cardiac, pulmonary or fetal monitoring, home care and related services that provide care to patients in the home. Often normal land-line or wireless connections are used to communicate directly between the patient and the center although some systems use the Internet.
- Web-based e-health patient service sites provide direct consumer outreach and services over the Internet. Under telemedicine, these include those sites that provide direct patient care.

10.1.3 What Are the Benefits of Telemedicine?

Telemedicine has been growing rapidly because it offers four fundamental benefits:

- **Improved Access:** For over 40 years, telemedicine has been used to bring healthcare services to patients in distant locations. Not only does telemedicine improve access to patients but it also allows physicians and health facilities to expand their reach, beyond their own offices. Given the provider shortages throughout the world—in both rural and urban areas—telemedicine has a unique capacity to increase service to millions of new patients.
- **Cost Efficiencies :** Reducing or containing the cost of healthcare is one of the most important reasons for funding and adopting telehealth technologies. Telemedicine has been shown to reduce the cost of healthcare and increase efficiency through better management of chronic diseases, shared health professional staffing, reduced travel times, and fewer or shorter hospital stays.
- **Improved Quality :** Studies have consistently shown that the quality of healthcare services delivered via telemedicine are as good those given in traditional in-person consultations. In some specialties, particularly in mental health and ICU care, telemedicine delivers a superior product, with greater outcomes and patient satisfaction.
- **Patient Demand :** Consumers want telemedicine. The greatest impact of telemedicine is on the patient, their family and their community. Using telemedicine technologies reduces travel time and related stresses for the patient. Over the past 15 years, study after study has documented patient satisfaction and support for telemedical services. Such services offer patients the access to providers that might not be available otherwise, as well as medical services without the need to travel long distances.

10.2 Telemedicine growth on global level in years

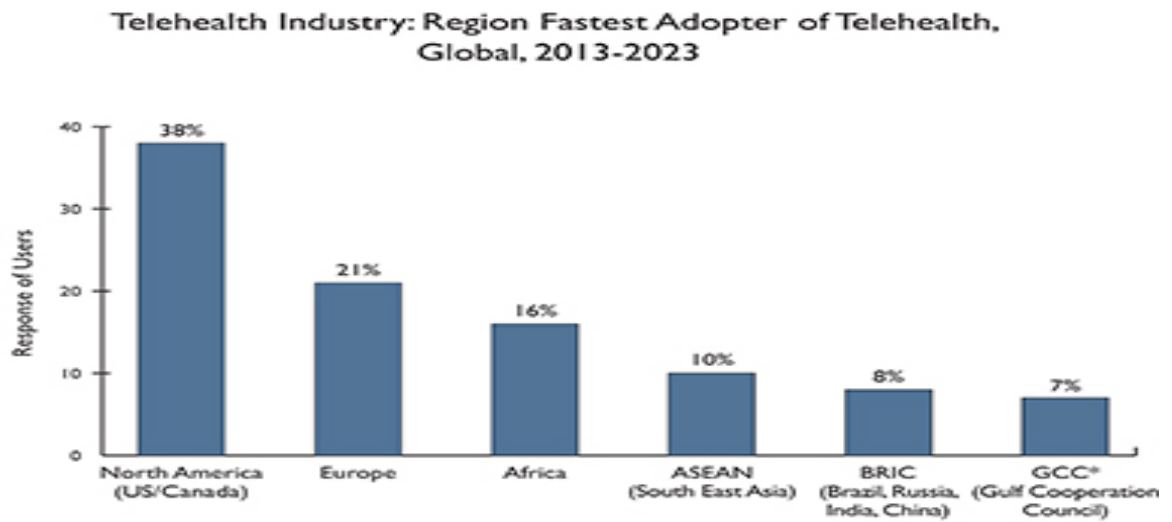
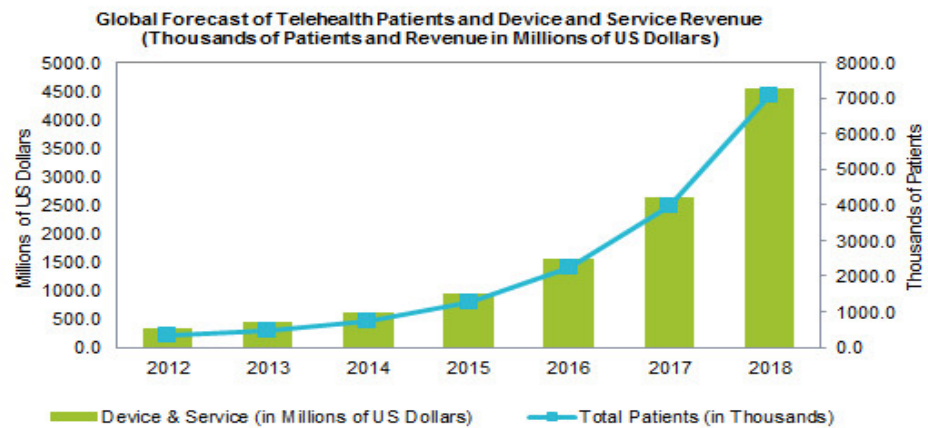


Figure 10.2: Tele-health industry status



Source: IHS Technology, January 2014

Figure 10.3: Global forecast of tele-health patients and device and service

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We would like to take the opportunity to express our sincere thanks to our guide **Prof. Sameer Panwala**, Assistant Professor **Prof. Irfan Jamkhandikar**, Department of Computer Engineering, AIKTC, School of Engineering, Panvel for his invaluable support and guidance throughout our project research work. Without his kind guidance & support this was not possible.

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Syed Mohd Atif Hanif Hazara (12CO60)

Deshmukh Mohsin Mahmood Goher (13CO77)

Shaikh Saman Mohammad Umar Asma (13CO64)

Rizvi Irfan Shabihul Hasan Nasrin Fatima (12CO55)

(Department of Computer Engineering)

University of Mumbai.