A Project Report on

# IoT based Healthcare Kit with Chatbot

Submitted in partial fulfillment of the requirements for the award of the degree of

**Bachelor of Engineering**

in

**Information Technology**

by

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Under the Guidance of

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UNIVERSITY OF MUMBAI

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# Approval Sheet

This Project Report entitled ***"IoT based Healthcare kit with Chatbot"*** Submitted by ***"Shreya Bhutada (17104019)"*** is approved for the partial fulfillment of the requirement for the award of the degree of ***Bachelor of Engineering*** in ***Information Technology*** from ***University of Mumbai***.

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Place:A.P.Shah Institute of Technology, Thane
Date: 27/05/2021

# CERTIFICATE

This is to certify that the project entitled ***"IoT based Healthcare kit with Chatbot"*** submitted by ***"Shreya Bhutada (17104019)"*** for the partial fulfillment of the requirement for award of a degree ***Bachelor of Engineering*** in ***Information Technology***,to the University of Mumbai,is a bonafide work carried out during academic year 2020-2021.

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# Acknowledgement

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**Student Name: Shreya Bhutada**
**Student ID: 17104019**

## 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.

_____

(Signature)

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(Shreya Bhutada (17104019))

Date: 27/05/2021

**Abstract**

The Healthcare of a country plays a major role in defining a country's development. It is the expenditure, quality, and accessibility of health services that govern the quality of healthcare. With this in mind, we aim to develop an IoT based healthcare kit that is portable, low cost, lightweight, and low power electronic health care system. It will record and monitor health parameters like temperature, ECG, heart rate, blood pressure, etc providing primary patient monitoring and care assistance to strengthen our country's healthcare system from rural to urban sectors. The kit is accessible 24/7 as real time data can be stored and fetched from the cloud anytime and anywhere. A significant issue in rural India is the 1:10,000 ratio of doctor to patient, which is now resolved by this kit because doctors all over India can now access the data on their timeline. Also, our Rasa based NLP-powered AI bot helps in assisting patients in identifying their illness via credible symptom checking, providing remedies for their illness, scheduling doctor appointments, and notifying caregivers. A web app is also provided for our system to broaden usability.

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# List of Abbreviations

| | |
|---|---|
| IoT: | Internet of Things |
| AWS: | Amazon Web Services |
| EHR: | Electronic Health Record |
| BPM: | Beats Per Minute |
| MQTT: | Message Queuing Telemetry Transport |
| HTTP: | Hypertext Transfer Protocol |
| CEIC: | Census and Economic Information Center |
| TLS: | Transport Layer Security |
| SSH: | Secure Shell Protocol |
| API: | Application Programming Interface |
| AI: | Artificial Intelligence |
| CSS: | Cascading Style Sheets |
| HTML: | HyperText Markup Language |

# Chapter 1

# Introduction

The healthcare industry plays a vital role not only in the physical health of people but also in the economy as a whole. While the healthcare sector is constantly improving, a country like India with its growing population always falls short on adequate facilities. India has a universal healthcare model that is mostly administered at the state level rather than the federal level, with each state having its own publicly funded healthcare. The National Health Policy focuses on the emergence of the robust healthcare industry. In practice, however, the private healthcare sector is responsible for the majority of healthcare in India. Major medical professionals are in urban areas which just cover some parts of India. Lack of exposure to rural areas increases the risks and reduces the quality of life. In addition to this, the cost of medical treatment is pretty high. Normal body checkups, to and fro hospitals, pre-and-post hospitalization medical expenses all add up to a hefty amount that people cannot afford.

To change all these demerits, we thus take the full benefit of the revolutionizing IoT in healthcare. The Internet of Things has made objects smart without any manual intervention. It establishes a platform that creates opportunities for people to connect devices and control them with big data technology. It is a perfect amalgamation of real-time analytics, wireless network sensors, and embedded systems. There are countless advantages of IoT in healthcare fields like time management, less expenditure, better and accurate results. Because of this, all the inefficiencies in the health sector will reduce. With emerging technologies, data management also becomes an important part of the healthcare system. Millions of data have to be stored and this causes space complexity in databases. Here's where cloud computing comes into the picture. Amazon Web Services (AWS) is a cloud platform that has widened its roots into IoT services. It is reliable, scalable and most importantly it adheres to data management and provides rich analytics.

The idea of this project originated to give good medical care and reduce the need for patients to visit the doctor for a regular health checkup. This kit facilitates cost and time savings for both patients and doctors and it also allows doctors to give more time for emergency cases. The kit will help the disabled and old people who cannot come to hospitals independently for their regular checkups. The system provides a distinguishing characteristic of continuous real time analysis of various health parameters such as blood pressure, oximeter, and temperature by using various sensors whose data is sent to the cloud. The data will be accessible to doctors on their website where we will plot the sensor's data and visualize them. The doctors can retrieve past records of patients for reference from the Electronic

Health Records stored in the cloud. They will notify the patients about their diagnosis and if it is required, they can stay connected with the patients.

The patients need to register themselves on the app, and doing so, will give them access to various features. Nowadays people tend to seek knowledge or information from the internet related to health. To reduce this, the introduction of a chatbot in the kit is a completely new concept and a highlighting feature. A Healthcare bot is a technology that makes the interaction between man and machine possible by using natural language processing with the support of Rasa. The information for the healthcare services given by the bot can be trusted and it can be chosen over traditional community-generated systems because they are more reliable, compatible, and provide instant remedial options. It intends to provide personalized health and therapy information to patients. Moreover, because of the feasibility of chatbot, the visit to doctors for minor issues will also decrease thus, saving time and expenditure.

## 1.1 Objective

- Develop an absolute, portable and cheap system that will be 24/7 available.
- Aid the disabled and old people who cannot come to hospitals independently for their regular checkups.
- Enable constant monitoring of a patient by providing real time analysis of health parameters.
- Lessening the communication gap by providing quick access to doctors.
- Ease the usability by developing a Web based application.
- Integration of chat bot that would assist medical queries, symptom check and provide referral for major health issues that would decrease time and expenditure of patients.

## 1.2 Problem Statement

Rural healthcare is one of the biggest challenges and as per the 2011 provisional population totals of Maharashtra, more than 50 percent of the population resides in rural areas. The number of government hospitals in this area was reported at 273 Units in 2015. This records a decrease from the previous number of 450 Units for 2013. The data reached an all-time high of 735 Units in 2010 and a record low of 273 Units in 2015. In 2015, there was an increase in the total number of hospitals with 711 Units, but a steep decline in the number of hospitals in rural areas. So more hospitals were being constructed in the urban areas, making it inconvenient for people residing in rural areas to walk miles for visiting hospitals. This data was referenced from CEIC and is reported by the Central Bureau of Health Intelligence. As the lack of health facilities is clearly visible from the data shown in Fig. 1, there is a need for low cost medical care in rural areas. Fig. 1. Government hospitals in rural areas of Maharashtra Even though there are several government hospitals in Maharashtra, only a few of them are in rural areas, creating a necessity. Fewer people have access to healthcare

than their urban counterparts. To overcome this we proposed a system that will help in lessening this gap and provide people of every age quality care.

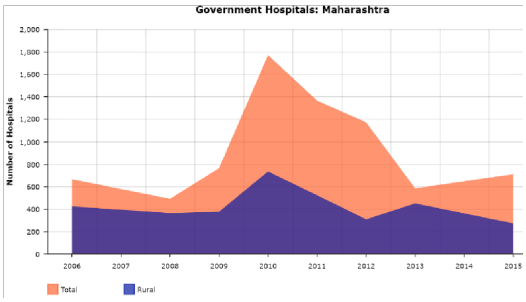


Figure 1.1: Government hospitals in rural areas of Maharashtra

In addition to this, websites that available are mostly comprised of a particular hospital which reduces the versatility and also doctors don't have enough time to give to online as well as incoming patients.There are applications which are just limited to making appointments with doctors and very minimal interaction related to disease condition of the patients. This project aims at providing an IoT based remote Health care kit and AI Chatbot which provides healthcare tips to patients, and effectively, reducing the cost of customer service and providing a vital communication link between doctors and patients.

## 1.3 Scope

- A valuable asset to Healthcare sector
- Remote Patient Monitoring
- Reduced Healthcare cost
- Care for elderly
- Health Chatbot facility
- Quick access to doctors
- Resolved database issue by deploying the sensor data on Cloud
- Reduce the pollution by making everything digitally available

## 1.4 Technology Stack

The project can be achieved by using below listed modules.

### 1.4.1 Hardware Components:

- Arduino UNO
- Oximeter MAX 30100

- Temperature Sensor TMP 36
- Pressure Sensor BMP 180
- Capacitor
- Touch Display - Nextion 2.4”

### 1.4.2 Software Used:

- HTML5
- CSS
- Bootstrap
- JQuery
- MySQL
- Xampp
- Node-Red
- AWS
- Tinkercad
- Nextion

# Chapter 2

# Literature Review

The papers referred are mentioned below:

**[1] Tamilselvi V, Sribalaji S, Vigneshwaran P, Vinu P, GeethaRamani J. IoT based health monitoring system. In: 2020 6th International conference on advanced computing and communication systems (ICACCS). IEEE; 2020. p. 386–9.**

This system provides patients with better and more effective healthcare services, using data acquired via the internet and communication devices, which are then connected to cloud services. The suggested methodology examines the values of variable health markers obtained from sensors. Along with GSM, this device incorporates an IoT-based health care monitoring system for coma patients. Using this technology, the doctor can check on his patient at any time and from any location. If the obtained current value exceeds or falls below the threshold value, an emergency alert message will be sent to a predetermined Smartphone number.

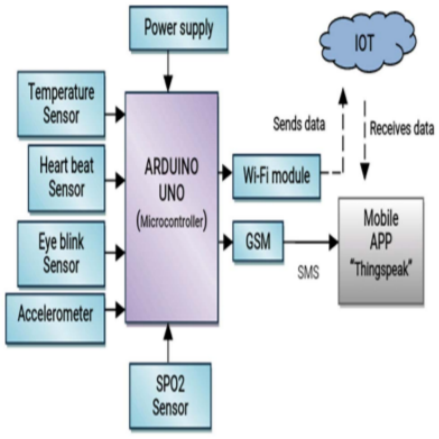


Figure 2.1: IoT based health monitoring system

**[2] Hossain, Md Anowar and Qureshi, Md. (2020). IoT Based Medical Assistant Robot (Docto-Bot).**

The primary goal of this paper is to create and develop Docto-Bot, a biomedical-based medical assistant robot. This study focuses on the design and development of a medical assistance robot for the disabled and underserved. The objective of such a robot is to reduce human-to-human contact while also ensuring hospital cleanliness, sterilization, and assistance. A pharmaceutical reminder and delivery system, an automatic hand sanitizer, and an IoT-based Physiological Monitoring System are all included in this prototype robot (Body Temperature, Pulse rate, ECG, Oxygen saturation level). A direct one-to-one server-based communication technique was built, as well as a user-end Android app maintenance system.

**[3] Islam, Md and Rahaman, Ashikur and Islam, Rashedul. (2020). Development of Smart Healthcare Monitoring System in IoT Environment. SN Computer Science. 1. 185. 10.1007/s42979-020-00195-y.**

This paper discusses a secure Internet-of-Things-based health monitoring system that reduces the distance between a patient and the appropriate medical institution. The processing and encryption tasks, as well as enabling Wi-Fi connections to the cloud, are all handled by a Node MCU microcontroller. Furthermore, only after submitting the decryption credentials may a medical specialist view confidential health data in real time. If the vital signs are outside of normal ranges, the proposed system sends an email to selected patient family or a coordinating specialist. For private health data records, the envisioned system provides privacy, security, and real-time connectivity.

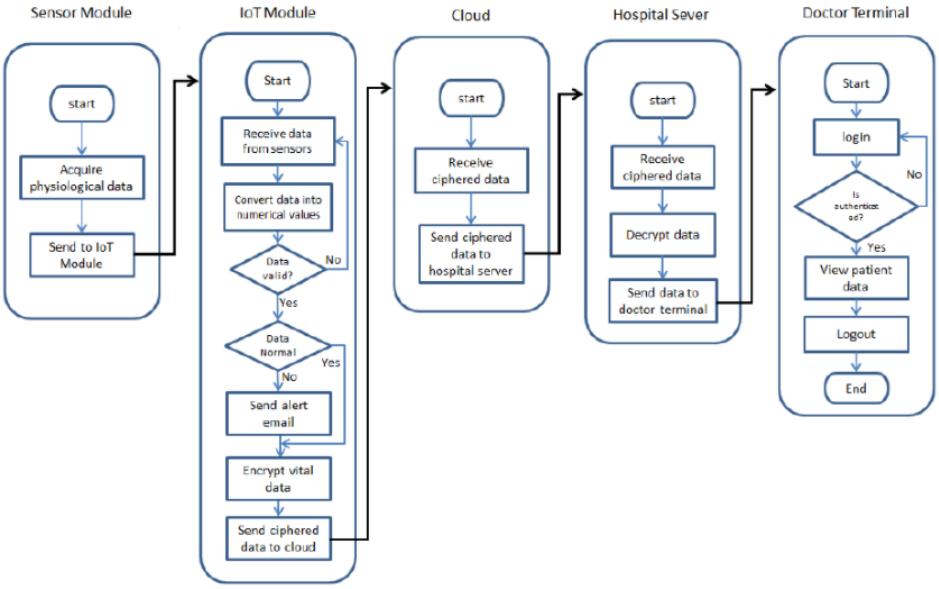


Figure 2.2: Development of Smart Healthcare in IoT Environment

**[4] Malapane, T. and Doorsamy, Wesley and Paul, B.S.. (2020). An Intelligent IoT-based Health Monitoring System. 95-100. 10.1109/IDSTA50958.2020.9264102.**

This paper presents a smart healthcare system that can monitor a patient's fundamental health indications as well as the room situation where the patients are now in real-time in an IoT context. Heart beat sensor, body temperature sensor, room temperature sensor, CO

sensor, and CO2 sensor are among the five sensors implemented in this system to collect data from the hospital environment. Patient's conditions are communicated to medical professionals via a portal, where they may process and assess the patient's current position. Even if the tests are performed outside of the hospital, authentic medical staff may examine and track the data in real time.

| Title | Author | Year of Publication | Findings | Drawback | Our Project |
|---|---|---|---|---|---|
| IoT Based Health Monitoring System | Tamilselvi V, Sribalaji S, Vigneshwaran P, Vinu P, J.GeethaRamani | 2020 | It offers an accelerometer sensor displays the body movments of the coma patients. All the information is collected via the internet and their devices are all connected to cloud services. | It focuses on coma patients and the sensors used are not of much use for basic health check up and there is no web-portal. | Focuses on over- all health parameters with easy usuablity by providing a web-based portal |
| IoT based Health Care Monitoring Kit | Anand D. Acharya, Shital N. Patil | 2020 | The developed system consists of basic health parameters like ECG and temperature. This data is collected from the following sensors and sent to raspberry pi. | The project is effective but there is no data visualization interface for the kit. | Dashboard and web-based portal has been developed for visualization with health bot feature |
| IoT based smart healthcare kit | Punit Gupta, Jasmeet Chhabra, Pulkit Kumar Dhir, Deepika Agrawal | 2016 | The proposed model collects data from the sensors like pulse rate, blood pressure and ECG . The server uploads the database with current medical information. | After a certain amount of time, database contraint will be the major issue | Entire database is connected to cloud services |
| Smart Health Monitoring System based on IoT and Cloud Computing | Ali I. Siam, Atef Elsayed Abouelaz, Nirmeen A. El-Bahnasawy, Ghada El Banby | 2019 | This paper discusses the processing and encryption tasks, as well as enabling WiFi connections to the cloud, are all handled by a Node MCU microcontroller. | There is little to no importance given to GUI which decrease the overall efficiency | Web - based portal is developed for better approach with chat bot feature. |

Figure 2.3: Overview of paper referred

# Chapter 3

# Project Design

## 3.1 Basic Diagrams

Any real-world system is used by different users. The users can be developers, testers, business people, analysts, and many more. Hence, before designing a system, the architecture is made with different perspectives in mind.
The most important part is to visualize the system from the perspective of different viewers. The better we understand the better we can build the system. Hence UML diagrams are used to represent the idea of users with the help of various diagrams. UML diagrams is a standard language for specifying, visualizing, constructing, and documenting the artifacts of software systems.

### 3.1.1 Use Case Diagram

A use case diagram at its simplest is a representation of a user's interaction with the system that shows the relationship between the user and the different use cases in which the user is involved. A use case diagram can identify the different types of users of a system and the different use cases and will often be accompanied by other types of diagrams as well. The use cases are represented by either circles or ellipses. Use case diagrams are used to gather the requirements of a system including internal and external influences. These requirements are mostly design requirements. Hence, when a system is analyzed to gather ts functionalities, use cases are prepared and actors are identified.

The use case for handling IoT based Healthcare Kit involves various modules and working of it which is represented in diagrammatic way. Use case helps in understanding the function of managing system i.e. what are the role that are being played by managing system. Hence use case provides an easier way for understanding the roles of the actors to the different users involved in project. In this project managing system is the major actor its performs various tasks such as Registration, Booking Appointments, Medical Records, Chatbot etc. Thus different users can understand role of actor by having a glimpse of use case diagram.

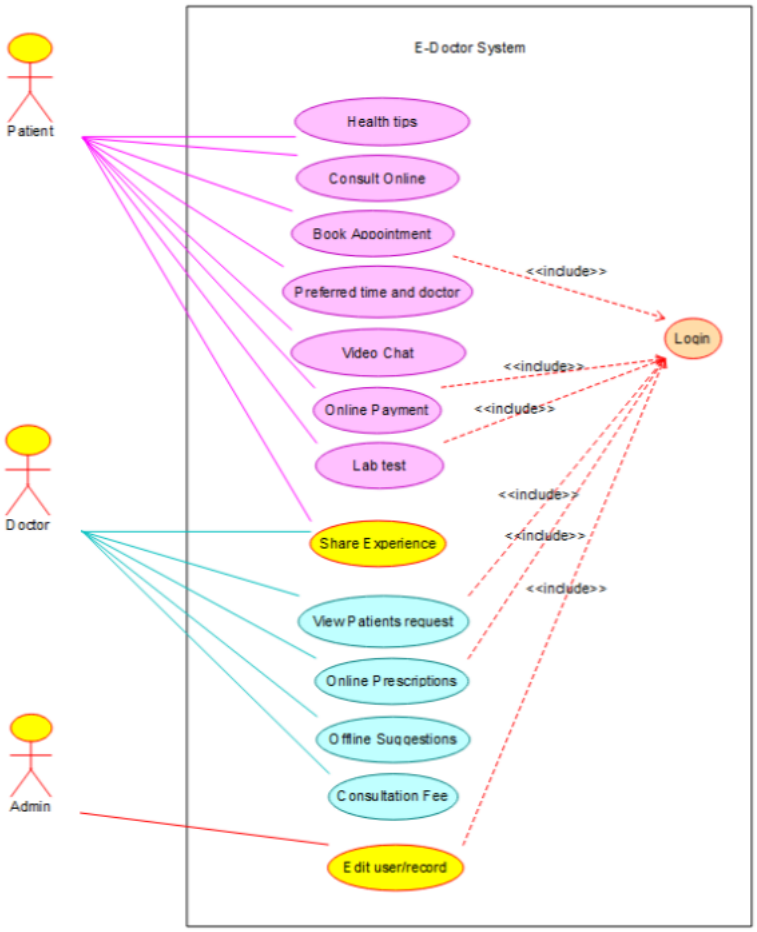


Figure 3.1: Use Case Diagram

### 3.1.2 Class Diagram

Class diagram is a static diagram. It represents the static view of an application. Class diagram is not only used for visualizing, describing, and documenting different aspects of a system but also for constructing executable code of the software application. Class diagram describes the attributes and operations of a class and also the constraints imposed on the system. The class diagrams are widely used in the modeling of object oriented systems because they are the only UML diagrams, which can be mapped directly with object-oriented languages. Class diagram shows a collection of classes, interfaces, associations, collaborations, and constraints. It is also known as a structural diagram.

Class diagram in IoT based Healthcare Kit with Chatbot helps in understanding various different modules that are functioning such as Patient History module, Doctor module, Patient module and Bill module. Class diagram not only provide visual overview of project instead it helps in understanding various operations that a particular module performs. It also helps in understanding various attributes involved in the project. Class diagram also explains the interfacing components that plays an vital role in functioning of main modules.

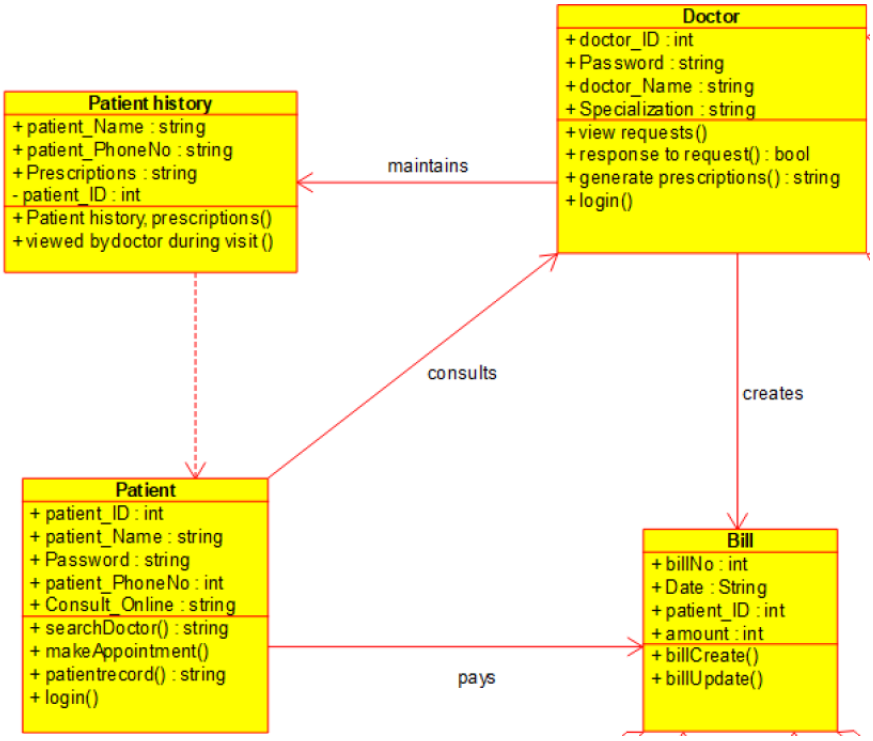


Figure 3.2: Class Diagram

## 3.2 Flow of Modules

The project flow is divided into of sequence of activity following one after the another starting from usage of the IoT based Healthcare kit, storing the values in the cloud and using them whenever required, Ease the accessibility by making a web based portal, and finally to dashboards are created one for doctor and other for patient to interact with each other.

To make this model working the project is divided into three main sub modules starting from IoT based Healthcare kit followed by AWS cloud and web based portal module.

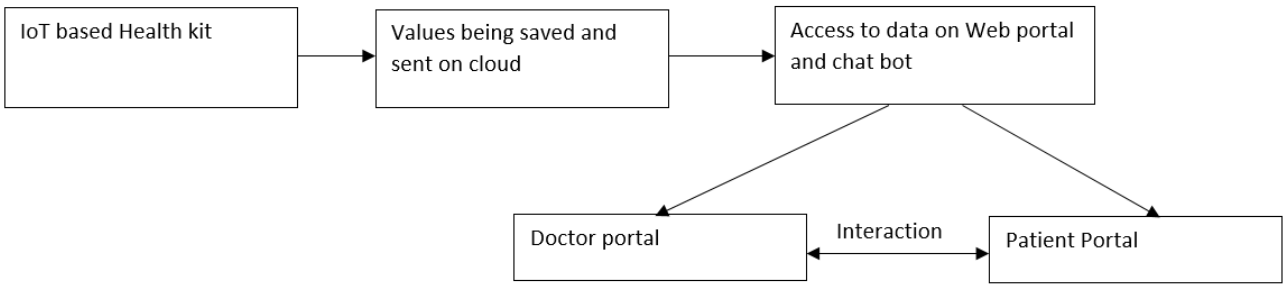


Figure 3.3: Flow of Modules

### 3.2.1 IoT based Kit

- The kit includes a Blood pressure sensor module that uses 5V.
- A Temperature sensor that requires 3V – 5V and can go up to 50 degrees Celsius.
- A Pulse Oximeter MAX30102 in which oxygen is in percentage and the heart rate is measured in BPM.
- The wearable sensors will collect the health parameters and their value will be displayed on the screen.

### 3.2.2 AWS Connectivity

- The data collected from the sensors is then sent to the cloud.
- Since the device gateway is built on top of MQTT, it uses the Publish-Subscribe programming model that allows one-to-many connectivity between different devices.
- The registry feature establishes an identity for the device and keeps track of the meta-data of the connected devices.

### 3.2.3 Web-based portal and Chatbot

- This processed data is then accessed through Web and Mobile Applications.
- This application consists of two main interfaces: the user side and the doctor side.
- Along with this application, we are providing an additional feature of chatbot.
- The chatbot collects the keywords from the initial messages and then asks questions related to the options that are being selected and by doing so it concludes and suggests remedies and medications to the user.

# Chapter 4

# Project Implementation

The healthcare sector in India lacks three major factors that are supply, utilization, and equipment. The IoT healthcare kit is one of the vital elements of the IoT in healthcare. It facilitates the transmission and reception of records and enables the use of tailored health communication. Fig. 4.1 demonstrates the flow of our healthcare system.

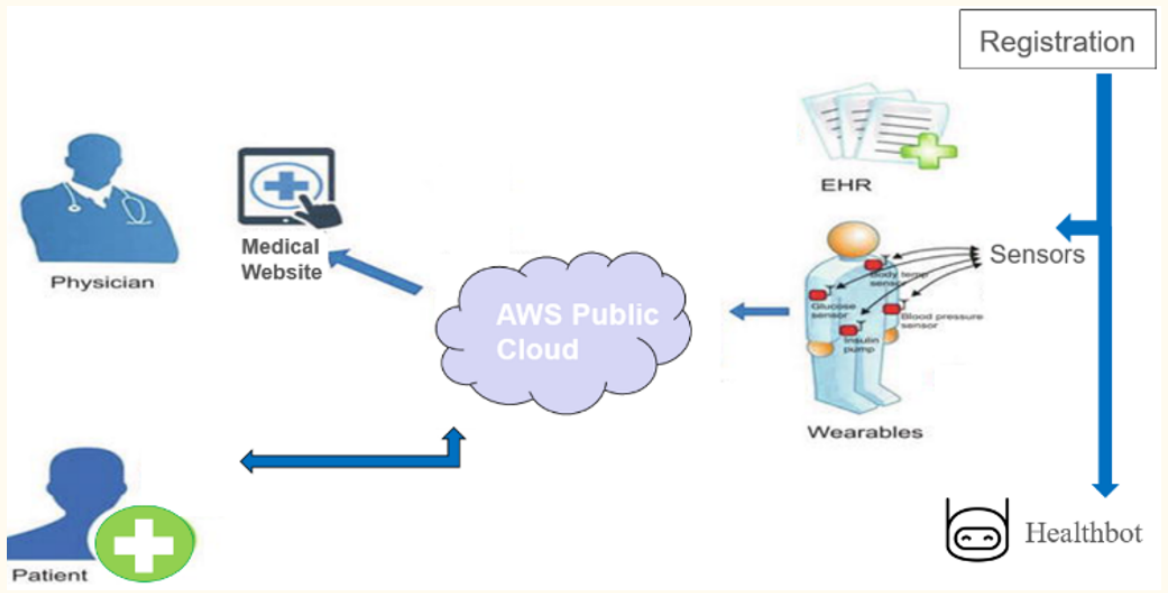


Figure 4.1: Flow of healthcare system

To use the kit, the patient first needs to register themselves to the system. After registration, the patient can then wear the connected sensors to get their health parameters monitored. This data is then sent to the cloud where it will be stored and an Electronic History Record (EHR) of each patient will be maintained for future usage. A web based application is used where the available doctors from any location can then analyze the patient's records and notify them of their results. The application enables us to monitor the user's health while providing access to all the earlier data to lessen the hassle and improve the lifestyle of individuals. Furthermore, the website will include health blogs, the history of the patient, and a chatbot that will provide a Self- assessment of mild symptoms.For better understanding, the proposed system has been divided into four sub-topics:

1. IoT based Healthcare Kit

2. Connectivity with Cloud
3. Web-based Portal
4. Chatbot

## 4.1 IoT Based Healthcare Kit

Nextion is a Human Machine Interface (HMI) solution. Nextion displays are resistive touch-screens that makes it easy to build a Graphical User Interface (GUI). It is a great solution to monitor and control processes, being mainly applied to IoT applications. There are several Nextion display modules, with sizes ranging from 2.4" to 7". The Nextion has a built-in ARM microcontroller that controls the display, for example it takes care of generating the buttons, creating text, store images or change the background. The Nextion communicates with any microcontroller using serial communication at a 9600 baud rate. So, it works with any board that has serial capabilities like Arduino, Raspberry Pi, ESP8266, ESP32, and so on. Here we have developed the GUI for the LCD screen that will be used in our project.


Fig.1 Selection of language

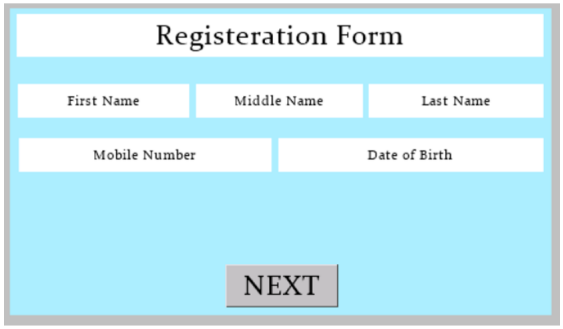


Fig.2 Registration form

The kit has an inbuilt display that will be used to interact with the users. The screen displays different languages as shown in Fig.1. After the selection of language, the user needs to register itself which will create a profile for the user as shown in Fig.2 .

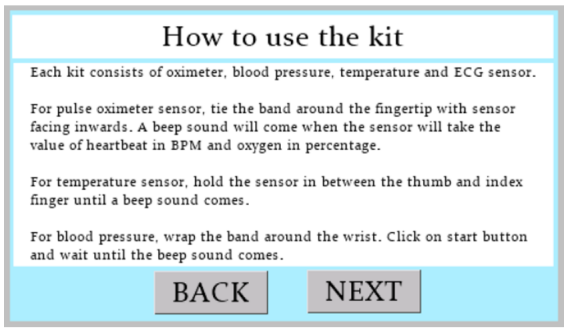


Fig.3 Instruction manual

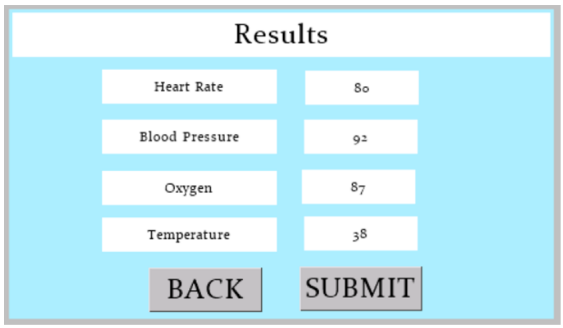


Fig.4 Results

After registration, the instruction manual for usage of the kit will appear as shown in Fig.3 , so that the user comes to know how to use the kit without any difficulty. Finally,

the last step would be to use the sensors. The kit includes a Blood pressure sensor module that uses 5V, a Temperature sensor that requires 3V – 5V and can go up to 50 degrees Celsius, and Pulse Oximeter MAX30102 in which oxygen is in percentage and the heart rate is measured in BPM. The wearable sensors will collect the health parameters and their value will be displayed on the screen. (Fig.4)

## 4.2 Connectivity with Cloud


Figure 4.2: Flow diagram of storing sensor data

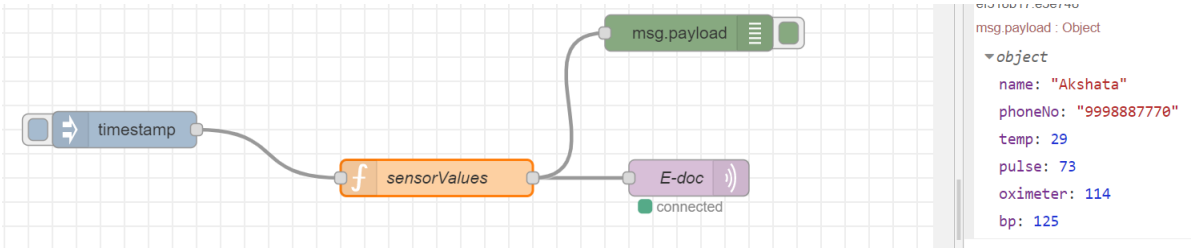


Figure 4.3: Node-RED Flow diagram

The above diagram represents how we will send the sensor data from Node-RED to AWS IoT core.

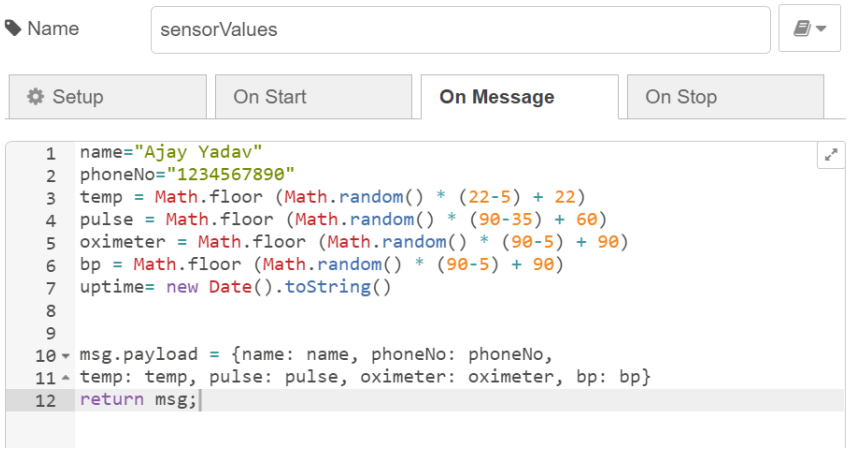


Figure 4.4: Function node - sensorValues

First, we have created a function 'sensorValues' for generating random data for our sensors. This function node is then connected to the E-doc node which is the MQTT Out node for publishing data. In MQTT out node, we have added the device data endpoint to connect to AWS, then uploaded the required certificates in TLS configuration, and lastly entered a topic name. We will then deploy our flow and send the data to AWS.

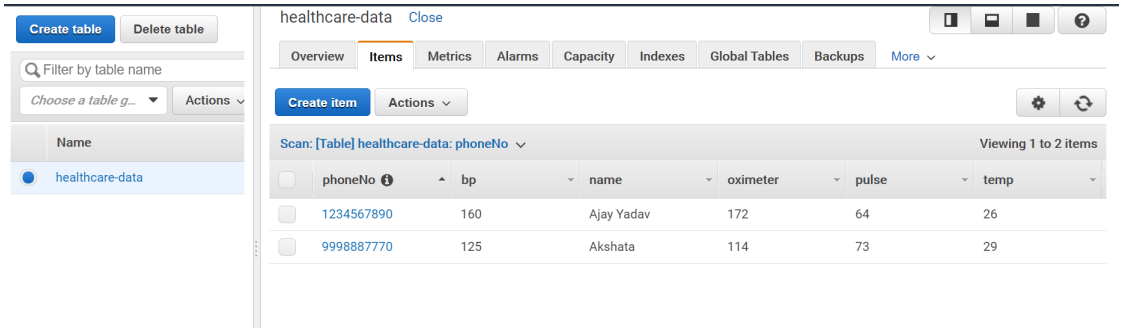


Figure 4.5: DynamoDB healthcare-data table

For storing the received data we have used the Amazon DynamoDB service. It is a NoSQL database service that supports key-value and document data structures. In DynamoDB, we have built a table named healthcare-data. Using the Rules engine we have defined a Rule in the AWS IoT, that will store sensor data received from Node-RED MQTT directly into DynamoDB. From Fig.4.5 we can see that the data sent from Node-RED is getting stored in our DynamoDB healthcare-data table.


Figure 4.6: Flow diagram of retrieving sensor data

Now to get the data from DynamoDB we have written a Lambda function. Then we created a REST API for our lambda function using Amazon API Gateway. This REST API uses a request/response model where a client sends a request to a service and the service responds synchronously.

## 4.3 Chatbot

Rasa is an open source machine learning framework for building AI assistants and chatbots. It has two main modules:Rasa NLU for understanding user messages and Rasa Core for holding conversations and deciding what to do next. Here we have made a chatbot in the area of healthcare. Following is the snippet for the terminal version of the chatbot.


Figure 4.7: Terminal view of Chatbot

# Chapter 5

# Testing and Result

## 5.1 Testing

For simulation of any IoT kit Tinkercad is used. Tinkercad is a free and simple 3D design, electronics, and coding program. It's also noted for its ease of use and simplicity. Here we have used Arduino UNO, Oximeter MAX 30100, Temperature Sensor TMP 36, Pressure Sensor BMP 180, Capacitor, Resistor and LCD to develop our Healthcare kit. It will provide with Temperature, Blood Pressure, Heart Rate and Oxygen level.

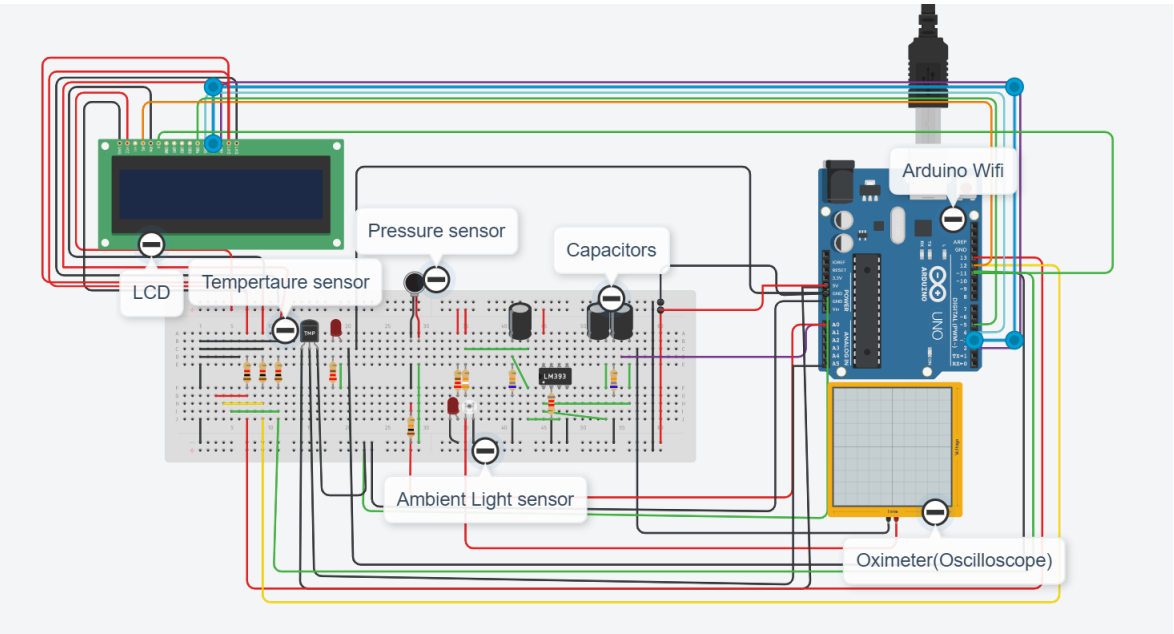


Figure 5.1: Healthkit Circuit Diagram

The sensor values are sent to AWS and this flow of the data is shown in Node-RED as shown in fig.5.2 . Node-RED is a flow-based development tool for visual programming developed originally by IBM for wiring together hardware devices, API and online services as part of the Internet of Things. Node-RED provides a web browser-based flow editor, which can be used to create JavaScript functions.

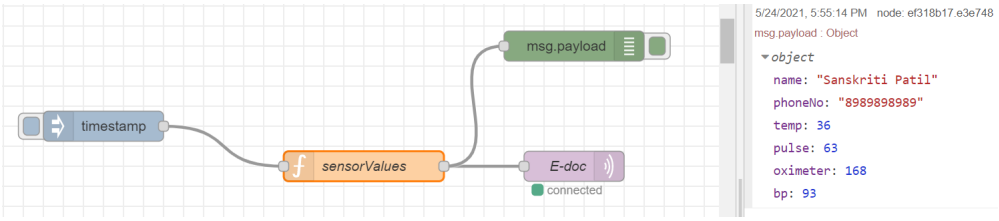


Figure 5.2: Flow diagram of Node-RED

We have used MQTT test client to monitor the MQTT messages being passed to AWS. Devices/Node-RED publish MQTT messages that are identified by topics to communicate with AWS IoT. To test this, we have subscribed to our MQTT message topic and from the diagram we can see the incoming data from node-RED.(fig. 5.3)


Figure 5.3: Flow diagram of MQTT

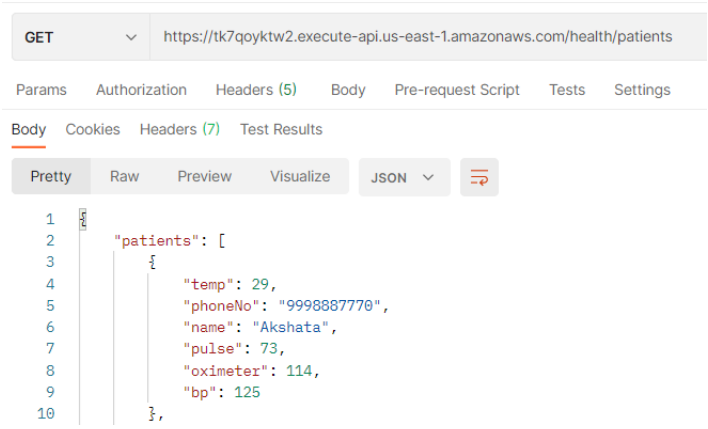


Figure 5.4: API Testing using Postman

For API Testing we have used Postman. Here, Get requests are used to retrieve the information from the Invoke URL we received from AWS. From the fig.5.4 we can see the GET request being successful.

## 5.2 Result

The result will be displayed on the website. This can again be divided into 3 sections:

- Patient Side
- Doctor Side
- Admin Dashboard

### 5.2.1 Patient Side

A Healthcare bot is a technology that makes the interaction between man and machine possible by using natural language processing with the support of Rasa. The basic aim of this system is to bridge the vocabulary gap between the doctors and patients by providing replies to the questions asked by the patients.

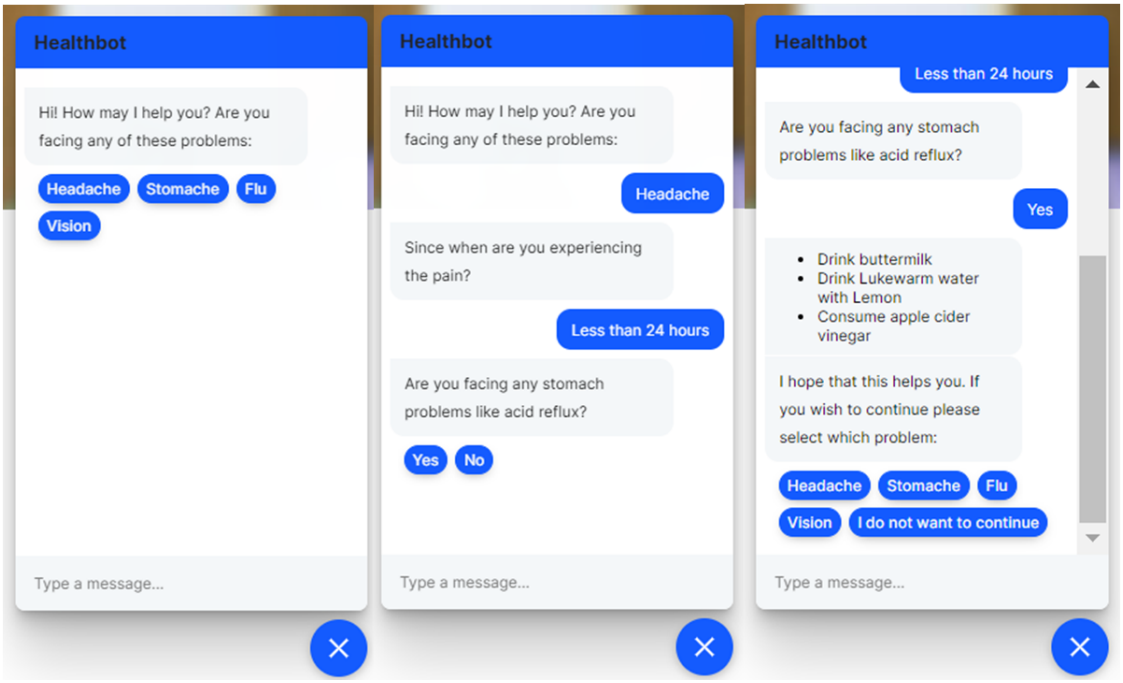


Figure 5.5: Rasa based Chatbot

The chatbot uses intents and entities for implementing a smooth conversation and then leading to a final diagnosis by an effective text-based diagnostic technique. Every question asked by the chatbot has multiple options for the user to select. The objective of this is for the chatbot to collect the keywords from the initial messages. It will ask questions related to the options that are being selected and by doing so it concludes and suggests remedies and medications to the user, as shown in Fig.5.5.

The patient portal will able to see all the features available in the website.It has features like publishing articles and workshops to ensure that the users get to grow knowledge in the healthcare domain. The homepage has basic amenities like book an appointment, blogs,

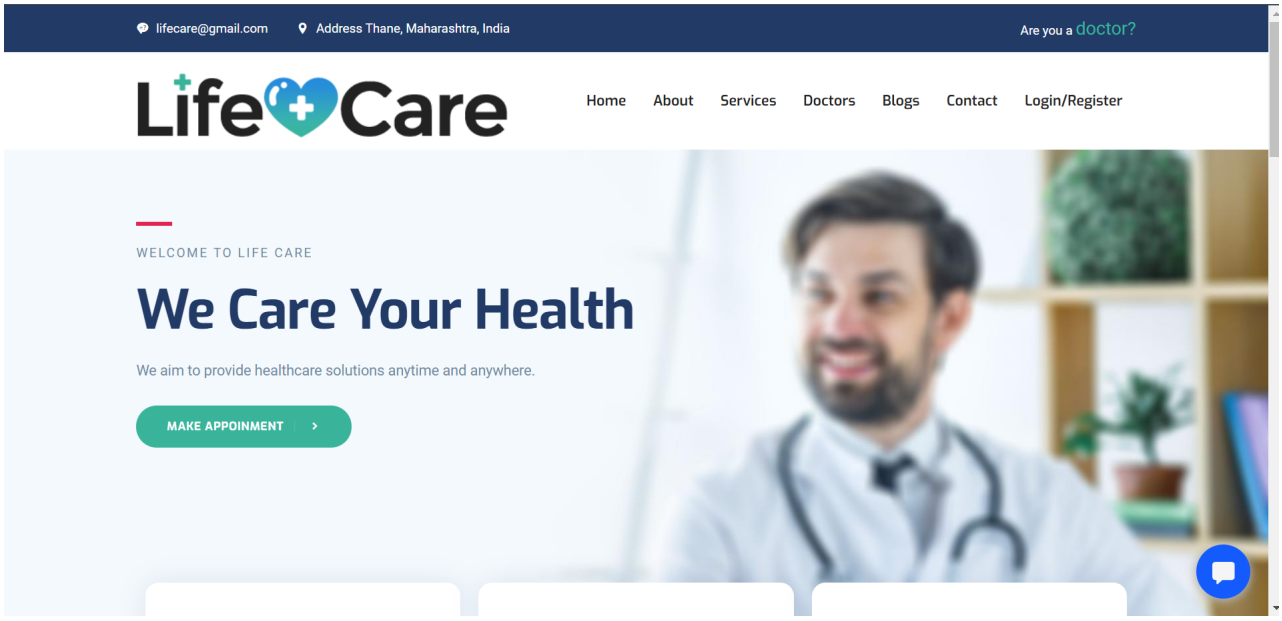


Figure 5.6: Website Front end for both patient and doctor

about us, login/register. Once the user/patient signs up he will have to completely use the website.

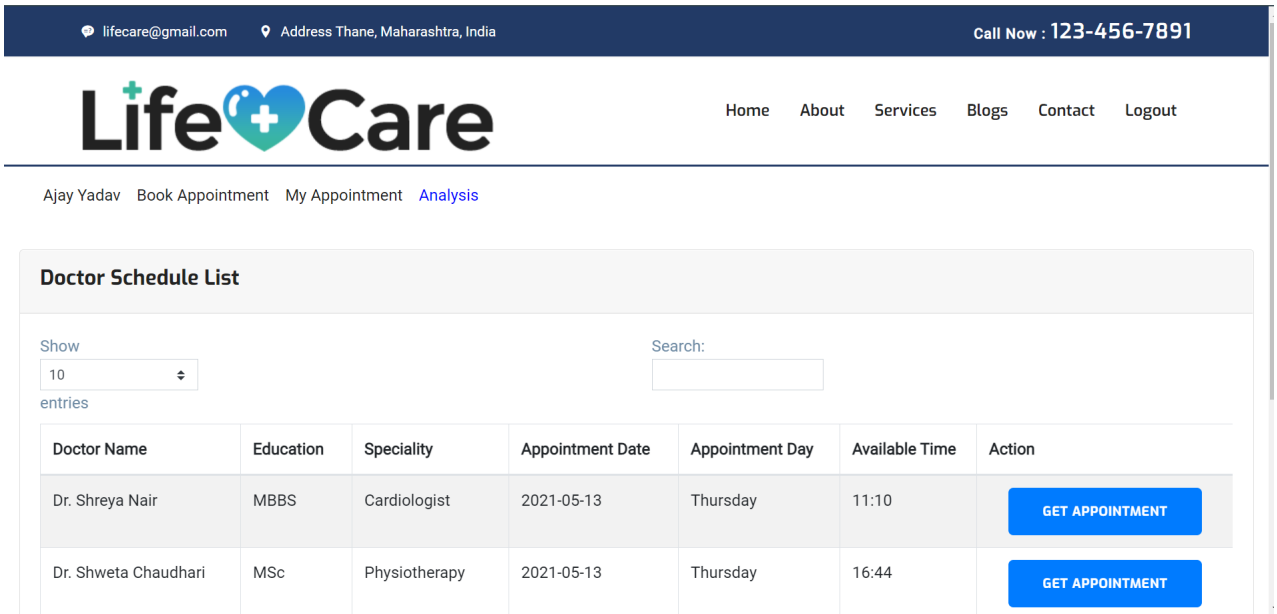


Figure 5.7: Doctor's List for Patient to book appointment

After the patient signs up, the patient will able the see the doctors that are associated with our website. The schedule and availability of doctors can also be seen as shown in fig. 5.7. The patient can book an appointment according to the doctors specification. He also has the right to cancel the appointment. The analysis and the report done by sensors can also been seen in the patient's portal.

### 5.2.2 Doctor Side

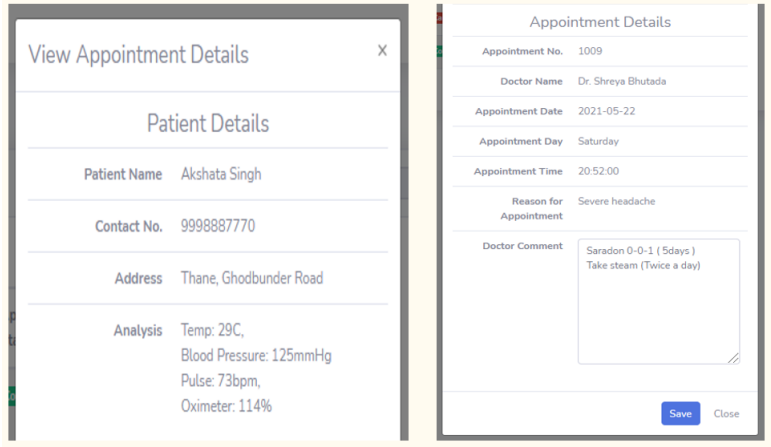


Figure 5.8: Patient's appointment with all health parameters and doctor's prescription

The doctor's side portal will get access to each of their patient's documents as shown in Fig.5.8. They can edit their profile and accept/reject an appointment of the patient. The doctor can add the prescription in the details only to avoid any complexity. If required, then the doctor can ask the patient to come for a visit or else the diagnosis can be done online itself.As all the data is stored in the cloud doctor from any location can analyze the patient's records and notify them of their result.

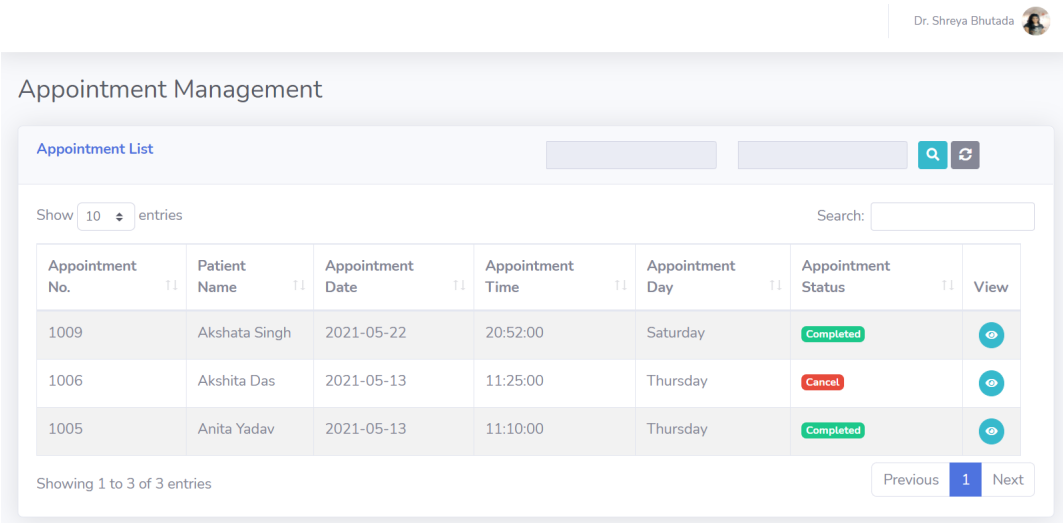


Figure 5.9: Doctor's Schedule the timing where patients can book appointment

But first, they need to schedule their availability, so that patients can see when the doctor is present to book the appointment as shown in fig. 5.9. When the doctors schedule their timings then only the patients can see and book an appointment.

### 5.2.3 Admin Side

The admin is can overview the entire portal.The admin has a dashboard which lets him to analyze total appointment till date and total registered patient as shown in fig. 5.10.

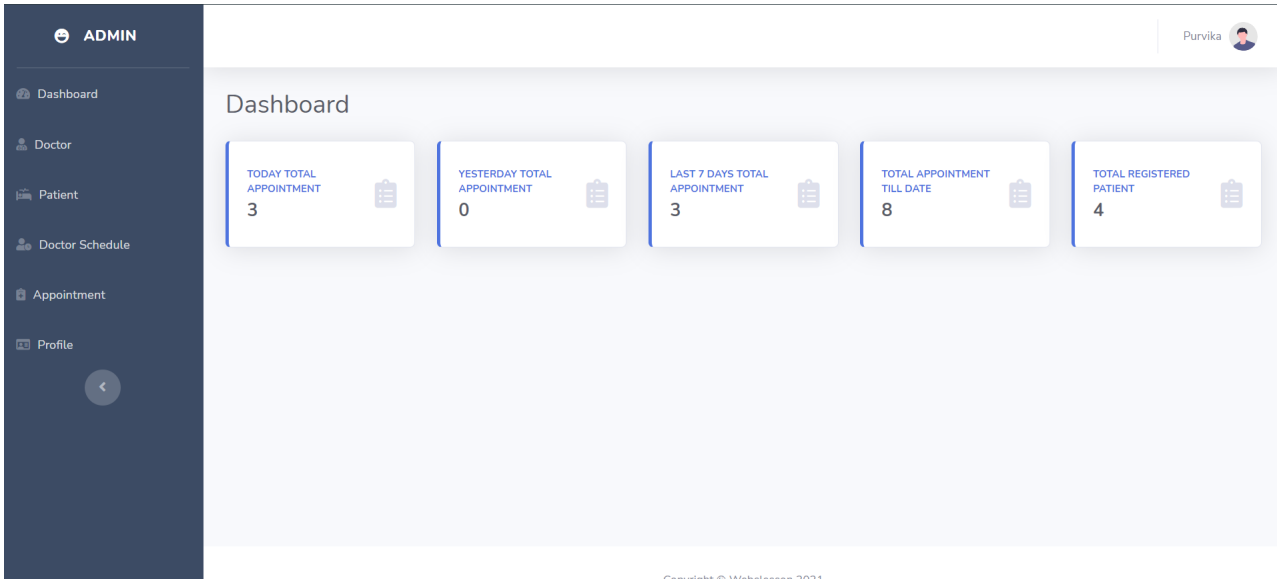


Figure 5.10: Admin's Dashboard

He can see the newly registered doctors and patients. He has the right to inactive the doctor if he is not available. The admin can see the schedule of all the doctors. He can also check the appointments for a particular doctor and can see till what process the doctor has been in terms of completion. He has the right to add or remove doctors as shown in the given figure.

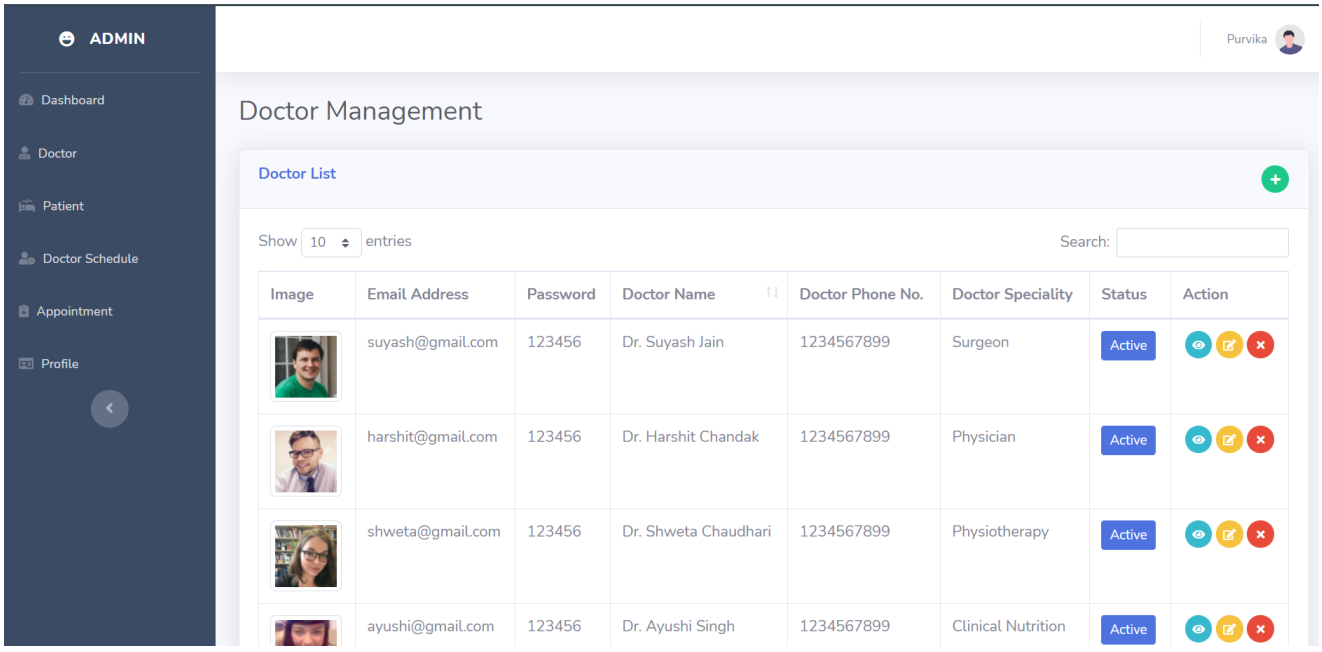


Figure 5.11: Admin side Doctor Management

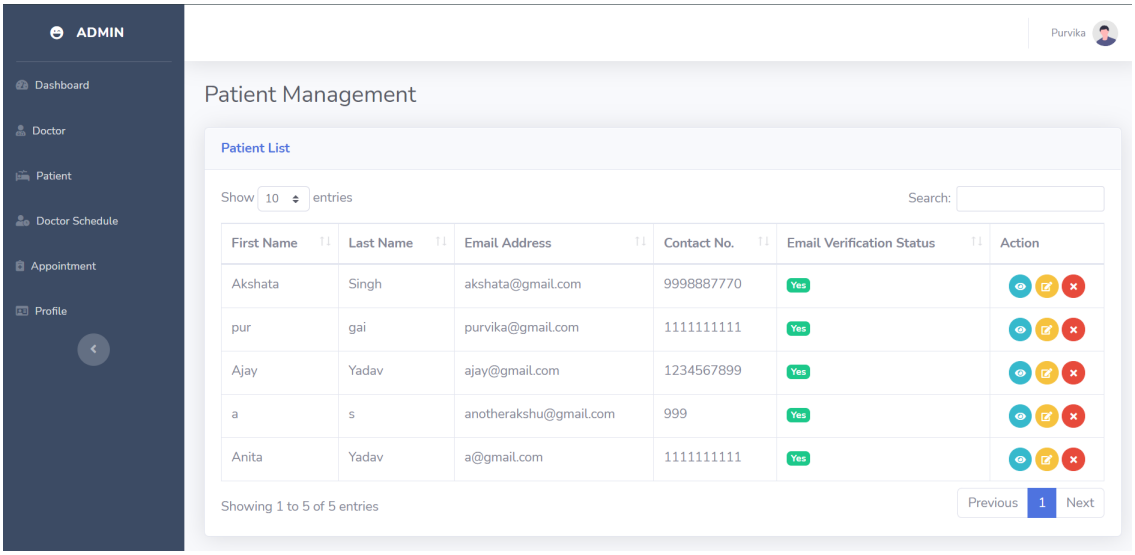


Figure 5.12: Admin side Patient Management

## 5.3 Project Timeline Chart

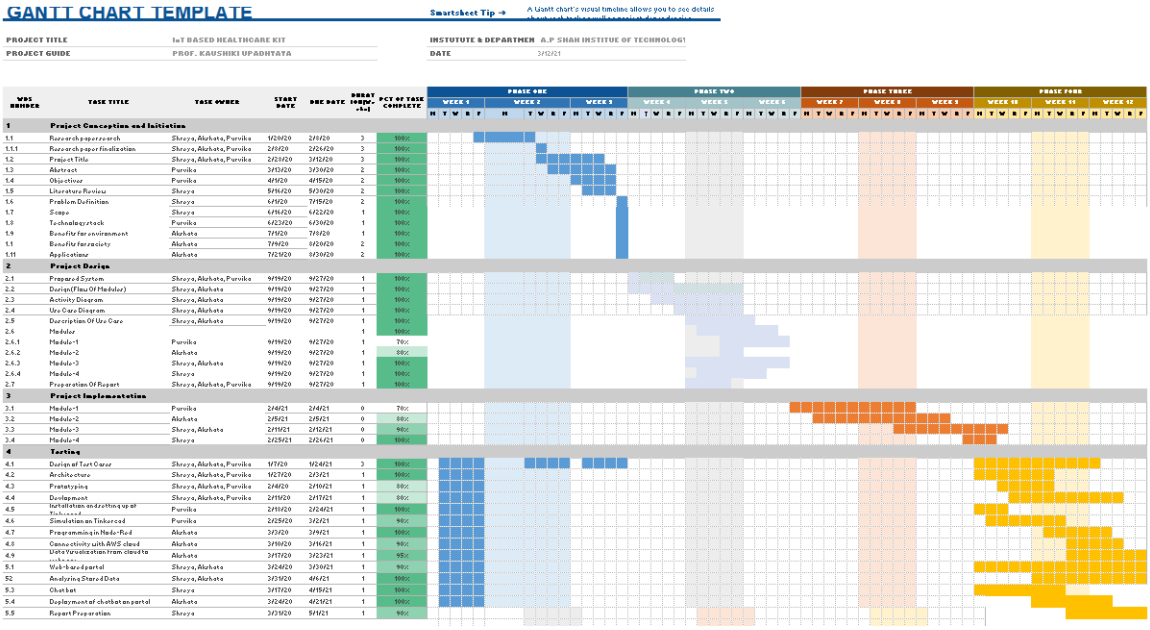


Figure 5.13: Project Timeline Chart

# Chapter 6

# Conclusions and Future Scope

## 6.1 Conclusion

The proposed system provides healthcare solutions anytime and anywhere. It will majorly benefit people living in the rural areas as well as the elderly and disabled people. Internet based Things system obtains real-time medical information about a patient and stores it in the cloud as Electronic Health Record which helps in data management. The health bot helps in better understanding of the medical terminologies and provides a customized service to the patients via text analysis.This integration of chat bot would decrease time and expenditure of patients.Our web application along with health bot can contribute to ease of accessibility to the masses as it can be used by rural people through web-based portal. We aim to make virtual assistance to doctors, patients, and workers to build better and well-connected healthcare for society.

## 6.2 Future Scope

A survey will be made to analyze what type of illness is majorly caused in every region and according to that the supply of medicines to the respective regions can be added.The doctors can directly send the prescription of patients to the pharmacy. An enhanced version of a health bot can be developed to solve complicated issues and provide more options for consultation.

## 6.3 Benefits for Environment and Society

- Useful in the healthcare sector, mainly in rural areas, where there are limited facilities of resources and hospitals.
- The web portal and chatbot will help decrease time and expenditure of patients.
- Casing used for the development of a healthcare kit will be made from a biodegradable material.
- As this kit doesn't require any paperwork, we will be saving a lot of wood and electricity consumption.Therefore, it is not going to contribute to any sort of land pollution.

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