Department of Information Technology
NBA Accredited

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UNIVERSITY OF MUMBAI

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A Project Report on

IoT based Healthcare kit with Chatbot

Submitted in partial fulfilment of the degree of
Bachelor of Engineering(Sem-8)

in

INFORMATION TECHNOLOGY

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1.Project Conception and Initiation

1.1 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.
- 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.
- With this in mind, we aim to develop an IoT based healthcare kit with chatbot that provide primary patient monitoring and care assistance to strengthen our country’s healthcare system from rural to urban sectors.
- A web-based application is also provided which is integrated with Chatbot for our system to broaden usability.

1.2 Objectives

- Develop an absolute, portable and cheap system that will be 24/7 available.
- Lessening the communication gap by providing quick access to doctors via web-based portal.
- 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.
- Storing the Electronic Health Record and sensor’s data on Cloud to ease accessibility.
- 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.

1.3 Literature Review

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.

1.4 Problem Definition

- Many rural areas don’t have enough physicians, hospitals and other health care resources to provide quality care for the whole population.
- Long waiting times, long duration between visits and a wide range of other challenges can prevent health care professional from providing the best care possible.
- The websites 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.
- In addition to this, 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.

1.5 Scope

- A valuable asset to Healthcare sector
- Remote Patient Monitoring
- Reduced Healthcare cost
- Care for elderly
- Health Chatbot facility
- Quick access to doctors
- Reduce the pollution by making everything digitally available

1.6 Technology stack

Hardware Components:
Arduino UNO
Oximeter MAX 30100
Temperature Sensor TMP 36
Pressure Sensor BMP 180
Capacitor
Resistor
Touch Display – Nextion 2.4”

Software’s Used:
HTML5
CSS
Bootstrap
JQuery
MySQL
Xampp
Node-Red
AWS
Nextion
Tinkercad

1.7 Benefits for environment & Society

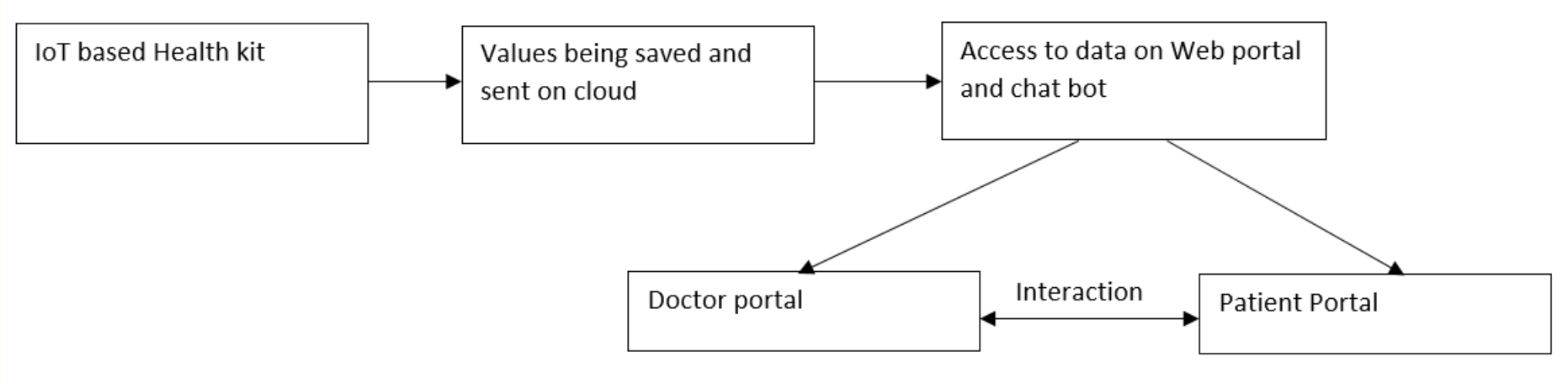
- Useful in the healthcare sector, mainly in rural areas, where there are limited facilities of resources and hospitals.
- Extremely efficient for disabled and old-age people who cannot independently come for regular checkups
- With such feasibility of web portal and chatbot, it will help decrease time 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. No waste will be generated. Therefore, it is not going to contribute to any sort of land pollution.

2. Project Design

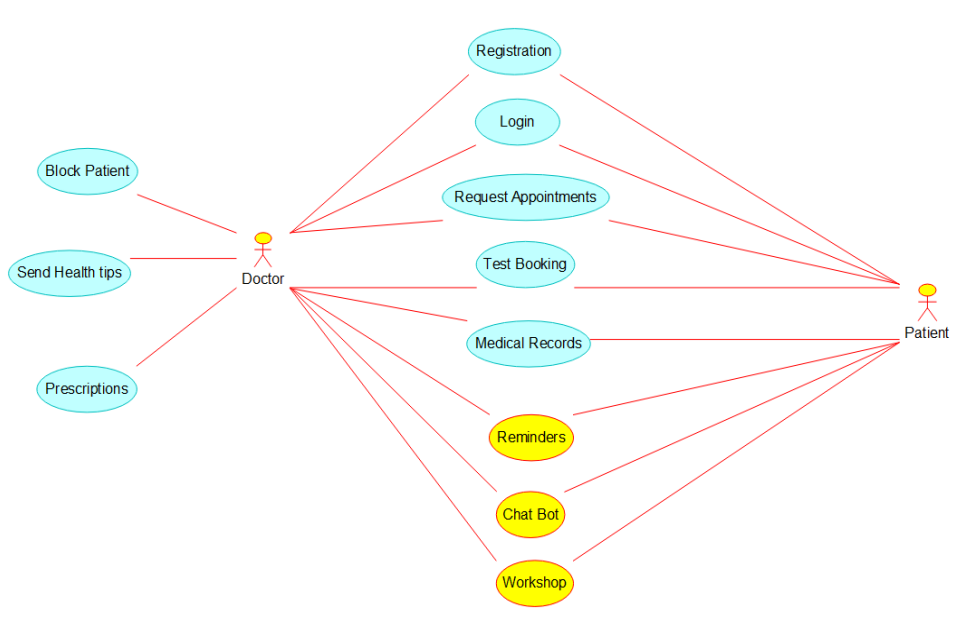
2.1 Proposed System

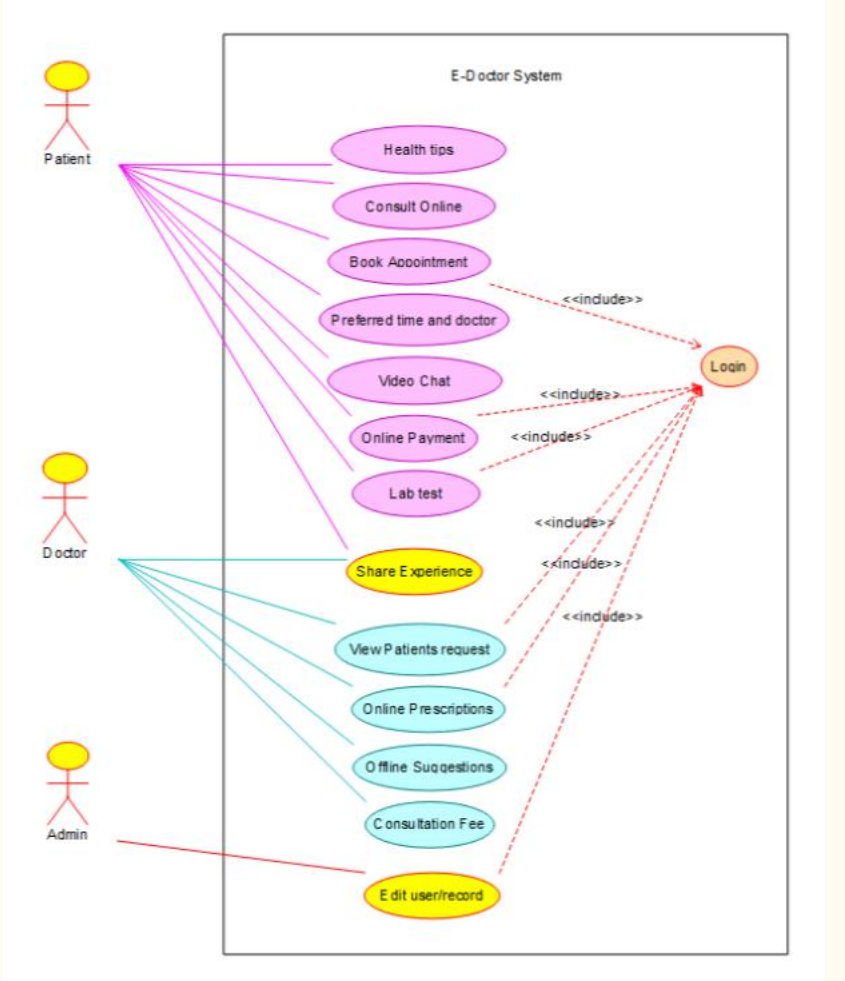
- IoT based Health care kit consisting of:
  - Blood pressure sensor BMP 180
  - Temperature sensor TMP 36
  - Pulse Oximeter MAX30100
- Kit is connected to Node-Red for database management.
- Website based application for better understanding of data and easy usability.
- Integration of Chatbot in the application programmed with Rasa.

2.2 Design(Flow Of Modules)

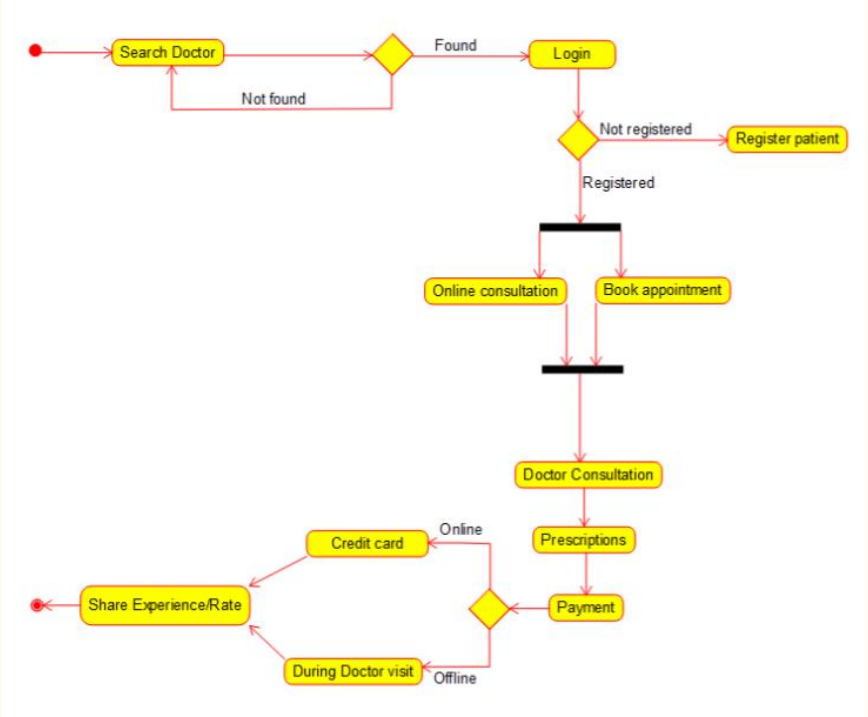


2.3 Description Of Use Case

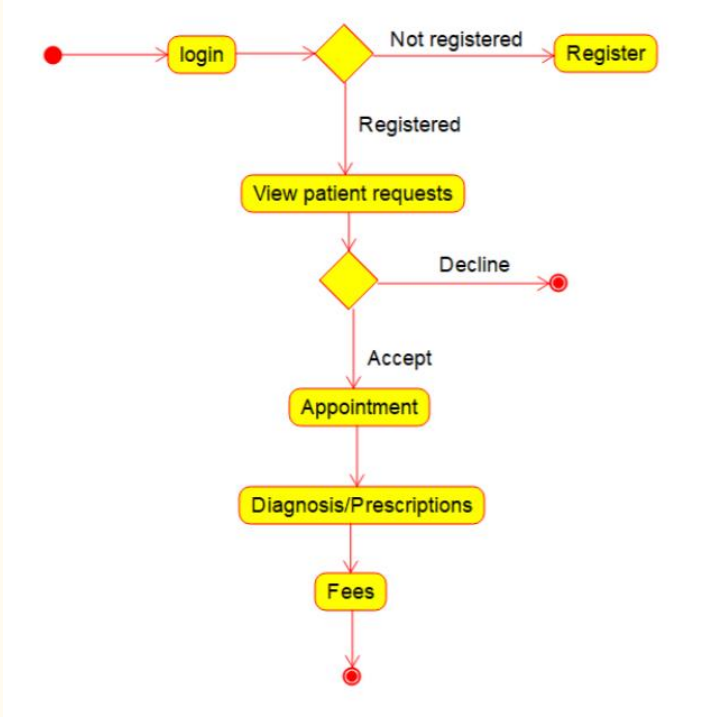




2.4 Activity diagram

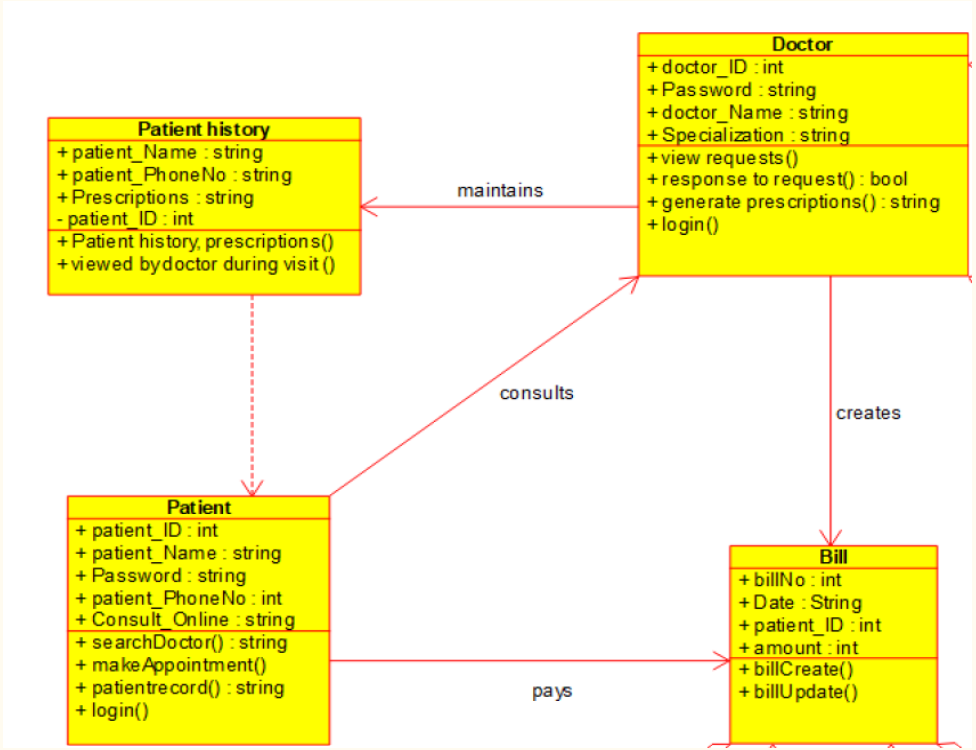


Activity diagram of a patient consulting a doctor in our system



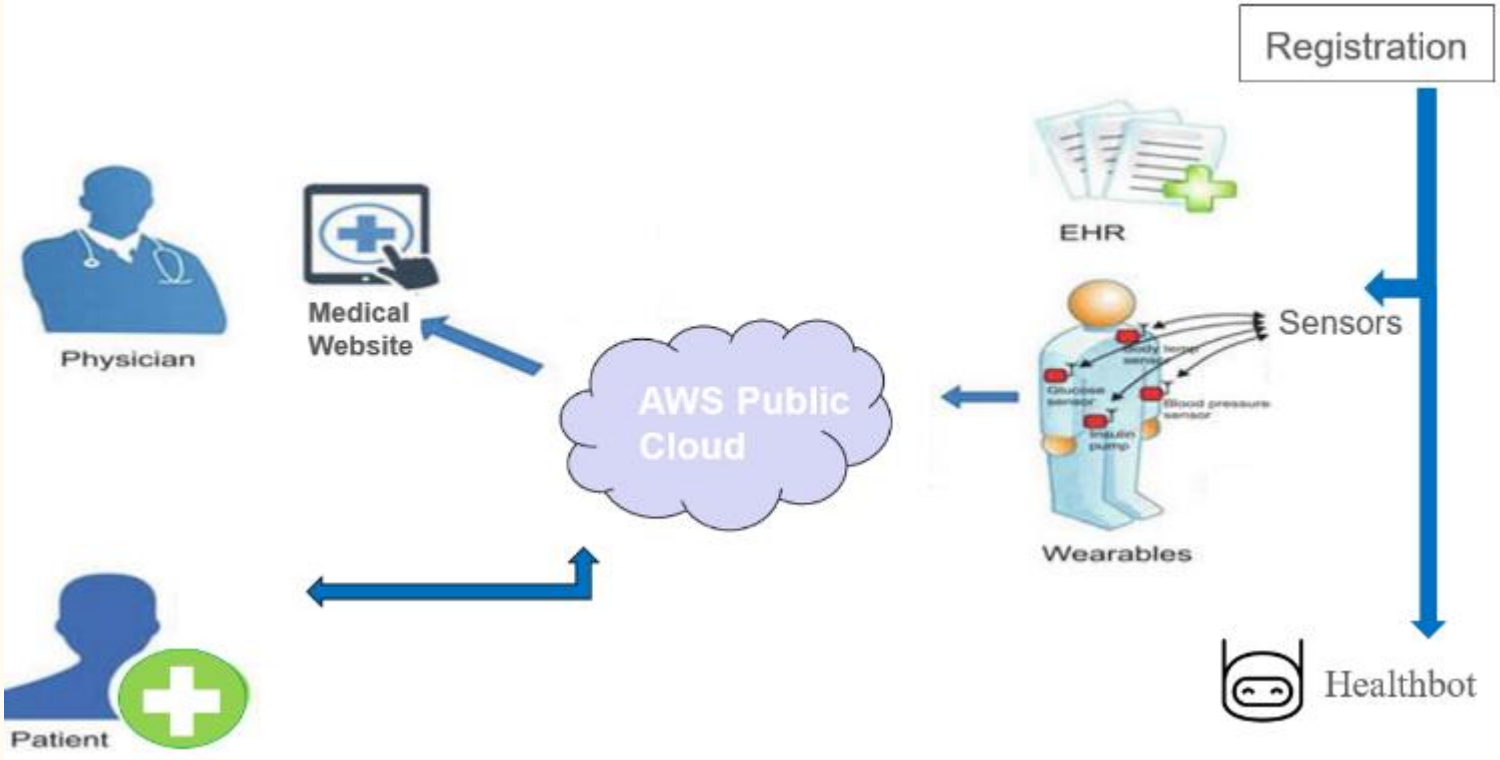
Activity diagram of doctor viewing the request in our system

2.5 Class Diagram

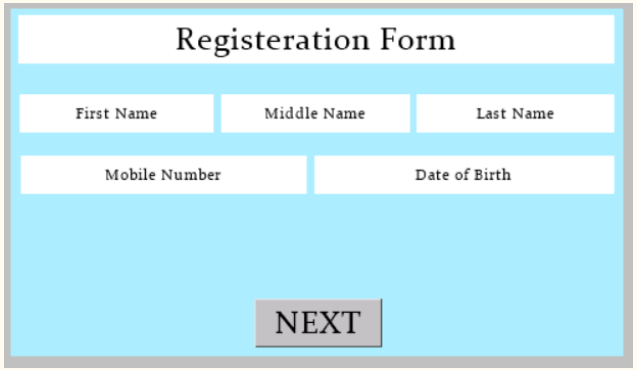


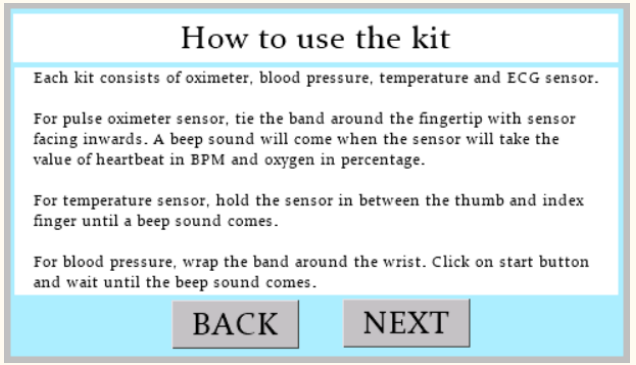
3. Implementation

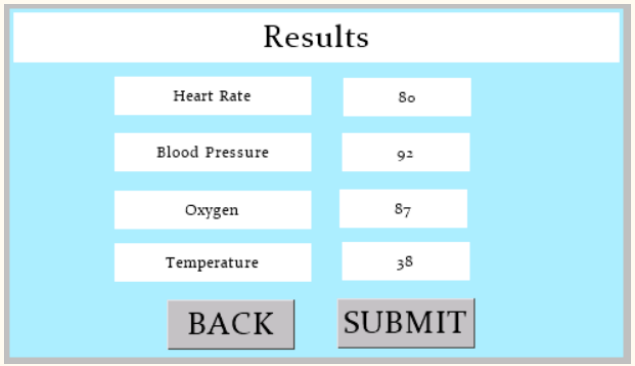
3.1 Implementation



3.2 Implementation – Health kit GUI







3.4 Implementation – Sensor to Cloud flow diagram

Fig. Flow diagram of storing sensor data

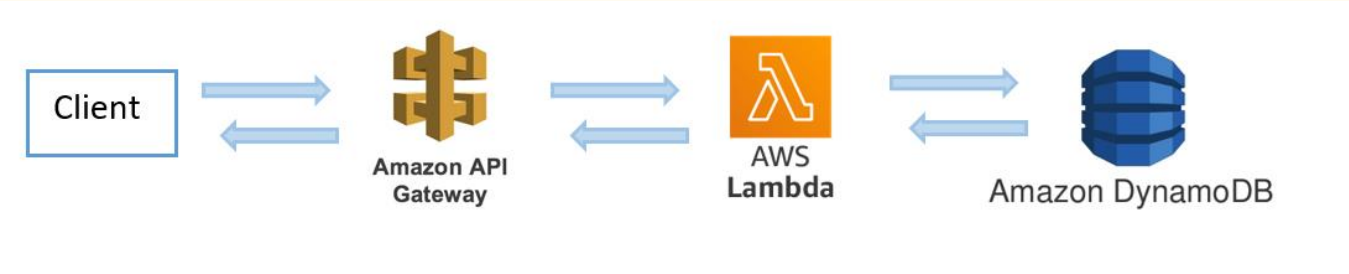
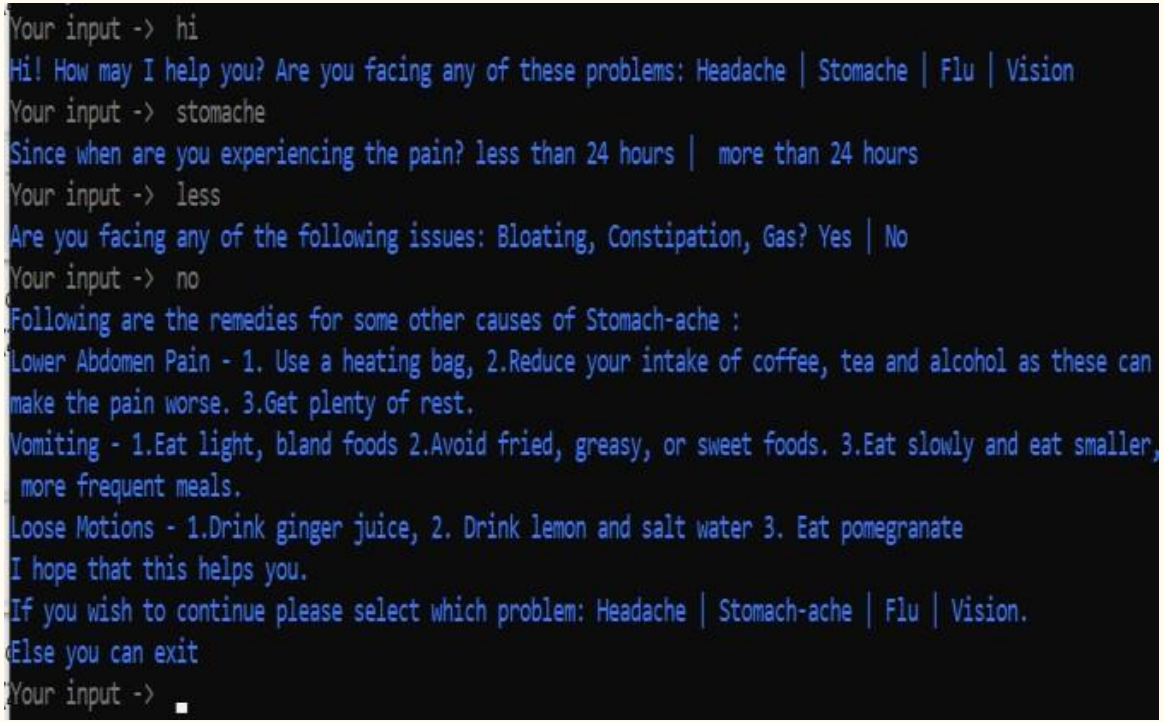


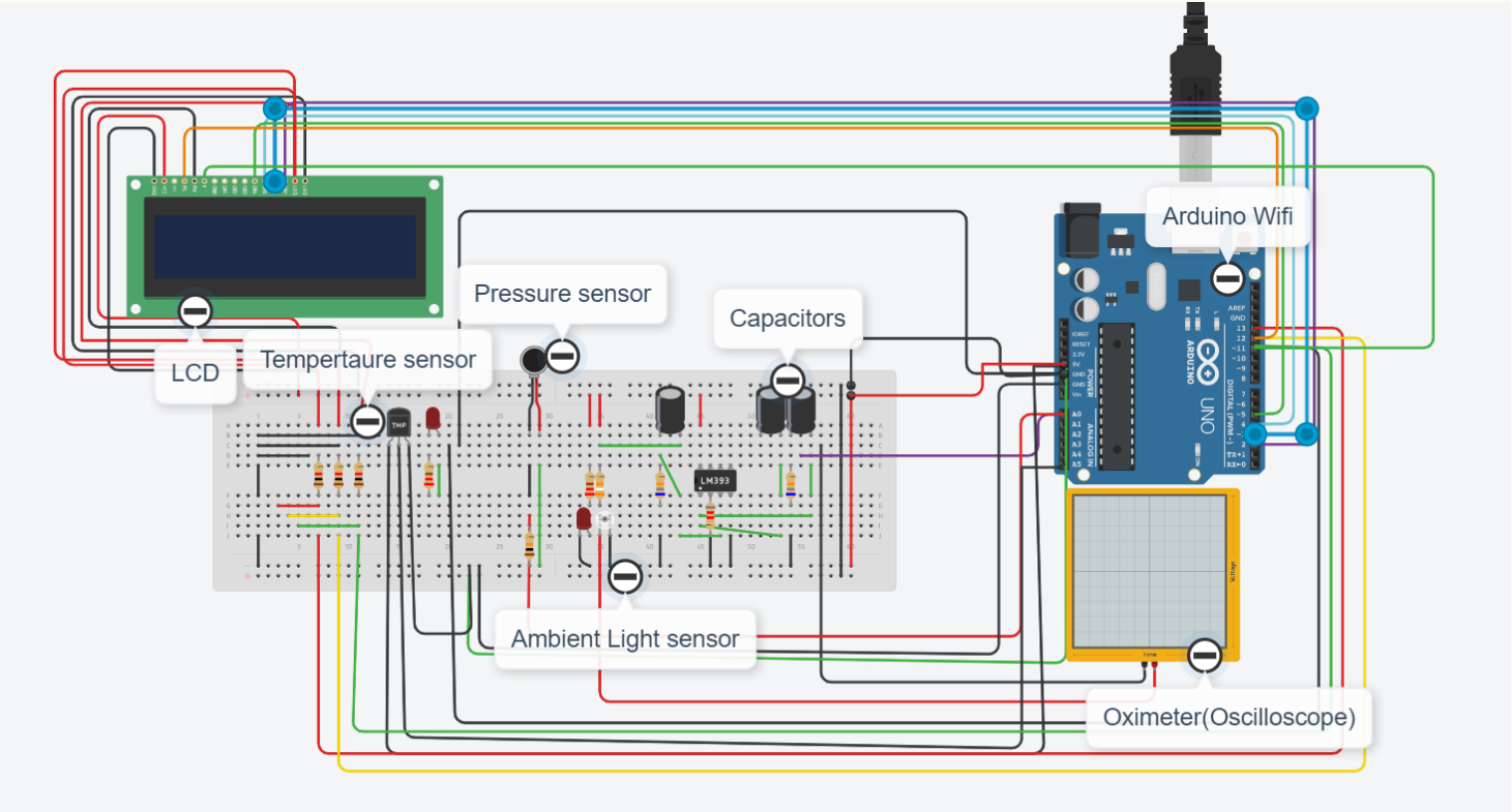
Fig. Flow diagram of retrieving sensor data

3.5 Implementation – Rasa Chatbot on Terminal

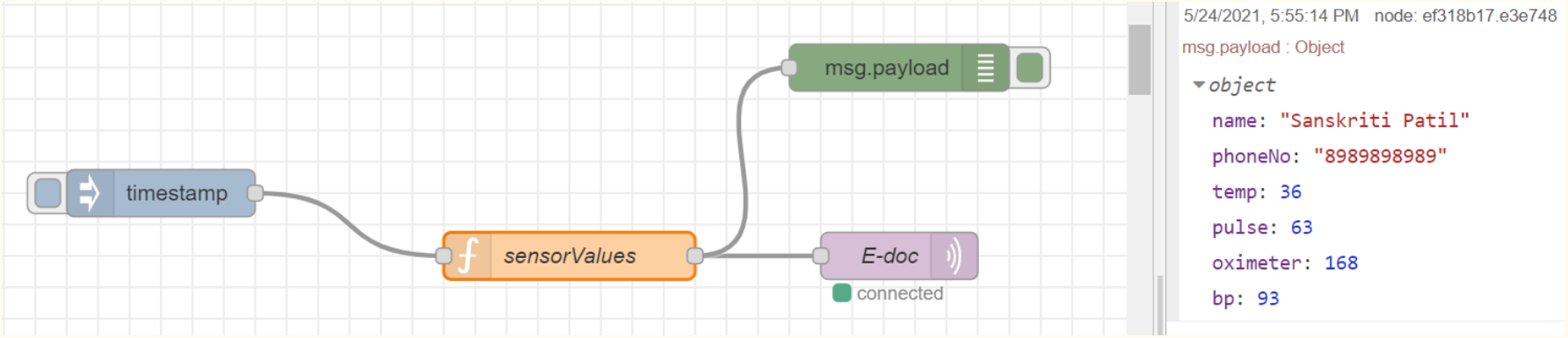


4. Testing

4.1 Testing – Circuit Diagram



4.1 Testing – Node Red



4.2 Testing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Clear
Export
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edoc
edoc
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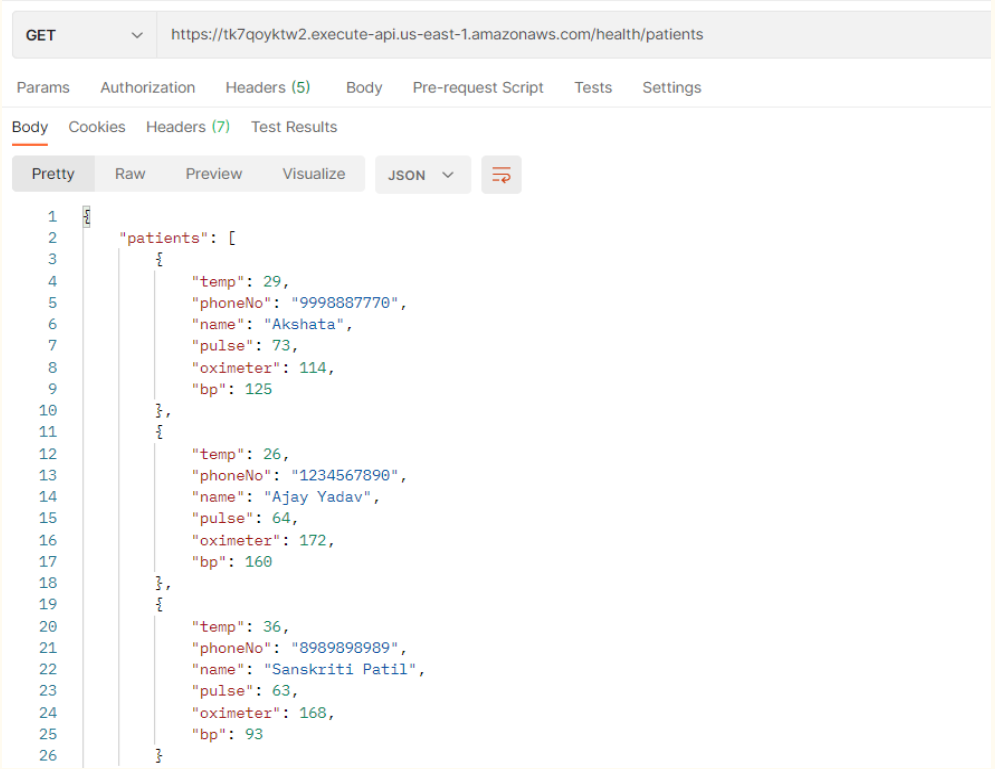
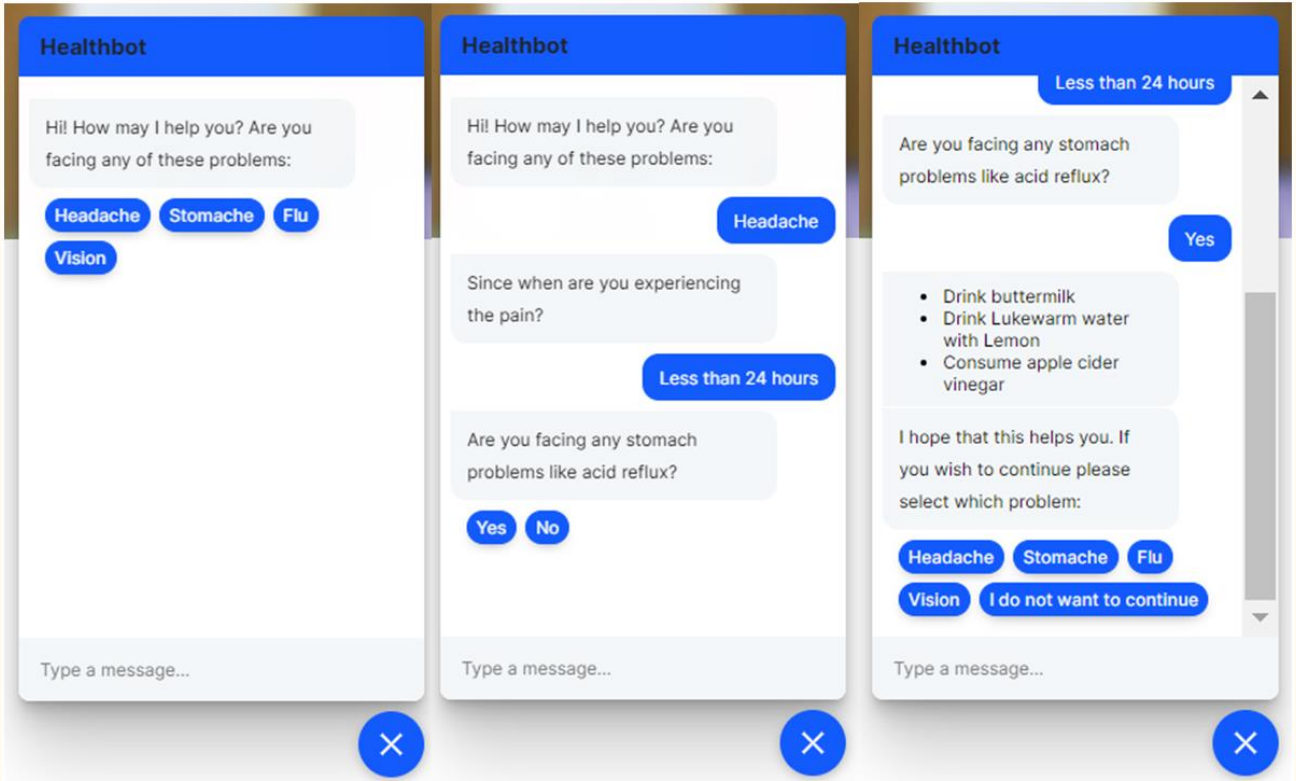
4.4 Testing – Database Management

4.5 Testing – API testing

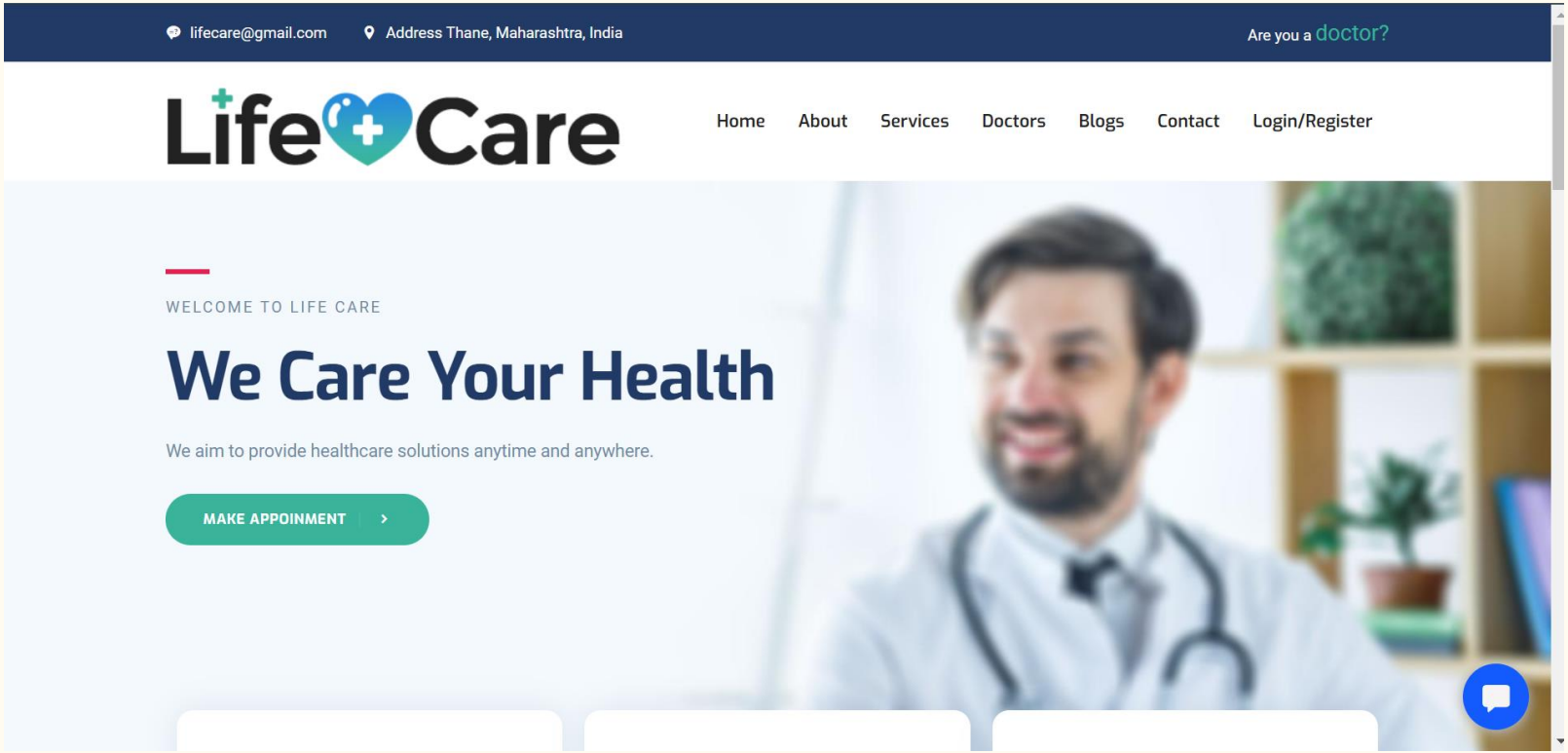


4.6 Testing– Health Bot

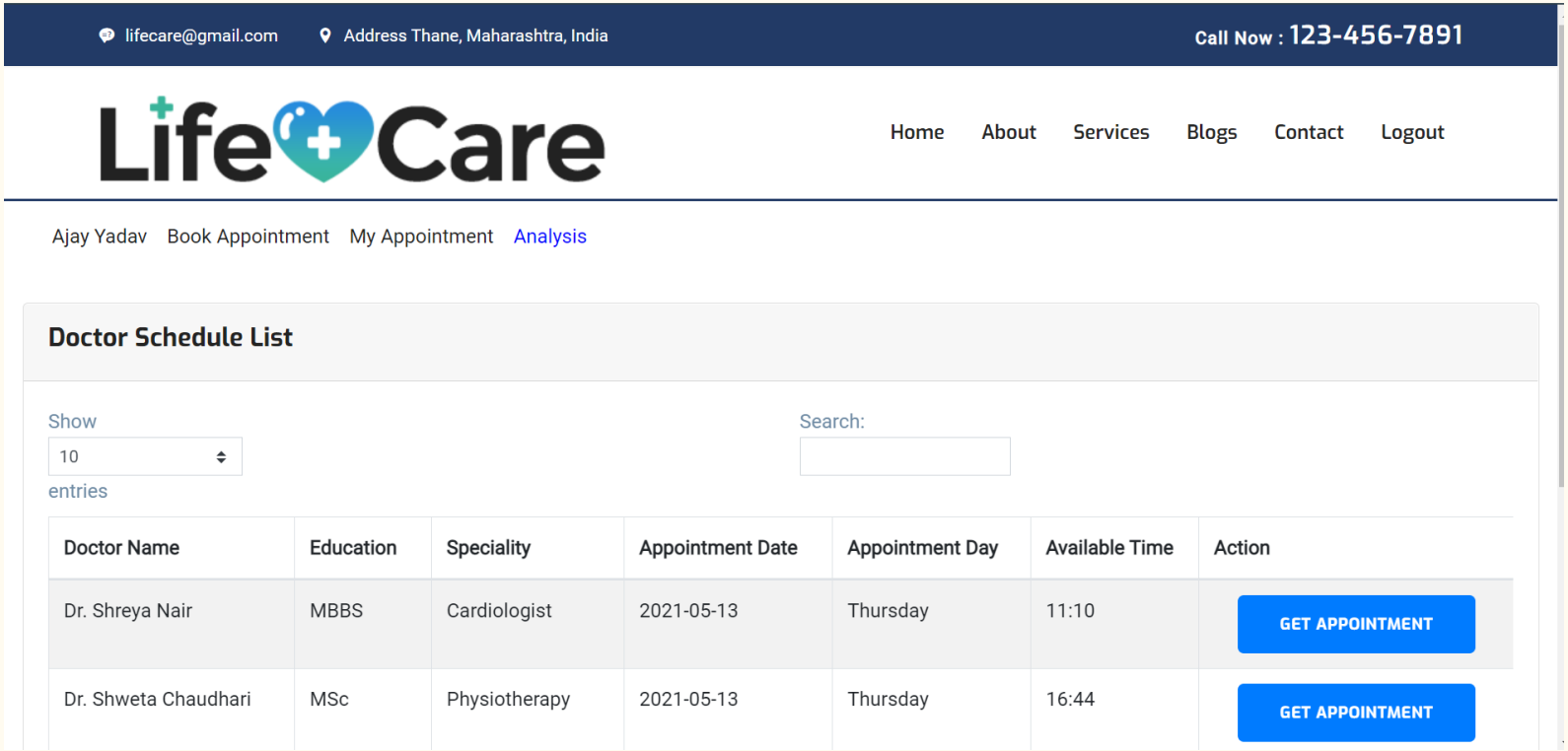


5. Result

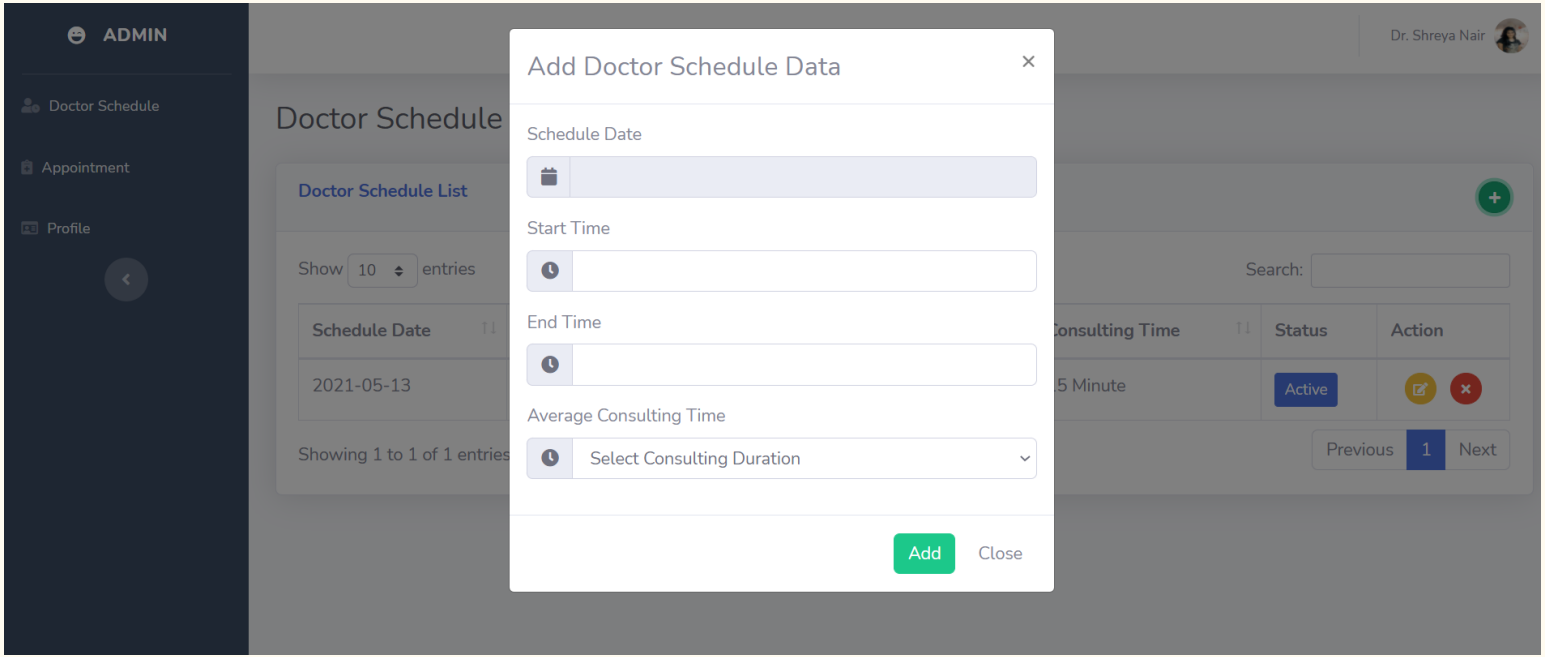
5.1 Results – Web-based portal



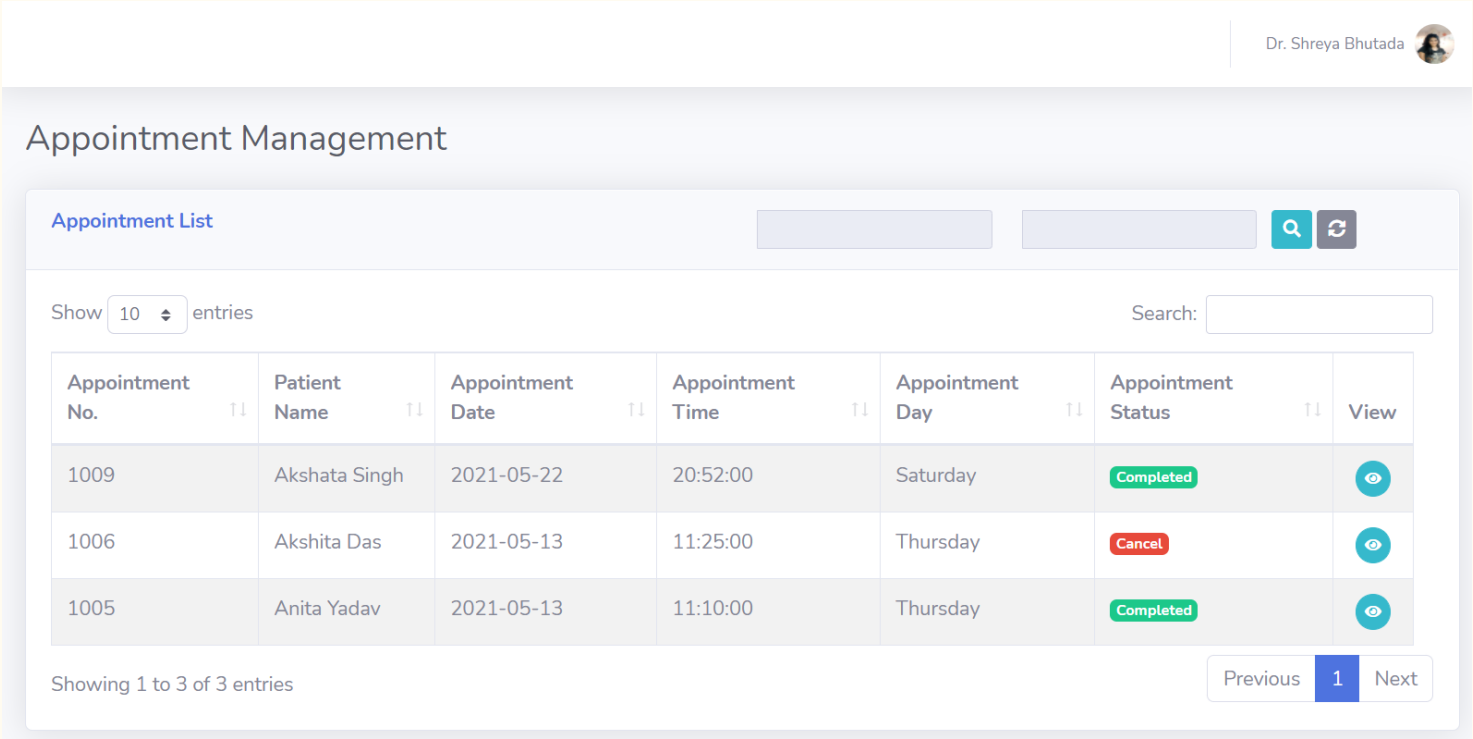
5.2 Results – Patient Side



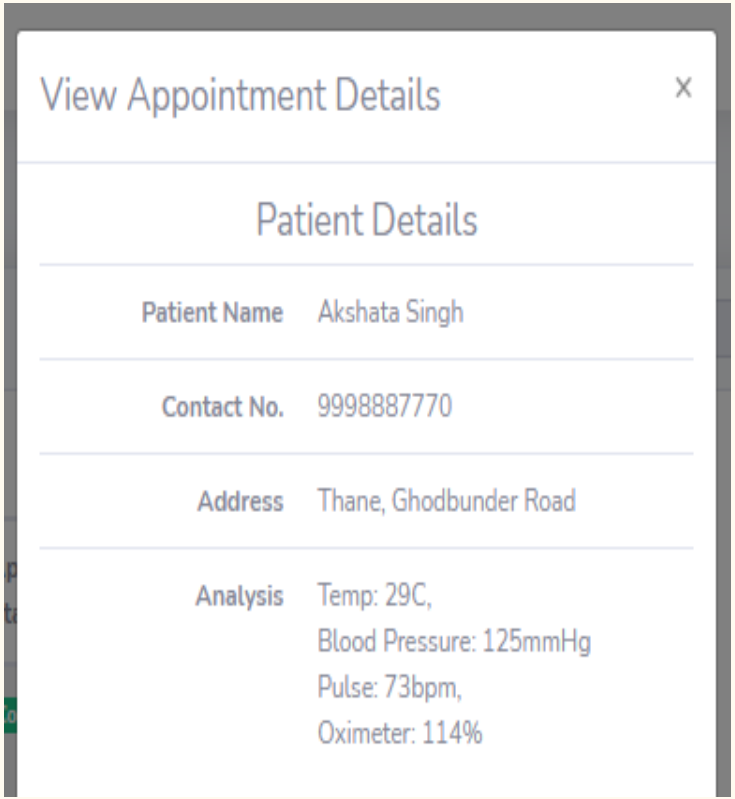
5.3 Results – Doctor adding schedule

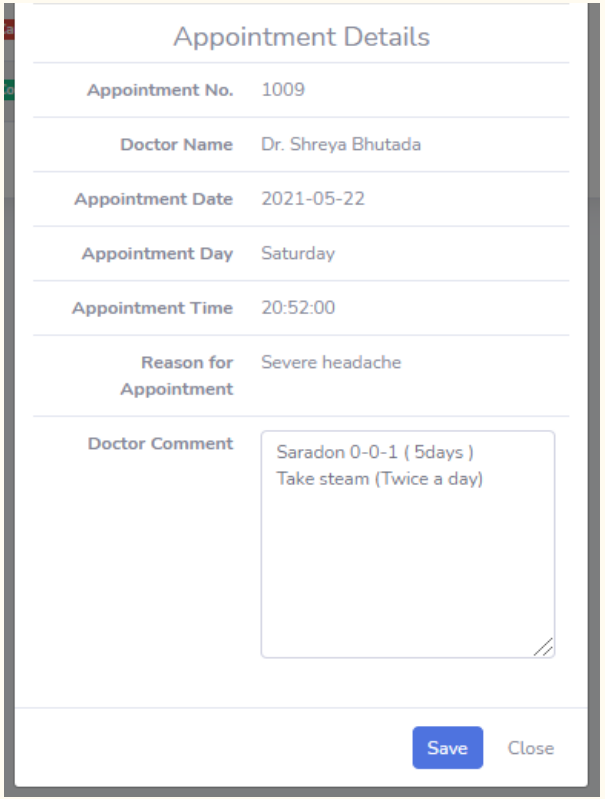


5.4 Results – Appointments scheduled for Doctor

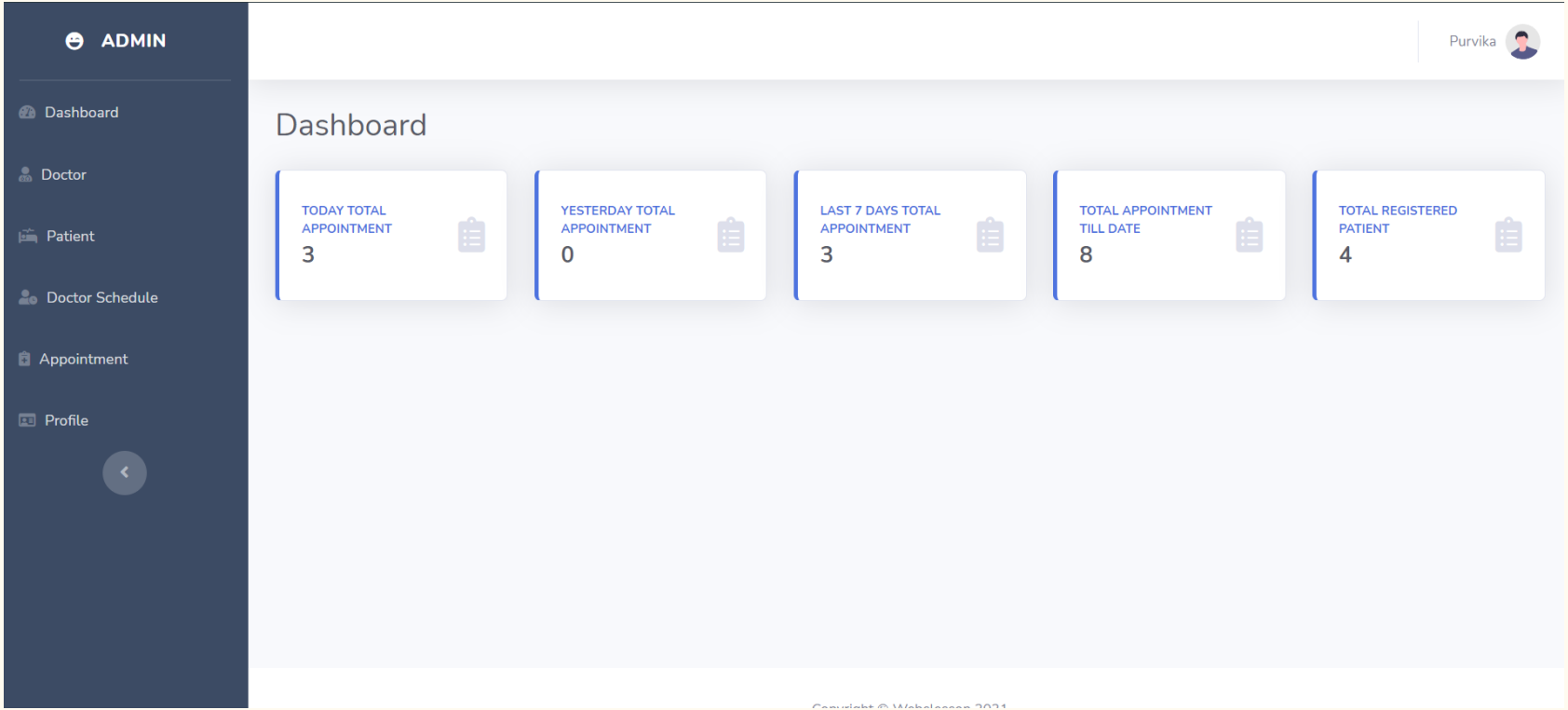


5.5 Results – Health Parameters

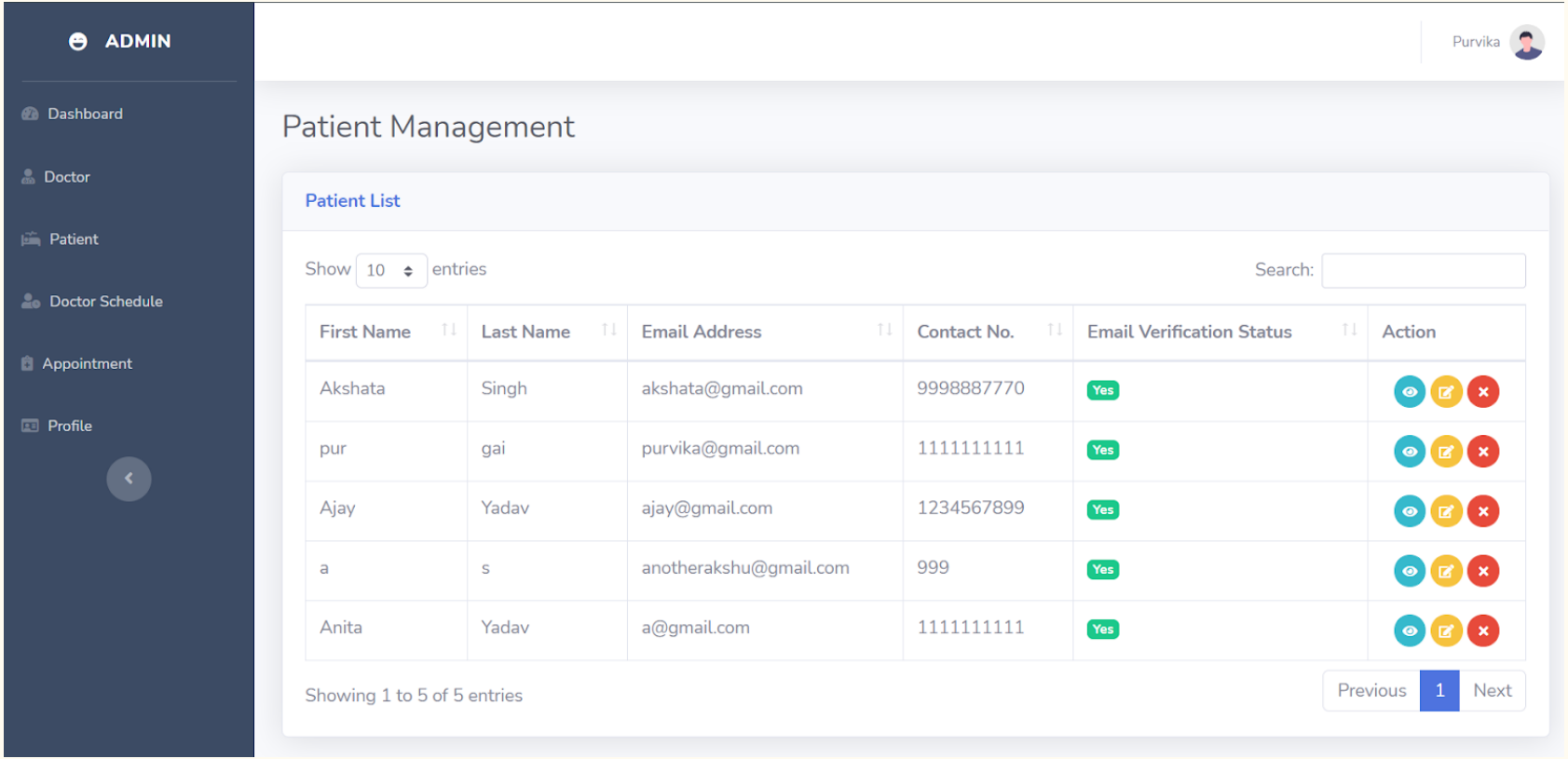




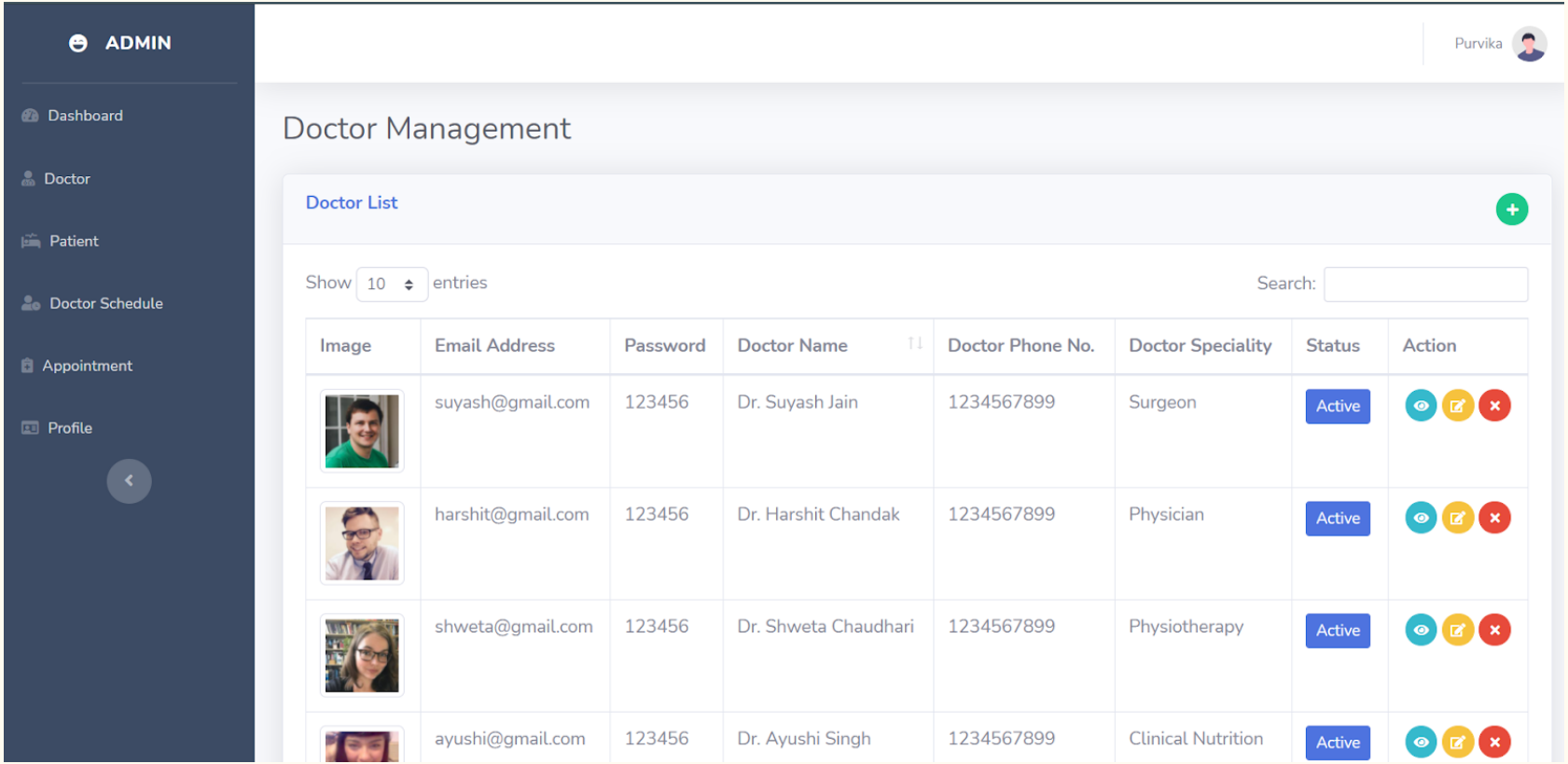
5.6 Results – Admin Dashboard



5.7 Results – Patient Management



5.8 Results – Doctor Management



6. Conclusion 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.
- 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 mobile phones.
- We aim to make virtual assistance to doctors, patients, and workers to build better and well-connected healthcare for society.

6.2 Future Scope

- The project is not connected to any pharmaceutical company as of now. The survey made will be used 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. Consequently, it wouldn’t lead to shortage of medicines.
- In addition to that, an additional feature will be added on the doctors portal which can directly send the prescription of patients to the pharmacy and the delivery can be made.
- An enhanced version of a health bot will be developed to solve complicated issues and provide more options for consultation.
- We will add advanced machine learning to increase the efficiency of the health bot.

References

- 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
- A. D. Acharya and S. N. Patil, "IoT based Health Care Monitoring Kit," 2020 Fourth International Conference on Computing Methodologies and Communication (ICCMC), Erode, India, 2020, pp. 363-368, doi: 10.1109/ICCMC48092.2020.ICCMC-00068
- Katariya, Vivek & Vitthal, Shinde & Gutte, & Devare, Manoj. (2019). Intelligent Healthbot for Transforming Healthcare.
- https://aws.amazon.com/iot-core/features/
- Hossain, Md Anowar & Qureshi, Md. (2020). IoT Based Medical Assistant Robot (Docto-Bot).

Paper Publication

Paper entitled “Ru-Urb IoT-AI powered Healthcare Kit” is presented and published at “5th International Conference on Intelligent Computing and Control Systems ICICCS 2021” by “Shreya Bhutada”, “Akshata Singh”, “Purvika Gaikar ”and “Kaushiki Upadhyaya”.

Thank You