MEDISAFE - STAY AWAY AND DEFEAT DISEASE

2022-143

Project Proposal Report

B.Sc. (Hons) Degree in Information Technology

Department of Information Technology

Sri Lanka Institute of Information Technology
SRI LANKA

February

MEDISAFE - STAY AWAY AND DEFEAT DISEASE

2022-143

Project Proposal Report

Rasuni Wageesha H.A
IT19015040

Mr. Supunya Swarnakantha

B.Sc. (Hons) Degree in Information Technology

Department of Information Technology

Sri Lanka Institute of Information Technology
SRI LANKA

February

Declaration

We declare that this is our own work and this proposal does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or Institute of higher learning and to the best of our knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

Student Name	Student ID	Signature
Rasuni Wageesha H.A	*IT19015040*	

The above candidates are carrying out research for the undergraduate Dissertation under my supervision.

Signature of the supervisor _____

Date _____

Abstract

A chatbot is a piece of software that is used to create natural language interactions between a user/human and a computer/system, similar to how people converse. Chatbots converse with clients in a conversation based on human input and a response to the client. It makes the user think that it is chatting with a human being whereas they're chatting with the computer. Chatbots are useful in a variety of fields, including education, customer service, entertainment, and health. The chat bot application helps patients learn about any medical process in western or helawedakama process from anywhere with an internet connection and receive fast replies. This chatbot system assists hospitals in doing less work by providing patients, doctors, and caregivers with the information they require while also reducing the department's workload. By the way, during a pandemic situation, those who thought going to work was impossible are now running their own online businesses. Sri Lanka, on the other hand, expected a technological evolution and began implementing new changes quickly. Covid was not just a problem for Sri Lankans. Countries around the world that were resistant to technological change began to adopt the trend quickly because they had no other choice. So, in that situation, patients can't go outside, so a chatbot is useful in that situation. As a result, patients are unable to leave the house in those situations. They can seek medical advice from a chatbot from anywhere at that moment. First, ask the user for a questionnaire. Based on the outcome, this report covers the functionalities of getting information with chatbots about all medical advice components. Understanding medical information through digital media is hard, as is getting information in multi-lingual formats. The suggested solution is a multilingual healthcare chatbot that can diagnose diseases depending on the symptoms of the user. The user will be able to observe and receive important medical information on a daily basis, predict the information needed for any patient, and provide information on any risk factors and recommendations using this suggested feature. Finally, this component, as well as the overall suggested system, aims to improve human health.

Key words: Chatbot, Artificial Intelligence, Enquiry, Response,

Table of Contents

List Of Figures

List Of Tables

1. Introduction

1.1 Background and Literature Survey

A chatbot is a software application that assists in the natural development of a conversation with the user. Artificial intelligence has become increasingly complicated as information technology and communication have advanced. Artificial Intelligence systems are machines that are able to perform the same human activities as humans such as taking a decision at a particular moment, performing day to day tasks, replying to users quickly and solving the same queries in the same way as humans would do. Chatbots are developed using the Artificial Intelligence Markup Language (AI) for communicating or interacting with the user. Chatbots uses machine learning to reach AI for helping them to understand the user queries/doubts and provide the user with an appropriate response. This application works in a very simple way because the knowledge is already programmed in advance and can be easily transferred from human to machine. Natural language processing is used in the application. The Chatbot compares the user's supplied sentence to an existing pattern in the knowledge base. Any patient with western medical or helavedakama can ask questions and get medical advice from the chatbot. The goal of this study was to compare human-to-human and human-to-chatbot conversations. The main issue seems to be that this does not use a multi-lingual format and long sentences.

According to the survey following are the responses gathered from people who are known about what is chatbot.
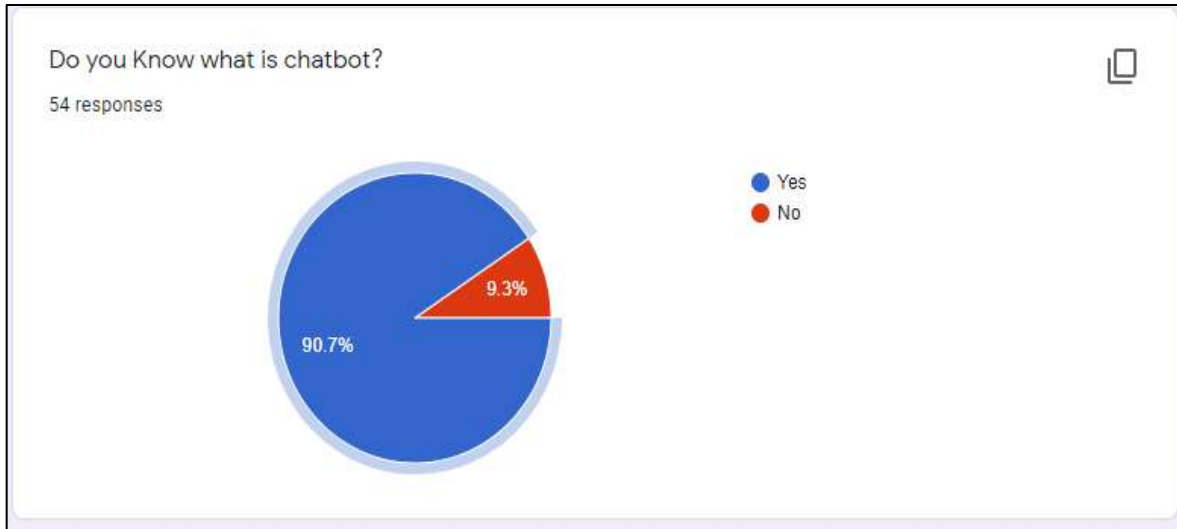
Figure 1.1:What is chatbot

According to the above information (Figure1.1) A Chatbot is a software application that is used to conduct an online chat conversation via text.
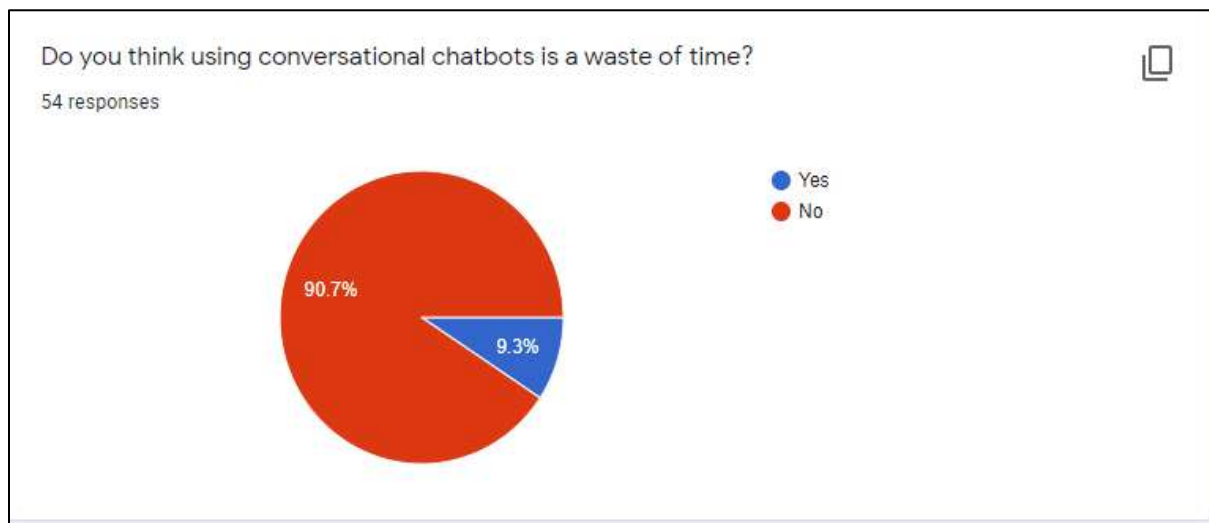
Figure 1.2:conversational chatbot

Considering the figure (Figure 1.1.2), people think this chatbot is not wasting their time because it is very useful to their lifestyle.

Do you know about multi-lingual chatbot?

54 responses

● Yes,I know
● No,I don't know

92.6%

7.4%
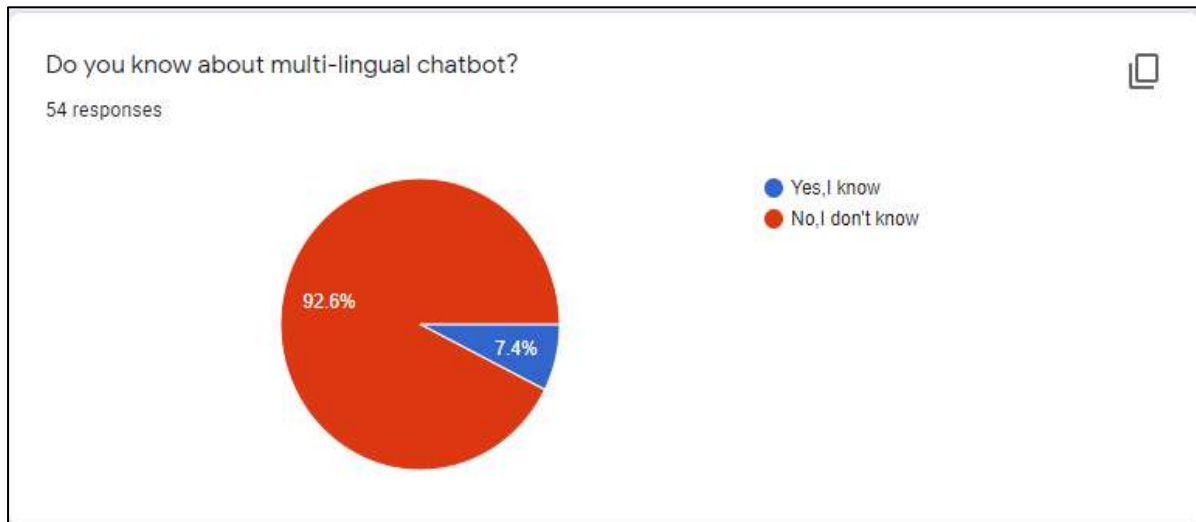
Figure 1.3:multi-lingual

This graph shows (Figure1.1.3) Both western and Helvedakama major patients do not know about multi-lingual chatbots.

What languages would you prefer to use the most?

54 responses

Sinhala only — 1 (1.9%)

English Only — 2 (3.7%)

Multi-lingual — 51 (94.4%)
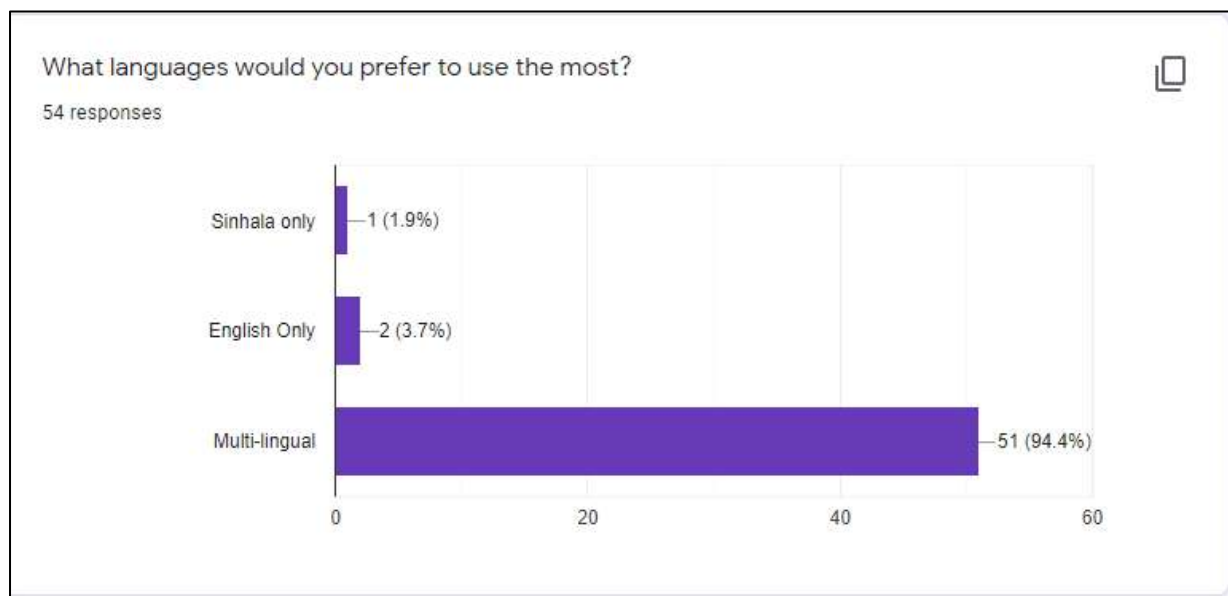
Figure 1.4:What language most prefer

From this figure (Figure1.1.4) most participants (94.4%) prefer to use multi-lingual chatbots

Do you agree chatbots will be effective in the medical field?

54 responses

- Yes
- No
- Maybe

20.4%

79.6%
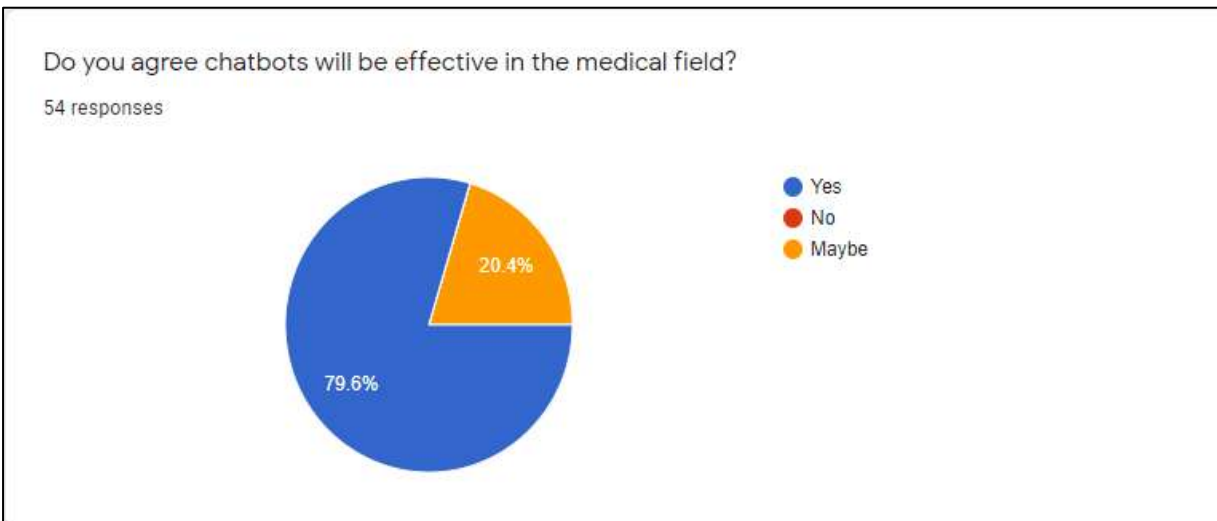
Figure 1.5:Effective medical field

This graph shows (Figure1.1.5) the results of a survey in which 79.6% of people think this chatbot is useful to the medical field. Finally, based on this survey, we may determine that users need multilingual chatbots in their life.

In the literature review, I concentrated on the same areas with similar study functionality and components. A research report published in 2020 by the International Symposium on Computer, Consumer and Control (IS3C) Chatbot Application in Laboratory Equipment Management and e-assistant goal of this [1] Troubleshooting that chatbot provide helps them remove the problem quickly and for those complex condition that rarely happens also provide a report form to report to administrator. People can access the chatbot service everywhere since the interface of chatbot is built on a smartphone app. For the next develop plan for chatbot, to implement an automatically generate troubleshooting procedures based on the maintenance history.

In this paper, Predicting Frequently Asked Questions (FAQs) on the COVID-19 Chatbot using the DIET Classifier, This research   paper was conducted at East Indonesia Conference on Computer and Information Technology (EIConCIT)in 17 May 2021 [2] Diet Classifier model in the RASA framework predicts answers on the chatbots related to COVID-19 information which uses around 300 epochs without normalizing data. DIET can predict each word or sentence from the chatbot with different confidence values for all of the 11 intents used. The effectiveness of the DIET model pre-training with the use of embeddings always provides the best result among different data sets. DIET Classifier model can predict each word or sentence from the chatbot with different confidence values for all of the 11 intents used. The confidence value of the Intent which is the entity of the question produced an adequately high value of around 0.979 and for the intent value that is not an entity it will have a moderate or small value. The effectiveness of the DIET model pre-training with the use of embeddings always provides the best result among different data sets. In the future development of the COVID-19 chatbot, other models such as BERT, Glove are recommended as a comparison.

A research article published on 29 December 2021 Can a Chatbot Comfort Humans? Studying the Impact of a Supportive Chatbot on Users 'Self-Perceived Stress [3] In this paper, they propose Websites such as Facebook, Twitter and Google are exploring the potential of chatbots for providing online emotional support to hennery's who are feeling stressed or worried about coping with a range of personal and professional stressors at any stage in their lives.

Health Chatbot Using Natural Language Processing for Disease Prediction and Treatment Published in 2019 3rd International Conference on Trends in Electronics and Informatics (ICOEI) This research intends to apply the concepts of natural language processing and machine learning to create a chatbot application [4] Medical chatbots can be very useful and important for the users if they can't afford nor have the time to go to the hospital. Our chatbot uses the concept of cosine similarity and ID3 decision tree to provide the diagnosis result. Although program accuracy is critical, it is nearly impossible to achieve 100 percent accuracy.

Corry Elsa Noviyanti, Harry Budi Santoso both researches published research paper in 20 October 2021 at 2021 4th International Conference on Information and Communications Technology (ICOIACT)about A Cross-Cultural Adaptation of Chatbot Usability Questionnaire (CUQ):

Indonesian Version[5]This research paper The goal of this study is to translate CUQ and create a credible Indonesian version. The Chatbot Usability Questionnaire (CUQ) will be translated into Indonesian as part of a research. To guarantee that the findings of the CUQ can be understood by a wide range of Indonesians, the proper translation method must be used. CUQ, on the other hand, hasn't been commonly used to assess chatbot usability. In the framework of the usability questionnaire, the CUQ instrument should be used in a variety of different kinds of chatbots, such as e-commerce, government, and chatbot messengers, to improve this tool.

1.2 Research GAP

There are several health-related chatbots available. So many researchers are concerned about following common areas.

- Go and get information about diseases.
- Using short words.
- Use only English language.

The, are only a few of the research that have been conducted.

- Ask questions from anywhere.
- Use long sentences
- Use multi-lingual
- Use the recommendations.

In 20 January 2021 research paper about Chatbot Assistant for English as a Second Language Learners [6] The construction of a chatbot to assist users learning English as a Second Language was completed as part of this project. The chatbot can translate text into regional languages, play audio, and research regional movies and music. By utilizing Simplewiki, the chatbot uses simple English terminology, making the user's activities easier while also assisting them in learning English. The chatbot can react

to user questions with appropriate responses and can also locate extra information that the user has requested. This system assists users who are learning English as a second language by offering instructive and entertaining information.

Most previous study publications use the English language to describe issues with chatbot. Different sorts of persons discuss various diseases. At that point, the chatbot should respond in their preferred language. To communicate as needed, the multilingual method is used. Ask questions about the diseases or any disease problems. Different kinds of patients tell them, so the chatbot always responds in their language. Another thing is that chatbots typically use only short words. As a result, we are attempting to develop long sentences. If anyone can ask questions during a long session of chat about any disease,

Interactive Chatbots for Software Engineering: A Case Study of Code Reviewer Recommendation research paper published on 11 February 2022[7] In this paper, we'd want to take Chatbots a step further by combining them with recommendation algorithms to provide an interactive recommendation experience. In this paper, we take a first step in exploring the possibilities of using Chatbots as conversational and interactive systems for developers. The evaluation of our method in a real-world situation, where the developer feels like they are having a discussion with an agent, is probably the toughest hurdle for the project. some recommendation research papers are available, but not for the medical side of recommendations online. By the way, in this pandemic situation, western or helavedakama-using patients can chat with a chatbot, and the chatbot recommends what exercises to follow and what videos to watch in this situation. Any recommended reading materials to read or not? Another thing is that this recommendation is used on both sides, so if you have any symptoms, you must ask the chatbot. recommends medical doctors.

Research products	Features		
	Long Sentences	Multi-Lingual	Recommendations
Research A	✖	✖	✓
Research B	✖	✖	✖
Proposed system (MediSafe)	✓	✓	✓

Table 1.1:comaprison table

My proposed system identifies using questioner-based patients' problems and gives them advice through a chatbot. So, this table demonstrates the lack of use of multi-language chatbots and long sentences, so I'm trying to develop these long sentences and multi-language.

1.3 Research Problem

Nowadays, COVID pandemic situations have become a common health problem all over the world. However that, because the information technology industry is moving at a rapid speed now days, we should adapt as well. In the United States and other nations, technologies are being used in a range of industries, including the healthcare industry. Currently chatbot is not to use long sentences. Their use short words. Short Text Intent Classification for Conversational Agents published in 05 February 2021[8]In the context of chatbots, this research investigates the performance of several models and strategies for brief text intent categorization.

And Not to support multi language. In This research paper using English and Hindi language Multilingual Healthcare Chatbot Using Machine Learning in 22 June 2021[9]Because of its multilingual capabilities, the chatbot system is ideal for usage in rural India. English, Hindi, and Gujarati are the three languages presently supported by the chatbot program.

Nowadays, COVID pandemic situations have become a common health problem all over the world. It's impossible to tell whether the symptoms are real.

2. Objectives

2.1 Main Objective

Many people are shutting themselves in their houses to avoid the spread of COVID-19, which is presently under control, but new COVID-19 variants are constantly developing. The primary goal of this study is to offer patients with information and health recommendations based on their IoT device findings, so they may better understand their own health and prevent avoidable hospitalizations. If you're older, you'll need to do this since you're susceptible to a variety of ailments. Furthermore, cutting-edge technologies are being employed to collect patient information and analyze the data to diagnose illnesses in their early stages. They provide medical advice and instructional films for patients based on the information obtained from the questionnaire and the patients' descriptions of their symptoms and ailments. Diseases in Sri Lanka Anyone interested in learning more about how to use our implementation may access this wealth of knowledge. As a result, everyone may use any online or mobile application whenever they want, depending on their preferences.

2.2 Specific Objective

There are goals to consider in addition to the general aim.

1) To collect the patient's varied health data, an IoT device was created.

2) The pulse rate of a patient may be used to diagnose diseases.

3) The chatbot provides medical advice and treatment information to the patient.

4) provides information about the country's current sickness situation.

In consideration of the above-mentioned key aspects, I'm working on the third key point. Artificial intelligence (AI), natural language processing (NLP), and machine learning are the foundations of chatbots. People that create chatbots, and hence brand communication, take it to a whole new level of personalization. Based on Questioner and asking the problems in the chatbot on the web app.

3. Methodology

The recommended "Medi Safe" is a gadget with a web and mobile application that can do the following functions:

1. Sensing and analyzing the patient's present status parameters using the suggested equipment. (Temperature controller, Exhale Detector, Pulse Detector, Blood Pressure Detector)
2. The frequency distribution of pulse rate variability data is used to diagnose and treat the condition.
3. The chatbot recommends treatment and proposes movies in multi-lingual based on the contents of the user's questionnaire and symptoms.
4. Find more about the latest diseases in Sri Lanka.

I would be able to propose a solution for the third step by evaluating the preceding stages for the existing difficulties and future concerns that individuals experience in their lives. Chatbot basic technologies include artificial intelligence (AI), natural language processing (NLP), and machine learning. They take chatbot development, and thereby brand communication, to a whole new level of personalization. Then on the Medicare website, have a messenger app so patients from western and helvedakama can fill out a questionnaire that is based on giving suggestions for each patient's multi-lingual long-term problems based on that questionnaire using NLP.
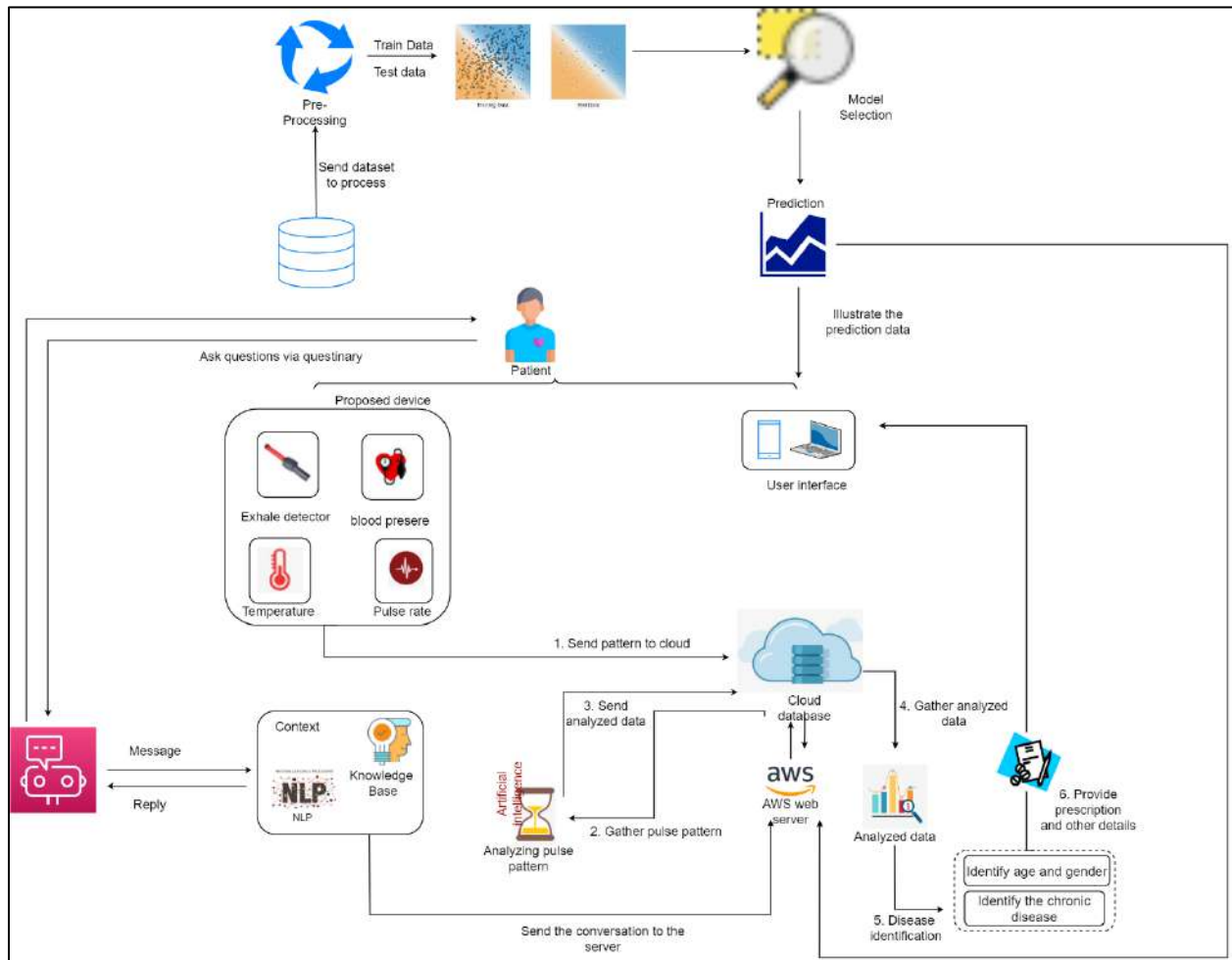
3.1 System Architecture

Figure 3.1:overall system architecture

3.2 Software Solution

The Agile technique will be used to implement the proposed system. The team ultimately agreed on the Scrum approach, which would be implemented as part of the Agile software development process. In such instance, the whole development process will be broken down into sprints. As this project moves forward using the Agile technique, existing needs may alter, and new requirements can develop throughout sprint sessions. He agile approach involves six basic phases: gathering requirements, planning the project, designing, developing the product, releasing, monitoring, and keeping track of the product, according to the agile methodology. This study project also includes a timeframe and objectives that follow the scrum model, and the figure team is required to deliver software in stages.
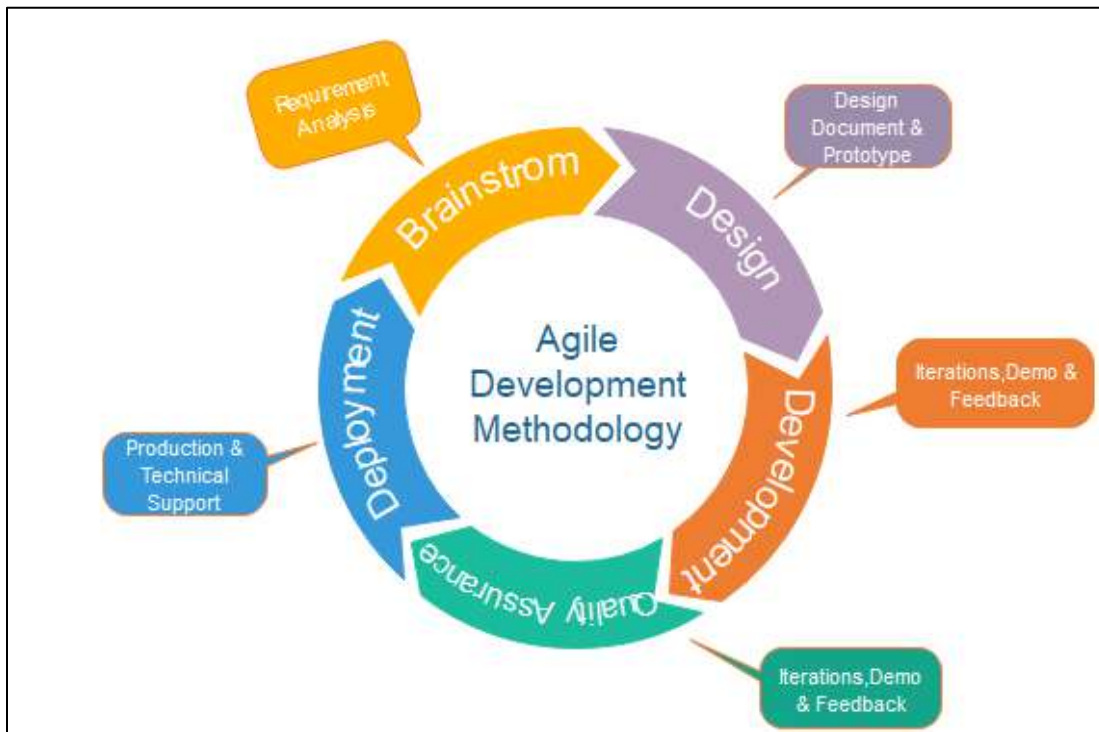

Figure 3.2:Agile methodology

- **Requirements gathering**

  The requirement gathering procedure will be the initial step.

14

Survey Results

Investing time in a requirement collecting questionnaire has supported us, the writers, in gaining a better understanding of what people believe about employing chatbots to solve each symptom of a problem. The questions have been structured by the writers to properly meet the project's aims.

- **Functional Requirements**
  - ➢ Remind some patients to take their medication on time.
  - ➢ Multi-lingual support.
  - ➢ Recommend for videos, games and articles

- **Non-Functional Requirements**
  - ➢ Fast response
  - ➢ Modularity
  - ➢ Accuracy

- **Feasibility Study**

Schedule feasibility

Every project plan has a start and an end date, as well as a set of goals to achieve along the way. Therefore, there is concern in this feasibility evaluation about how the projected system would evolve over time. It's already making progress in the right way**.**

Technical Feasibility

Concerns about technical resources and expertise occur throughout a technical feasibility study. As a result, several technological requirements and standards will be used in the proposed system. Technical skills may be used to assess the technical knowledge and resources needed to turn existing concepts into functional software solutions. As the person in charge of this

section, the author should have a better understanding of how to create mobile and web applications.

- **Implementation**

All three of AI, natural language processing (NLP), and machine learning (ML), were used in the development of the chatbot. Natural Language Processing (NLP) was applied to train the chatbot. MongoDB was utilized for data storage because of its speed, flexibility of use, and excellent query capabilities. As a web and mobile application, this chatbot is expected to employ the React and React Native frontend frameworks, making it the most popular and easiest-to-use framework available today. AWS Web Services was utilized for the deployment of a chatbot. AWS Web Services was utilized. We intend to make use of Amazon Web Services via the Amazon Elastic Compute Cloud (EC2). A robust and simple web service is available.

4. Description of Personal and Facilities

4.1 To collect the patient's varied health data, an IoT device was created.
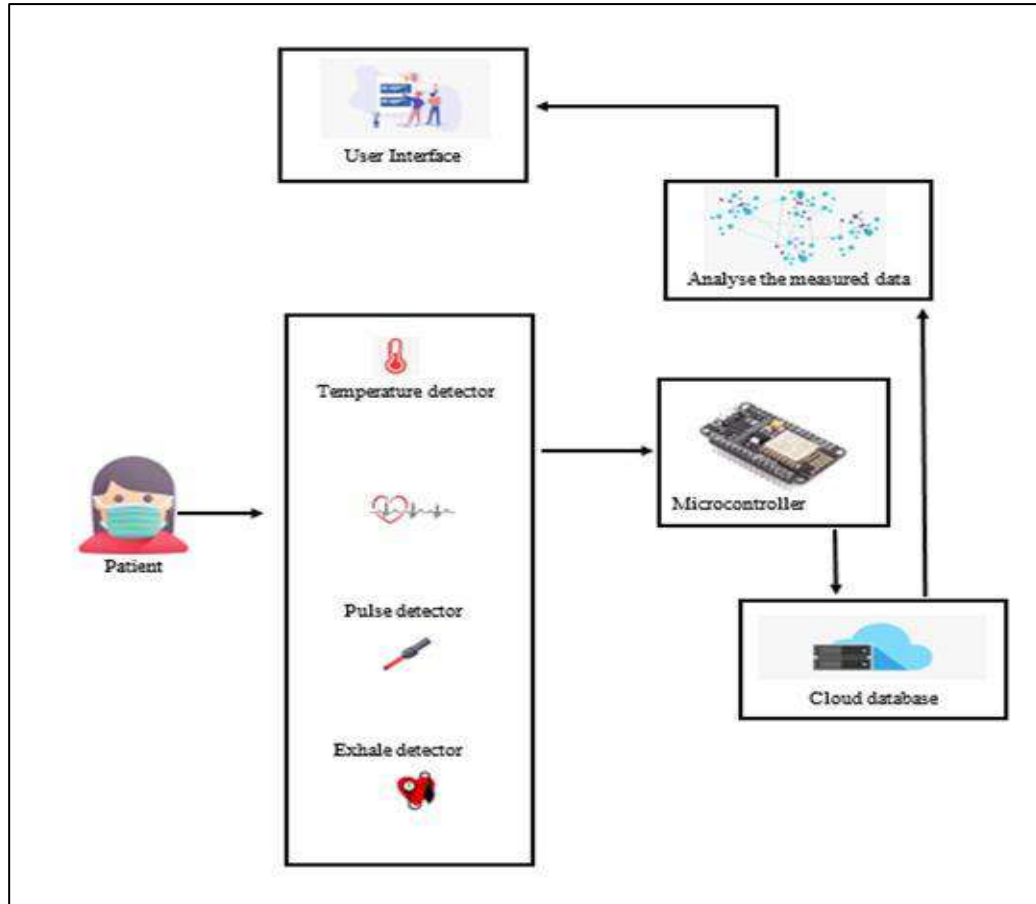
Figure 4.1:IOT device

Collect sensor data from multiple data sources as required. The Medisafe system should gather data from the sensors and communicate it to an external cloud storage using a microcontroller in order to perform the following actions. All of the collected data is stored in a database before being directed to a microcontroller for processing. All of the data is gathered and then processed. The neural network analyzes the data from the database, and if the patient is infected with the coronavirus, the algorithm will identify where in the body he or she should seek medical treatment, as well as whether or not there is a risk of disease.

4.2 The pulse rate of a patient may be used to diagnose diseases.

Figure 4.2:Pulse Rate

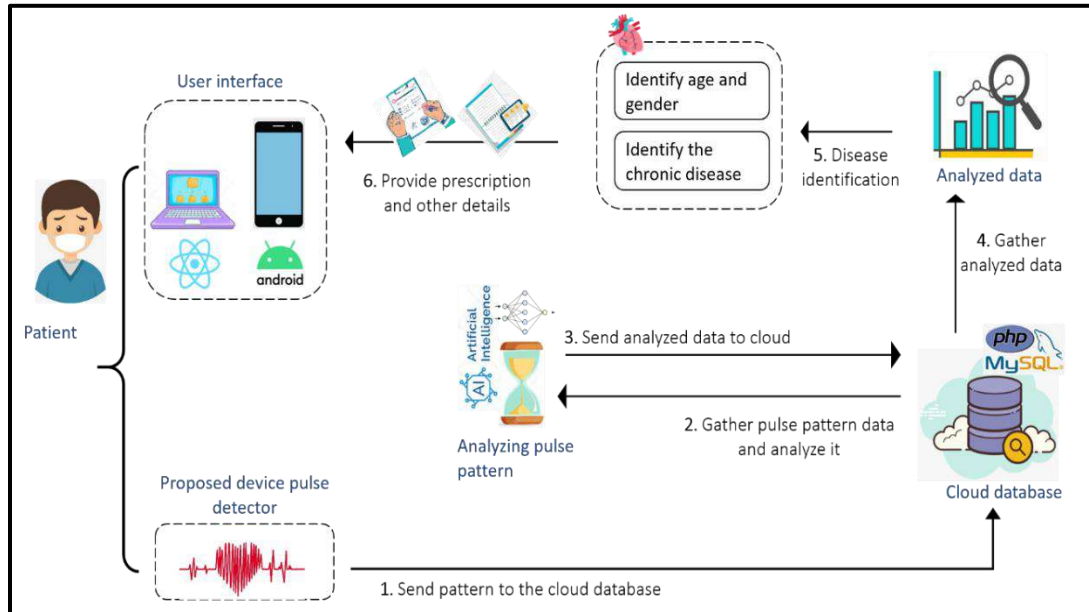By using pulse detect sensors, the IoT gadget captures patient data and delivers it to an AWS server, which anybody may access through mobile or online apps. The patient may obtain western or ayurveda therapy ideas through mobile apps once data is analyzed and the patient's pulse rate is determined.

4.3 The chatbot provides medical advice and treatment information to the patient.
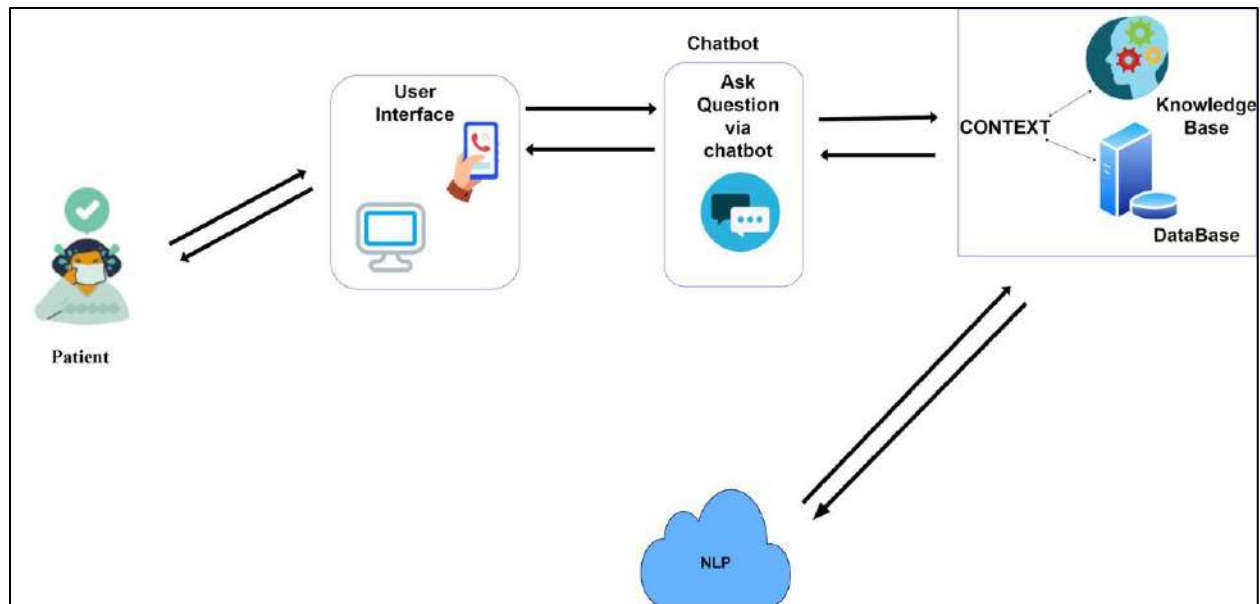
Figure 4.3:Chatbot

We give services to patients in the medisafe system in both western and helavedakama, Sri Lanka's two primary languages. They can communicate in a variety of languages. Long phrases may be requested by humans for any ailment. The chatbot will respond to any inquiries you may have. Another aspect is that the chatbot instructs any patient on what to do if a diagnosis is provided after a medicine is prescribed for any ailment.

Obtain the necessary information from the questionnaire.
- Obtain and analyze data on the necessary symptoms of patients.

Analyse and identify changes in symptom details.
- What are the symptoms? Details of past records of patients

This process (previous) is real time and users can see their symptoms using their web application
- The web app provided, will have the facility of providing a online chat.

19

According to the current chatbot and the historical chatbot.

- It is analyzed what the necessary recommendations and symptoms are.

4.4 provides information about the country's current sickness situation.
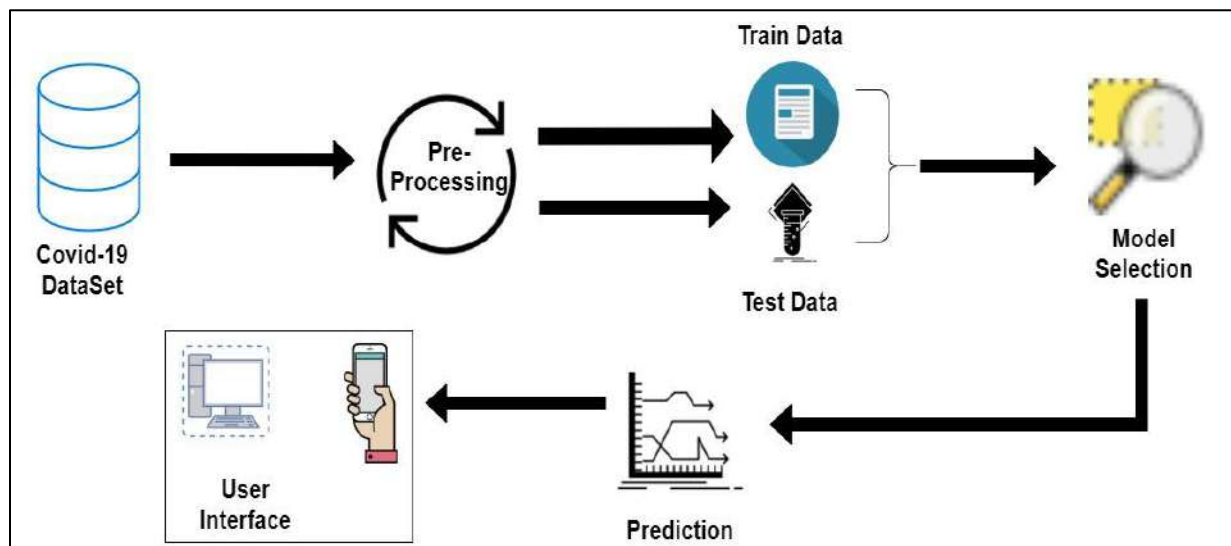
Figure 4.4:Machine learning

Assemble information from a range of sources Create a Machine Learning Model and use it to create illness predictions. To processing information, first make sure it's in the right format, then divide it into two variables and two parts. The first is for testing, while the second is for training. The data may then be separated into 80 to 20 percentiles using a number of machine learning algorithms. Finally, combine the findings and depict the desired outcomes. And Developed Healthcare Dashboard The full-featured healthcare dashboard is provided after completing the prediction based on past illness data, enabling the healthcare sector to have a greater understanding of what should be done next to avoid diseases.

5. Gantt chart

MediSafe - Gantt Chart

Task Id	Task
1	Feasiblitiy
1.2	Identify the opportunity
1.3	Evaluate feasibility and background study
1.4	Discuss with supervisor
1.5	Making changers
2	Enviornment setup
2.1	Background survey
2.2	Requirement gathring
2.3	Submit topic assesment form
2.4	Requirement anlaysis
3	Proposal
3.1	Project proposal presentation
3.2	Initial proposal report submission
4	Hardware requiremnets specification
4.1	Identifying the functions
4.2	Getting used to the technologies
4.3	Gathering information
5	Software requiremnets specification
5.1	Identifying the functions
5.2	Getting used to the technologies
5.3	Gathering information
6	Software and Hardware design
6.1	Cording
6.2	Progress presentation 1
7	Implementing software and hardware
7.1	Intigration testing
8	Research paper submission
9	Progress presentation 2
10	Final Doc, Presentation & Viva
10.1	Final documentation
10.2	Final presentation & viva
10.3	Final report submission

Figure 5.1:Gantt chart

6. Work Breakdown Structure

Multi-lingual Chatbot

Initiation	Planning	Execution	Control	Testing
Topic assessment evaluation	Draft a rough scope statement	Identify user requirements	Time management	Plan the test
Getting approval to research	Select project team	Arrange meetings	Risk management	Unit Testing
Charter submission	Arrange meetings with team	Status development of system	Project management	System testing
Prepare for the proposal presentation	Develop project plan	Getting infrastructure	Quality management	UI Testing
Proposal presentation done	Discussions with supervisor	Installation of software	Development of project plans	

Figure 6.1:Work Breakdown

7. Budget and Budget Justification

Component	Amount
Flexible Cable	200
5V Power Supply	170
Power Battery	450
Reset Button	60
Cloud Service and servers	3900
DERobot PT100 Temperature Sensor Probe	1650
Mega NodeMCU WeMos ESP8266	4000
Total	10,430

Table 7.1:Budget

8. Reference List

[1] S. -H. Lin, R. -S. Run and J. -Y. Yan, "Chatbot Application in Laboratory Equipment Management and e-assistant," 2020 International Symposium on Computer, Consumer and Control (IS3C), 2020, pp. 39-42, doi: 10.1109/IS3C50286.2020.00017.

[2] W. Astuti, D. P. I. Putri, A. P. Wibawa, Y. Salim, Purnawansyah and A. Ghosh, "Predicting Frequently Asked Questions (FAQs) on the COVID-19 Chatbot using the DIET Classifier," 2021 3rd East Indonesia Conference on Computer and Information Technology (EIConCIT), 2021, pp. 25-29, doi: 10.1109/EIConCIT50028.2021.9431913.

[3] L. Medeiros, T. Bosse and C. Gerritsen, "Can a Chatbot Comfort Humans? Studying the Impact of a Supportive Chatbot on Users' Self-Perceived Stress," in IEEE Transactions on Human-Machine Systems, doi: 10.1109/THMS.2021.3113643.

[4] R. B. Mathew, S. Varghese, S. E. Joy and S. S. Alex, "Chatbot for Disease Prediction and Treatment Recommendation using Machine Learning," 2019 3rd International Conference on Trends in Electronics and Informatics (ICOEI), 2019, pp. 851-856, doi: 10.1109/ICOEI.2019.8862707.

[5] C. E. Noviyanti, H. B. Santoso and P. O. Hadi Putra, "A Cross-Cultural Adaptation of Chatbot Usability Questionnaire (CUQ): Indonesian Version," 2021 4th International Conference on Information and Communications Technology (ICOIACT), 2021, pp. 248-251, doi: 10.1109/ICOIACT53268.2021.9563926.

[6] S. Vyawahare and K. Chakradeo, "Chatbot Assistant for English as a Second Language Learners," 2020 International Conference on Convergence to Digital World - Quo Vadis (ICCDW), 2020, pp. 1-5, doi: 10.1109/ICCDW45521.2020.9318672.

[7] N. Assavakamhaenghan, R. G. Kula and K. Matsumoto, "Interactive ChatBots for Software Engineering: A Case Study of Code Reviewer Recommendation," 2021 IEEE/ACIS 22nd International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing (SNPD), 2021, pp. 262-266, doi: 10.1109/SNPD51163.2021.9704950.

[8] S. Kuchlous and M. Kadaba, "Short Text Intent Classification for Conversational Agents," 2020 IEEE 17th India Council International Conference (INDICON), 2020,
 pp. 1-4, doi: 10.1109/INDICON49873.2020.9342516.

[9] S. Badlani, T. Aditya, M. Dave and S. Chaudhari, "Multilingual Healthcare Chatbot Using Machine Learning," 2021 2nd International Conference for Emerging Technology (INCET), 2021, pp. 1-6, doi: 10.1109/INCET51464.2021.9456304.

9. Appendix