

# **MAKING A HEALTH CARE CHATBOT USING NLP**

## **A PROJECT REPORT**

*Submitted by*

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## **ABSTRACT**

To start a good life healthcare is more important. But it is very difficult to obtain the consultation with the doctor in case of any health issues. The proposed idea is to create a health care Chat bot system using Artificial Intelligence that can diagnose the disease and provide basic details about the disease before consulting a doctor. The system provides text (or) voice assistance that means user can use own convenient language. Bot will provides which type of disease you have based on user symptoms and appeared doctor details respective to user disease. The Chat bot will clarify the users symptoms with serious of questions and the symptom conformation will be done. The disease will be categorized as minor and major disease. Chat bot will reply whether it is a major or minor disease. If it is a major disease user will be suggested with the doctor details and analgesics for further treatment and also provides food suggestion that means which type of food you have to take. The user can achieve the real benefit of a chat bot only when it can diagnose all kind of disease and provide necessary information. A text-to-text diagnosis Bot engages patients in conversation about their medical issues and provides a personalized diagnosis based on their symptoms. Hence, people will have an idea about their health and have the right protection.

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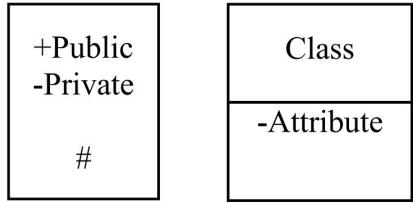
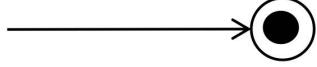
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## **LIST OF ABBREVIATIONS**

<b>IDE</b>	Integrated Development Environment
<b>AI</b>	Artificial Intelligence
<b>SQL</b>	Structured Query Language
<b>HTML</b>	Hyper Text Markup Language
<b>CMD</b>	Command
<b>CSS</b>	Cascading Styling Sheet
<b>JS</b>	Java Script
<b>SOAP</b>	Simple Object Access Protocol
<b>TF-IDF</b>	Term Frequency - Inverse Document Frequency
<b>NLP</b>	Natural Language Processing
<b>NLU</b>	Natural Language Understanding
<b>STT</b>	Speech To Text
<b>TTS</b>	Text To Speech
<b>NLTK</b>	Natural Language Toolkit
<b>TC</b>	Test Case

## LIST OF SYMBOLS

SI.NO	NOTATION	NOTATION	DESCRIPTION
	NAME		
1	Class		Represents a collection of similar entities grouped together.
2	Association		Association represent static relationship between classes.
			Roles represent the way the two classes see each other.
3	Actor		Specifies a role played by a user that interacts with the subject.
4	Communication		Communication between various use case.
5	Initial State		Initial state of the object.
6	Final State		Final state of the object.

SI.NO	NOTATION	NOTATION	DESCRIPTION
	NAME		
7	Control Flow		Represents various control flow between the states.
8	Decision Box		Represents decision making process from a constraint.
9	Use case		Interaction between the system and external environment.
10	External Entity		Represent external entities such as keyboard, sensors,etc.
11	Transition		Represents communication that occurs between process.
12	Object Lifeline		Represents the vertical dimension that the object communication.
13	Message		Represents the message exchanged.

## **CHAPTER 1**

## **INTRODUCTION**

# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 OVERVIEW**

Now a days , health care is very important in our life. Today's people are busy with their works at home, office works and more addicted to Internet. They are not concerned about their health and hence the job gets avoided and becomes a burden to go hospitals for small problems. It may become a major problem. Here comes Healthcare chat-bot which provides an idea where by using AI, that can diagnosis the disease and provide basic information about the disease before consulting a doctor. Which helps the patients know more about their disease and improves their health User can achieve the all kind of disease information. The system application uses question and answer protocol in the form of chat bot to answer user queries. The response to the question will be replied based on the user query. The significant keywords are fetched from the sentence and answer to those sentences. If match is discovered or significant answer will be given or similar answers will be displayed. Bot will diagnosis which type of disease you have based on user symptoms and also gives doctor details of particular disease. It may reduce their health issues by using this application system. The system is developed to reduce the healthcare cost and time of the users as it is not possible for the users to visit the doctors or experts when immediately needed.

The complex questions and answers present in the database are viewed and answered by an expert. Here the users can personally ask any questions regarding healthcare, as not much time will be wasted by the user for consulting a doctor. The input sentence of the chat pattern is stored in an RDBMS. The chat bot would coordinate the input sentence from the user question with the knowledge base. Each query is compared with the knowledge database of the chat bot. The important keywords are extracted from the given input sentence and the sentence similarity is found. The keyword ranking and sentence similarity are found using the N-gram, TF-IDF, and cosine similarity. The interfaces are standalone built using the JAVA programming language.

## **1.2 OBJECTIVE**

The objective of our system is to make a health care chatbot to assist users with their problems or symptoms and give the necessary set of information that is needed by the user.

## **1.3 LITERATURE SURVEY**

**[1] Simon Hoermann, Kathryn L McCabe, David N Milne, and Rafael A Calvo1, “Application of Synchronous Text- Based Dialogue Systems in Mental Health Interventions” Volume: 19, issue: 8, pp. 755-756 , 2019. IEEE**

Discusses the current evidence for the feasibility and effectiveness of online one-on-one mental health interventions that use text-based synchronous chat. Synchronous written conversations (or -chats<sup>11</sup>) are becoming increasingly popular as Web- based mental health interventions. This review is based on an evaluation of individual synchronous Web- based chat technologies. Through the current evidence of the application of this technology, the tentative support for mode of intervention is seen. Interventions utilizing text-based synchronous communication showed better outcomes compared with Waitlist conditions and overall equivalent outcomes compared with Treatment As usual, and were at least as good as the comparison interventions. However, the issue of whether these technologies are cost effective in clinical practice remains a consideration for future research studies.

**[2] Saurav Kumar Mishra, Dhirendra Bharti, Nidhi Mishra and Dr.Vdoc “A Medical Chatbot that Acts as a Virtual Doctor” Volume: 6, issue: 3 pp. 897-967 , 2020. IEEE**

Claimed that the chatbot will act as a virtual doctor and makes possible for the patient to interact with virtual doctor. Natural language processing and pattern matching algorithm

for the development of this chatbot. It is developed using the python Language. Based on the survey given it is found that the no of correct answer given by the chatbot is 80% and incorrect/ambiguous answer given is 20%. From this survey of chatbot and analysis of result suggested that this software can be used for teaching and as a virtual doctor for awareness and primary care.

**[3] Divya Madhu, ,Neeraj Jain C. J, Elmy Sebastain, ShinoyShaji , Anandhu Ajayakumar , “A Novel Approach for Medical Assistance Using Trained Chatbot ”, Volume: 25, issue: 6, pp. 456-523 , Published: 20 May 2020. International Conference on Inventive Communication and Computational Technologies (ICICCT )**

Proposed an idea in which the AI can predict the diseases based on the symptoms and give the list of available treatments If a person's body is analyzed periodically, it is possible to predict any possible problem even before they start to cause any damage to the body. Some Challenges are research and implementation costs, and government regulations for the successful implementation of personalized medicine, they are not mentioned in the paper.

**[4] Hameedullah Kazi, , B.S. Chowdhry and ZeeshanMemon , “ MedChatBot: An UMLS based Chatbot for Medical Students” ,Volume: 55, issue: 17, pp. 345-412. International Journal of Computer Applications (0975 – 8887). IJCA**

Describes the development of a chat bot for medical students, that is based on the open source AIML based Chatterbean. The AIML based chat bot is customized to convert natural language queries into relevant SQL queries.

## **CHAPTER 2**

## **SYSTEM ANALYSIS**

## **CHAPTER 2**

### **SYSTEM ANALYSIS**

The system study is to provide a description about the existing system, its limitation and proposed system of the project.

#### **2.1 EXISTING SYSTEM**

In this paper a voice recognition chat-bot is developed, if the questions are not understood asked to the bot is further processed using the third party expert-system. The web-bots are created as text-based web-friends, an entertainer for the user. Here they focused on the improved system if the system is not only text-based but also voice-based trained. Here the voice recognition requires a 2 part process of capturing and analysis of an input signal. Server response recognition data retrieval and information output. The server used here is SOAP based on black box approach. The use of expert system allows unlimited and autonomous intelligence improvements.

##### **2.1.1 DISADVANTAGES**

- It takes more time to response to the user question
- Pay some charges to perform live chat

#### **2.2 PROPOSED SYSTEM**

The proposed system provides a text-to- text(or) voice conversational agent that asks the user about their health issue .The user can chat as if chatting with a human. The bot then ask the user a series of questions about their symptoms to diagnose the disease. It gives suggestions about the different symptoms to clarify the disease. Based on the reply from the user the accurate disease is found and it suggests the doctor who needs to be consulted in

case of major disease. The system remembers past responses and asks progressively more specific questions in order to obtain a good diagnosis.

- In our proposed system the user can chat with the bot regarding the query through voice or text.
- The system uses an expert system to answer the queries
- User can also view the available doctors and booking appointments for that particular disease.
- This system can be used by the multiple users to get the counselling sessions online.
- The data of the chat bot stored in the database in the form of pattern-template.
- Bot will provide analgesics and food suggestions that means which food you have to take based on the disease

### **2.2.1 ADVANTAGES**

- Reducing health care cost
- Save the user time
- Don't go to hospital for even any small problem

## **CHAPTER 3**

## **SYSTEM REQUIREMENTS**

# **CHAPTER 3**

## **SYSTEM REQUIREMENTS**

### **INTRODUCTION**

The requirements specification is a technical specification of requirements for the software products. It is the first step in the requirements analysis process; it lists the requirements of a particular software system including functional, performance and security requirements. The requirements also provide usage scenarios from a user, an operational and an administrative perspective. This describes the project's target audience and its user interface, and hardware and software requirements.

### **3.1 HARDWARE REQUIREMENTS**

- Processor : Pentium IV 2.4 GHz.
- Hard Disk : 40 GB.
- Monitor : 15 VGA Colour.
- Mouse : Logitech.
- RAM : 512 Mb.

### **3.2 SOFTWARE SPECIFICATION**

- Operating system : Windows 7/10.
- Coding Language : PYTHON 3.8
- IDE : python 2.7.15

### **3.3 SOFTWARE DESCRIPTION**

Software Description is a technical specification of requirement of software product. This specifies the environment for development, operation and maintenance of the product.

#### **3.3.1 PYTHON**

Python is the popular programming language. In-fact you will see the code of python language as English language. Python 2 and Python 3 are the two major versions of Python. But , Python Installation for both the versions are different. In addition ,Commands and path environment variables for both the versions are different. Here it is used for most of the coding part since python is having various packages and functions which is easy and convenient than other languages.

##### **3.3.1.1 NUMPY**

It is a library for the Python programming language, adding support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays. Numpy has been taken into account here for numerical data analysis and to play with numbers in python.

##### **3.3.1.2 FLASK**

Flask is a web framework. This means flask provides you with tools, libraries and technologies that allow you to build a web application. Health care chat web application is built using this framework. Flask is part of the categories of the micro-framework.

##### **3.3.1.3 SKLEARN**

Scikit-learn (formerly scikits.learn and also known as sklearn) is a free software machine learning library for the Python programming language. It features various classification, regression and clustering algorithms including support-vector machines, random forests, gradient boosting, k-means and DBSCAN, and is designed to interoperate

with the Python numerical and scientific libraries NumPy and SciPy in the Healthcare chat bot system

### **3.3.1.4 NLTK**

Natural Language Tool Kit NLTK is a leading platform for building Python programs to work with human language data. It provides easy-to-use interfaces to corpora and lexical resources such as WordNet, along with a suite of text processing libraries for classification, tokenization, stemming, tagging, parsing, and semantic reasoning, wrappers for industrial-strength NLP libraries which is implemented in Health care chat-bot system.

### **3.3.2 JAVA SCRIPT**

JavaScript is a programming language commonly used in web development. It was originally developed by Netscape as a means to add dynamic and interactive elements to websites. It is used for connecting web servers here in Health care chat-bot system.

### **3.3.3 HTML AND CSS**

HTML stands for Hyper Text Markup Language. HTML describes the structure of web pages using mark up .

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language like HTML.

These are the main pillars for the background design of Health care chat-bot system where the features of design and colors are used.

## **CHAPTER 4**

## **SYSTEM DESIGN**

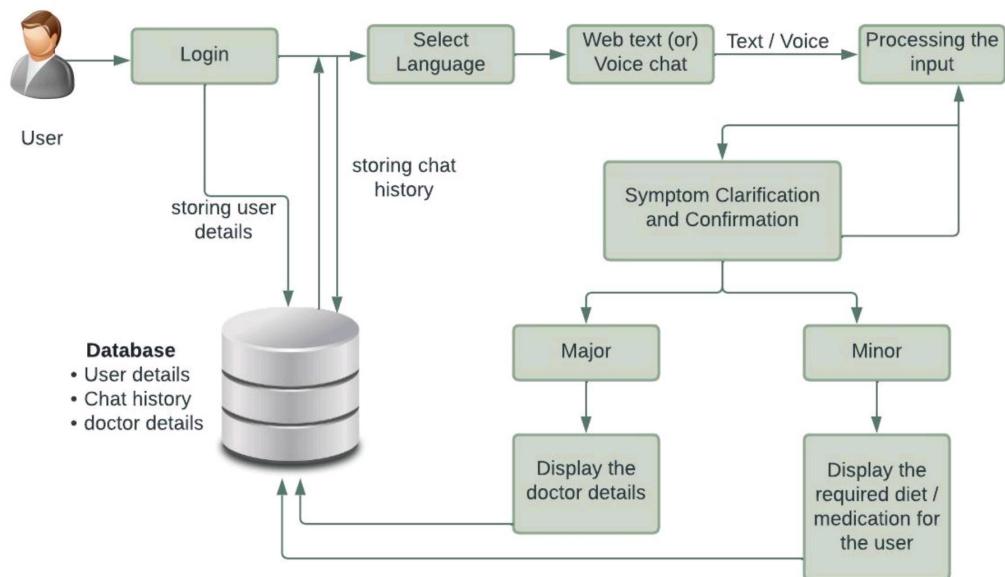
# CHAPTER 4

## SYSTEM DESIGN

System design is the process of planning a new system or to replace the existing system. Simply, system design is like the blueprint for building, it specifies all the features that are to be in the finished product.

### 4.1 SYSTEM ARCHITECTURE

A System architecture or systems architecture is the conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system. The user can start their conversation with the chat bot like user friendly and it will be stored in the database for future reference. The chat bot will clarify the users symptoms with serious of questions and the symptom conformation will be done. The disease will be categorized as minor and major disease. Chat bot will reply whether it's a major or minor disease



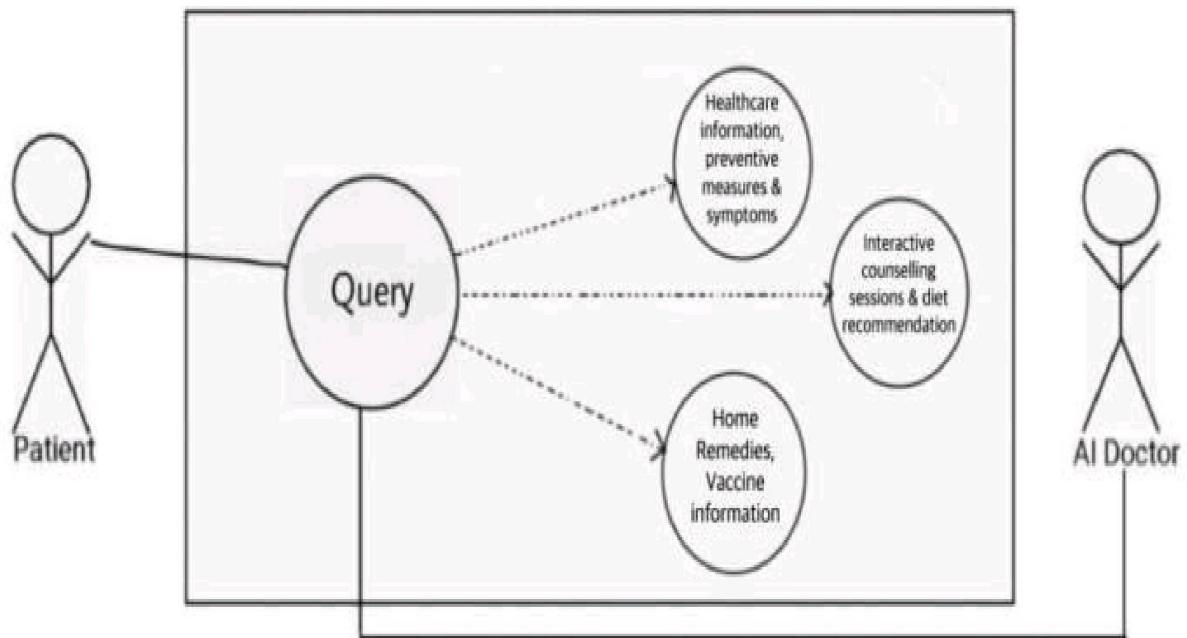
**Fig 4.1** System Architecture For Making a Health Care Chat Bot Using NLP

## 4.2 UML DIAGRAM

### 4.2.1 USE CASE DIAGRAM

Use Cases are used to describe the visible interactions that the system will have with users and external systems. They are used to describe how a user would perform their role using the system

Our use case depicts how the user can initiate a query through our system for which our chat bot via the cosine similarity and TF - IDF algorithmic techniques fetches the data from the trained datasets and provides data that is required to the user and provides various features for users convenience.

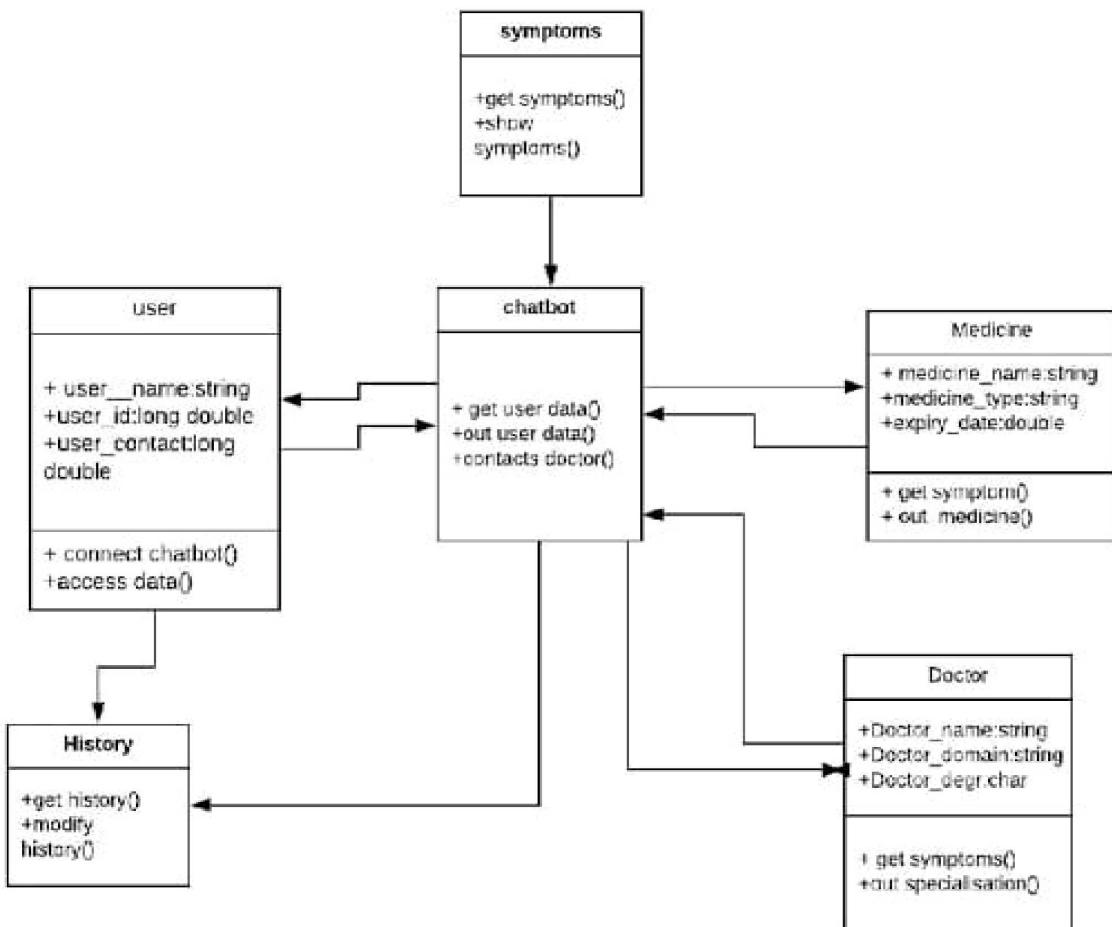


**Fig 4.2** Use Case Diagram For Making a Health Care Chat Bot Using NLP

## 4.2.2 CLASS DIAGRAM

The class diagram is a static structure diagram. It represents the static view of an application. In the design of a system, a number of classes are identified and grouped together in a class diagram that helps to determine the static relations between them.

Our class diagram depicts the relationship between the various symptoms that user could probably have which when the user inputs to the system it fetches the information data accordingly from the database and classifies it into minor and major and if its major it provides the details of nearest doctors and their address, if its minor one our system suggests related diet, analgesics and medicines according to the respective symptoms.

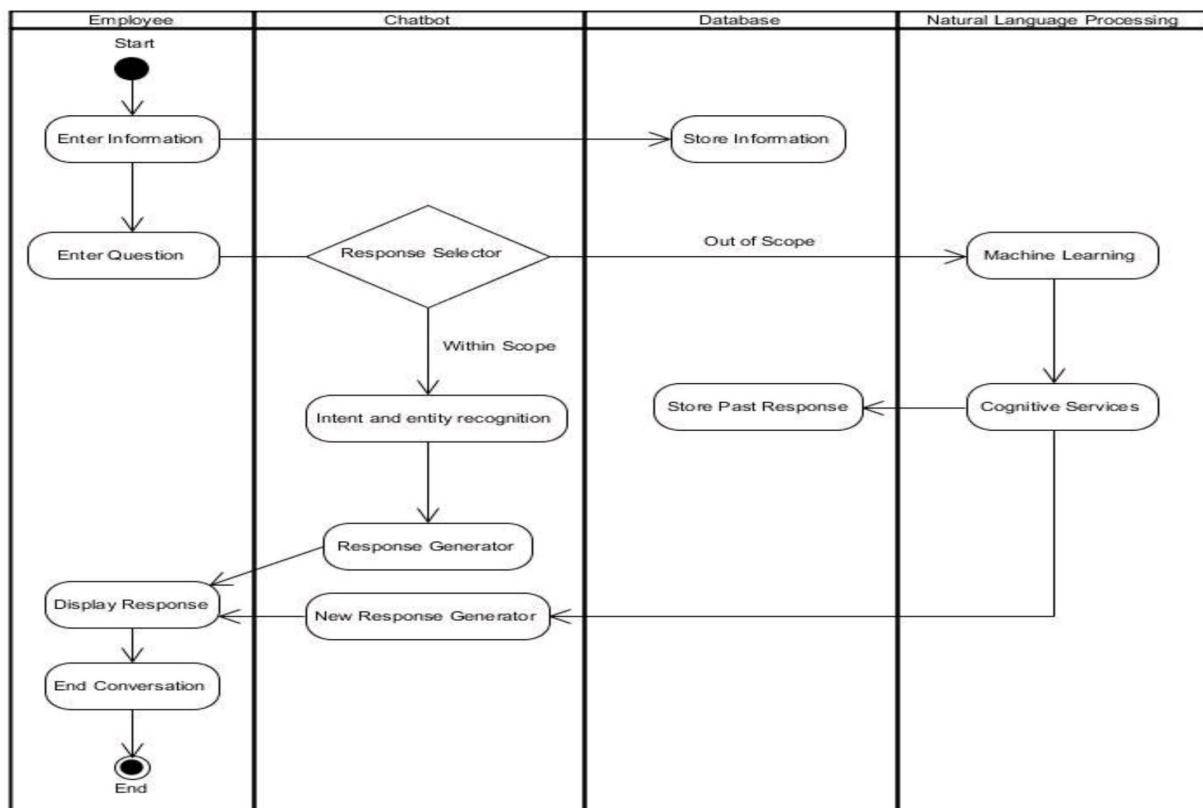


**Fig 4.3** Class Diagram For Making a Health Care Chat Bot Using NLP

#### 4.2.3 ACTIVITY DIAGRAM

Activity diagram is defined as a UML diagram that focuses on the execution and flow of the behavior of a system instead of implementation. It is also called object-oriented flowchart. Activity diagrams consist of activities that are made up of actions which apply to behavioral modeling technology.

Our system does the following activity from taking in the input from the user which then is processed word by word, sentence by sentence using our proposed algorithms which is cosine similarity using TF - IDF, then the related information to the input symptoms is fetched from the database and is provided to the user. Diving deep into the process the fetched information would be classified it into minor and major and if its major it provides the details of nearest doctors and their address, if its minor one our system suggests related diet, analgesics and medicines according to the respective symptoms.

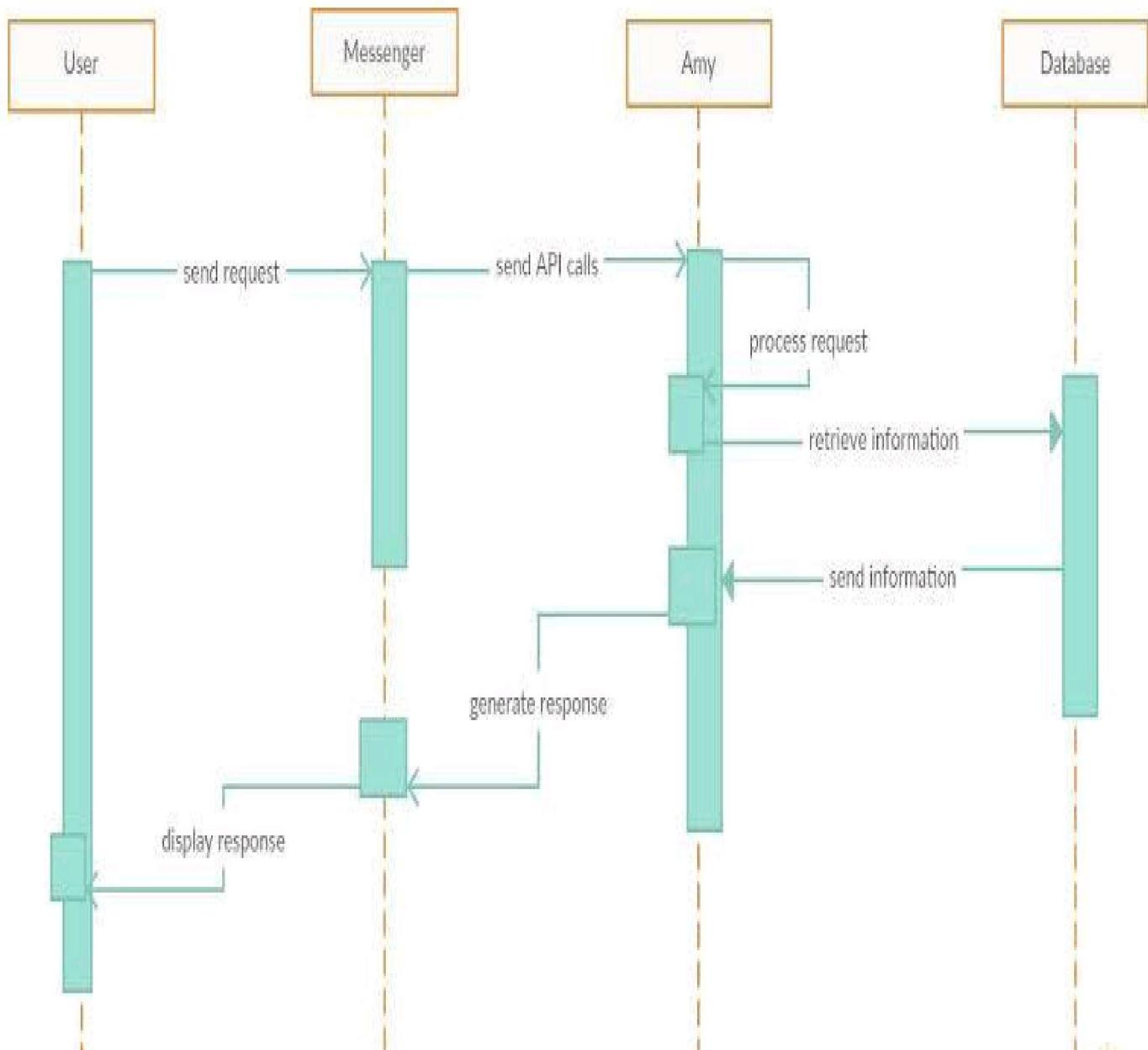


**Fig 4.4** Activity Diagram For Making a Health Care Chat Bot Using NLP

#### 4.2.4 SEQUENCE DIAGRAM

A Sequence diagram is a kind of interaction diagram that shows how processes operate with one another and in what order. It is a construct of a Message Sequence Chart.

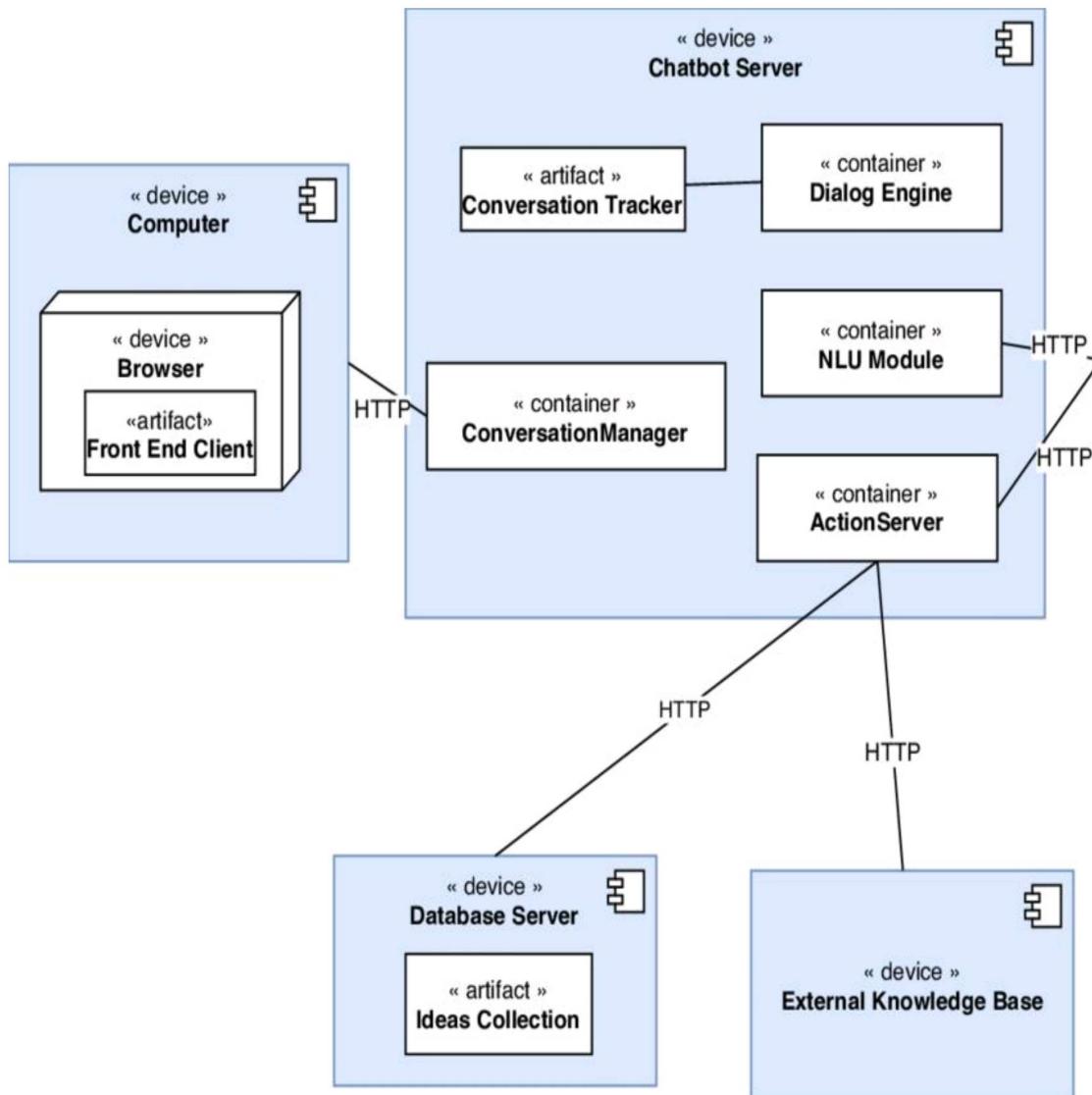
We have 4 sequences which are the user, messenger or the bot, algorithm for API, and the database.



**Fig 4.5** Sequence Diagram For Making a Health Care Chat Bot Using NLP

#### 4.2.5 COLLABORATION DIAGRAM

A collaboration diagram, also called a communication diagram or interaction diagram, is an illustration of the relationships and interactions among software objects in the Unified Modeling Language (UML). The concept is more than a decade old although it has been refined as the modeling paradigms have evolved. The different services need to interact to get the right information at the right time which is possible by threading from the different processes.



**Fig 4.6** Collaboration Diagram For Making a Health Care Chat Bot Using NLP

## **CHAPTER 5**

### **SYSTEM IMPLEMENTATION**

## **CHAPTER 5**

### **SYSTEM IMPLEMENTATION**

#### **5.1 LIST OF MODULES**

- ❖ User Validation And Extraction Of Symptoms
- ❖ Mapping Extracted Symptoms With Trained Datasets
- ❖ Specifying The Disease And Referring A Doctor

#### **5.2 MODULE DESCRIPTION**

##### **5.2.1 USER VALIDATION AND EXTRACTION OF SYMPTOMS**

The validation of the user login details occurs here. Then Symptoms are extracted using String Searching Algorithm where substring representing the symptoms is identified in the natural language text input. When users give directly the symptom name such as(e.g. -I have cough, fever, and nausea||), the system will easily identify it. But however, the system should also be able to handle input like, -When I read, I‘m okay at first, but over time, my eyes seem to get tired, and I start to see double.|| In this case, the system should extract substrings like -eyes tired|| and -see double|| (and not substrings like -read|| or -okay||).

##### **❖ SPEECH RECOGNITION**

Speech recognition means that when humans are speaking, a machine understands it. Here we are using Google Speech API in Python to make it happen. We need to install the following packages for this – Pyaudio – It can be installed by using pip install Pyaudio command.

## ❖ SPEECH TO TEXT (STT)

An audio file or speech spoken to a microphone is processed and converted to text, therefore it is also known as Speech-to-Text (STT). Speech-to-Text, or STT, is an easy-to-use API powered by Google's AI technologies to convert speech into text. Speech-to-Text can use one of several machine learning models to transcribe your audio file.

## 5.2.2 MAPPING EXTRACTED SYMPTOMS WITH TRAINED DATASETS:

Given some extracted substring from the user's input, we generate a list of suggested closest symptoms .We then ask the user to confirm if they have any of the suggested symptoms. Based on their reply few diseases are being shortlisted. Then further symptom clarification and symptom suggestions are being done by asking the users a series of questions and the mapping of the symptoms to the exact disease is done.

## ❖ LANGUAGE DETECTION

The idea behind language detection is based on the detection of the character among the expression and words in the text. The main principle is to detect commonly used words like to, of in English. Python provides various modules for language detection

## ❖ LANGUAGE PROCESSING (NLP)

Natural language processing (NLP) is a field that focuses on making natural human language usable by computer programs. NLTK, or Natural Language Toolkit, is a Python package that you can use for NLP. A lot of the data that you could be analyzing is unstructured data and contains human-readable text.

### **5.2.3 SPECIFYING THE DISEASE AND REFERRING A DOCTOR**

This process carries the list of diseases in the database and each symptom being entered is compared to the symptoms of the common diseases. Next symptom is checked until a matching one is found. The diseases are shortlisted based on the end users input on the question evaluation. The accurate disease is identified and specified to the end user by the chat bot. The chat bot checks whether the identified disease is a major issue or minor issue based on the conditions built in the chat bot. If it is a major issue the chat bot refers a specialist

### **❖ NATURAL LANGUAGE UNDERSTANDING (NLU)**

Natural Language Understanding (NLU) is a Python library that allows to extract structured information from sentences written in natural language. Rasa is a tool to build custom AI chat bots using Python and natural language understanding (NLU). Rasa provides a framework for developing AI chat bots that uses natural language understanding (NLU). It also allows the user to train the model and add custom actions

### **❖ TEXT TO SPEECH (TTS)**

Text to speech (TTS) is the conversion of written text into spoken voice. You can create TTS programs in python. The quality of the spoken voice depends on your speech engine.

## **CHAPTER 6**

### **TESTING**

# **CHAPTER 6**

## **TESTING**

Testing is the process of executing a program or application with the intent of finding software bugs, and to verify that the software product is fit for use.

### **6.1 UNIT TESTING**

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application and done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results..

#### **6.1.1 TEST OBJECTIVES**

- All field entries must work properly.
- Pages must be activated from the identified link.
- The entry screen, messages and responses must not be delayed.

#### **6.1.2 FEATURES TO BE TESTED**

- Verify that the entries are of the correct format
- No duplicate entries should be allowed
- All links should take the user to the correct page.

### 6.1.3 TEST CASES OF MAKING A CHATBOT USING NLP

ID	TEST CASES	PRE-CONDITIONS	EXPECTED RESULTS	ACTUAL RESULTS	PASS/FAIL
TC001	Cleaning the queries	Separated queries	Successfully cleaning queries	Successfully cleaning queries	PASS
TC002	Finding sentiment in the Queries	Tweets which are not separated	Successful finding of sentiment in the queries	Successful finding of sentiment in the queries	PASS
TC003	Topic modelling	Words in the dataset	Successfully finding the weightage of each topic.	Successfully finding the weightage of each topic.	PASS
TC004	Common key Words	Words in the dataset	Successfully finding the Common Words	Successfully finding the Common Words	PASS
TC005	Initialization of chat bot system	Internet Connection	Sucessful Initialization of chat bot system	Sucessful Initialization of chat bot system	PASS

<b>ID</b>	<b>TEST CASES</b>	<b>PRE-CONDITIONS</b>	<b>EXPECTED RESULTS</b>	<b>ACTUAL RESULTS</b>	<b>PASS/FAIL</b>
TC006	Cosine Similarity	Interactive chat sessions	Sucussful execution test cases Cosine Similarity	Sucussful execution test cases Cosine Similarity	PASS
TC007	Term Frequency Logarithm Examinations	Interactive inputs from the user.	Successful Term Frequency Logarithm Examinations	Successful Term Frequency Logarithm Examinations	PASS
TC008	Inverse Document Frequency Checks	Interactive input queries from users.	Successful execution Inverse Document Frequency Checks	Successful execution Inverse Document Frequency Checks	PASS
TC009	Chat History	Chat with the bot till the end of the session	Successful Saved history of chat in the database	Successful Saved history of chat in the database	PASS

ID	TEST CASES	PRE-CONDITIONS	EXPECTED RESULTS	ACTUAL RESULTS	PASS/FAIL
TC010	Near by local doctors / Physician Check	Have a major symptom for the user	Successful display of the nearby local doctor according to the pincode.	Successful display of the nearby local doctor according to the pincode	PASS
TC011	Analgesics/medicine s and diet	Have a valid symptom	Sucessfull verification of right diet and medicines	Sucessfull verification of right diet and medicines	PASS
TC012	Voice and language check	Valid input with active internet connection	Sucessfull voice recognition	Sucessfull language detection (English)	PASS

**Table 6.1 Test Cases Of Making A Chatbot Using NLP**

## 6.2 Integration testing

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

## **6.3 Functional testing**

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Functional testing is centered on the following items:

Valid Input : identified classes of valid input must be accepted.

Invalid Input : identified classes of invalid input must be rejected.

Functions : identified functions must be exercised.

Output : identified classes of application outputs must be exercised.

Systems/Procedures: interfacing systems or procedures must be invoked.

Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identify Business process flows; data fields, predefined processes, and successive processes must be considered for testing. Before functional testing is complete, additional tests are identified and the effective value of current tests is determined.

## **6.4 System Testing**

System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An example of system testing is the configuration oriented system integration test. System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points.

## **CHAPTER 7**

## **RESULTS AND DISCUSSION**

## **CHAPTER 7**

### **RESULTS AND DISCUSSION**

#### **7.1 RESULTS**

In the future, the bot's symptom recognition and diagnosis performance could be greatly improved by adding support for more medical features, such as location, duration, and intensity of symptoms, and more detailed symptom descriptions. The implementation of Personalized Medical assistants heavily relies on AI algorithms as well as the training data. Atlast, the implementation of personalized medicine would successfully save many lives and create medical awareness among the people. As said before, the future era is the era of messaging app because people going to spend more time in messaging app than any other apps. A text-to-text diagnosis Bot engages patients in conversation about their medical issues and provides a personalized diagnosis based on their symptoms. Hence, people will have an idea about their health and have the right protection.

#### **7.2 DISCUSSION**

Thus medical chatbot has wide and vast future scope. No matter how far people are, they can have this medical conversation. The only requirement they need is a simple desktop or smartphone with internet connection. The efficient of the chatbot can be improved by adding more combination of words and increasing the use of database so that of the medical chabot could handle all type of diseases. Even voice conversation can be added in the system to makeit more easy to use.

## **CHAPTER 8**

### **CONCLUSION AND FUTURE ENHANCEMENT**

## **CHAPTER 8**

### **CONCLUSION AND FUTURE ENHANCEMENT**

#### **8.1 CONCLUSION**

Chat bot is great tool for conversation between human and machine. The application is developed for getting a quick response from the bot which means without any delay it gives the accurate result to the user. It is concluded that, the usage of chat bot is user friendly and can be used by any person who knows how to type in their own language. Chat bot provides personalized diagnosis based on symptoms. From the review of various journals, it is concluded that, the usage of Chat bot is user friendly and can be used by any person who knows how to type in their own language inmobile app or desktop version. A medical chat bot provides personalized diagnoses based on symptoms.

#### **8.2 FUTURE ENHANCEMENT**

The future era is the era of messaging app because people going to spend more time inmessaging app than any other apps. The implementation of personalized medicine would successfully save many lives and create a medical awareness among the people. No matter how far people are, they can have this medical conversation. The only requirement they need is a simple desktop or smartphone with internet connection. The efficient of chat bot can be improved by adding more combination of words and increasing the use of database so that of the medical chat bot could handle all type of diseases.

## **ANNEXURE**

## **ANNEXURE**

## APPENDIX 1

### SOURCE CODE:

```
from flask import Flask, render_template, request
from chatterbot import ChatBot
from chatterbot.trainers import ChatterBotCorpusTrainer
import os
from chatterbot import ChatBot
from chatterbot.trainers import ListTrainer
filenumber=int(os.listdir('saved_conversations')[-1])
filenumber=filenumber+1
file= open('saved_conversations/'+str(filenumber),"w+")
file.write('bot :')
file.write('Hi There! I am a medical chatbot. You can begin conversation by typing')
file.write('in a message and pressing enter.\n')
file.close()
app = Flask(__name__)
english_bot = ChatBot('Bot',
                      storage_adapter='chatterbot.storage.SQLStorageAdapter',
                      logic_adapters=[
{
    'import_path': 'chatterbot.logic.BestMatch'
},
],
trainer='chatterbot.trainers.ListTrainer')
english_bot.set_trainer(ListTrainer)
@app.route("/")
def home():
    return render_template("index.html")
@app.route("/get")
```

```

def get_bot_response():
    userText = request.args.get('msg')
    response = str(english_bot.get_response(userText))

    appendfile=os.listdir('saved_conversations')[-1]
    appendfile= open('saved_conversations/'+str(filenumber),"a")
    appendfile.write('user : '+userText+'\n')
    appendfile.write('bot : '+response+'\n')appendfile.close()

    return response

if __name__ == "__main__":
    app.run()

from chatterbot import ChatBot
from chatterbot.trainers import ListTrainer
import os
try:
    except:
        os.remove("db.sqlite3")
        print("Old database removed. Training new database")
        print('No database found. Creating new database.')
        english_bot = ChatBot('Bot')
        english_bot.set_trainer(ListTrainer)
        for file in os.listdir('data'):
            print('Training using ' + file)
            convData = open('data/' + file).readlines()
            english_bot.train(convData)
            print("Training completed for " + file)

```

## **TRAINED DATA SETS:**

Stopped Growth :--> pred\_diseases:'Growth Disorder, Turner Syndrome', analgesics: 'Thyroid hormone pills, growth hormone injections', treatment scans:'Bone Age Xray, MRI scan', 'Meat, Seafood, Leafygreens, Diary, Spinach, Beef.

Wheezing, Coughing and troubled breathing, chest pain -->pred\_diseases: Asthma; analgesics: Metered dose inhalers, nebulizers; treatment scans: Asthma therapy; diet: Fruits and vegetables.

baby too small, weight<5.5 pounds-->pred\_diseases: 'Learning disabilities', analgesics: 'iron supplements', treatment scans: 'Temperature Control Incubator', diet: 'iron supplements'.

Repetitive behaviour, prefers to be alone-->pred\_diseases: 'Autism\r\n', analgesics: 'Ketamine, Midazolem', treatment scans: 'Teach social skills and cognitive behaviour', diet: 'Only yellow or white foods such as rice, potatoes or pasta and strictly avoid diary'.

Self-destructiveness, sadness and being upset-->pred\_diseases: 'Depression', analgesics: 'Prozac, Zoloft or Celexa', treatment scans: 'Constantly praise him, teach skills, and give self-development talks', diet: 'Fish and whole grains'.

Paleness, loss of energy, weightloss and easy bruising--pred\_diseases: 'Cancer or BrainTumor', analgesics: 'Morphine or Ibuprofen', treatment scans: 'Chemotherapy or Stem cell transplant', diet: 'Cheese, Meat, Seafood, Diary and Eggs'.

Fever, fever up to 102f, Tiredness or Loss of Appetite-->  
pred\_diseases:'Chickenpox',  
analgesics: 'Acetaminophen',  
  
treatment scans:'lukewarm bath and apply calamine lotion to itchy areas',  
diet: 'Raw fruits, Vegetables, Meat, Pastured eggs and avoid salty foods'.  
  
easy tiredness and overweight-->pred\_diseases:'Obesity',  
analgesics: 'Not suggested to take analgesics for obesity',  
  
treatment scans:'building healthy eating and drinking habits and  
physical activities like exercise',  
diet: 'Fruits and vegetables, and avoid skipping breakfast'.

Severe toothache--> pred\_diseases:'Cavities\r\n', analgesics: 'Ibuprofen  
or Aspirin', treatment scans: 'Fluoride toothpaste',  
diet: 'juices and avoid sweets, chocolates and unhealthy snacks'.

Often urinating, slow healing of bruises, weightloss-->pred\_diseases:  
'Diabetes', analgesics: 'Tylenol or Aspirin', treatment scans:'Insulin  
Treatment', diet: 'brown rice or cereals with two eggs daily'.

High body temperature, severe headache and tiredness-->pred\_diseases:  
'Fever',  
analgesics: 'Paracetemol or Aspirin',

treatment scans:'Tylenol, Ibuprofen to treat stomach irritation', diet:  
'fluid intake like gatorade, fruit juices or milk'.

Depression, Eating Disorders-->

pred\_diseases: 'Drug or Smoke or Alcohol Addiction', analgesics: 'Baclofen, Gebapentin', treatment scans: 'Visiting Rehabilitation Centers, Help teens choose good friends and learn to say NO', diet: 'Green leafy vegetables'.

Swelling, irritation, breast or nipple pain-->pred\_diseases: 'Breast Cancer', analgesics: 'Tamoxifen', treatment scans: 'heart-smart diet and indulge in physical activity and avoid smoking', diet: 'whole grains, beans, legumes'.

Sudden Confusion, Dizziness, Loss of Balance-->pred\_diseases: 'Stroke', analgesics: 'Anti-platelet drugs like Plavix', treatment scans: 'Clot-bursting therapy', diet: 'Fruits and Vegetables, and avoid salt'.

Shortness of breath, or being inactive-->pred\_diseases: 'COPD', analgesics: 'Tudorza or Brovana', treatment scans: 'Inhalers and oral steroids', diet: 'Eggs, Cheese, Meat, fish, and Poultry'.

Forgetfulness or Confusion--> pred\_diseases: 'Alzheimer's disease', analgesics: 'Aricept or Exelon', treatment scans: 'MRI and CT scans', diet: 'berries, beans and whole grains'.

Chest pain, confusion, cough or fatigue-->pred\_diseases: 'Pneumonia or Influenza', analgesics: 'Levofloxacin', treatment scans: 'Plenty of fluids and get lot of rest', diet: 'Citrus fruits, Oily fish and Leafy greens'.

Often urinating, slow healing of bruises, weightloss-->pred\_diseases: 'Diabetes',  
analgesics: 'Tylenol or Aspirin', treatment scans:'Insulin Treatment',  
diet:'Brown rice or cereals with two eggs daily'.

reduced urine, swelling of legs or fatigue-->pred\_diseases: 'Kidney Disease',  
analgesics: 'Naproxen or Ibuprofen', treatment scans:'Dialysis',  
diet:'Berries, bell peppers, onions and apples'.

Fever, chills, rapid breathing and heart rate-->pred\_diseases: 'Blood poisoning', analgesics: 'Ceftriaxone or Azithromycin',  
treatment scans:'Vasoconstriction to narrow blood vessels', diet:'Leafy greens like spinach'.  
Fragile bones-->pred\_diseases: 'Brittle bone disease',  
analgesics: 'Biphosphonates, calcium and vitamin D supplements',  
treatment scans: 'VitaminD supplements and avoid smoking and alcohol',  
diet:'fruits and foods high on calcium'.

Skin wrinkles and aging--> pred\_diseases: 'No disease', analgesics:  
'Anti-aging creams',  
treatment scans: 'Blepharoplasty surgery to get rid of aging', diet:  
'Berries, Broccoli, Papaya, Spinach, Nuts and Avocado'.

Blurry and loss of vision--> pred\_diseases: 'Muscular Degeneration',  
analgesics: 'Lucentis or Macugen',  
treatment scans: 'Regular exercise and avoid smoking', diet:'Fish and vegetables'.

Blood pressure reading 140 or higher-->pred\_diseases: 'High blood pressure', analgesics: 'Thiazide diuretics',

treatment scans:'Physical activity like exercise and avoid smoking and drinking',

diet:'low-fat diary, whole grains and Fruits'.

Trouble sleeping or sleep, mood swings, vaginal dryness-->

pred\_diseases: 'Menopause',

analgesics: 'Isoflav capsules', treatment scans: 'Estrogen levels test',

diet:'Fish, Fruits, Vegetables and Diary'.

Cold, Allergies, Nasal problems-->pred\_diseases: 'Sinusitis',

analgesics: 'Acetaminophen or Nasal spray',

treatment scans: 'Antibiotics like Aspirin and Nasal sprays', diet:'Salmon, Avocados, Cherries and Beans'.

Pain while urine and ejaculation--> pred\_diseases: 'Prostate Cancer',

analgesics: 'Bicalutamide or Casodex',

treatment scans:'Radiation therapy or prostatectomy', diet: 'Veggies and fruits and low in meat'.

Trembling body parts and loss of balance-->pred\_diseases: 'Parkinson's disease', analgesics: 'Vesoret capsules',

treatment scans: 'Cardibopa-levodopa', diet:'Fruits and vegetables'. Buildup of fluids in legs, ankles and legs,

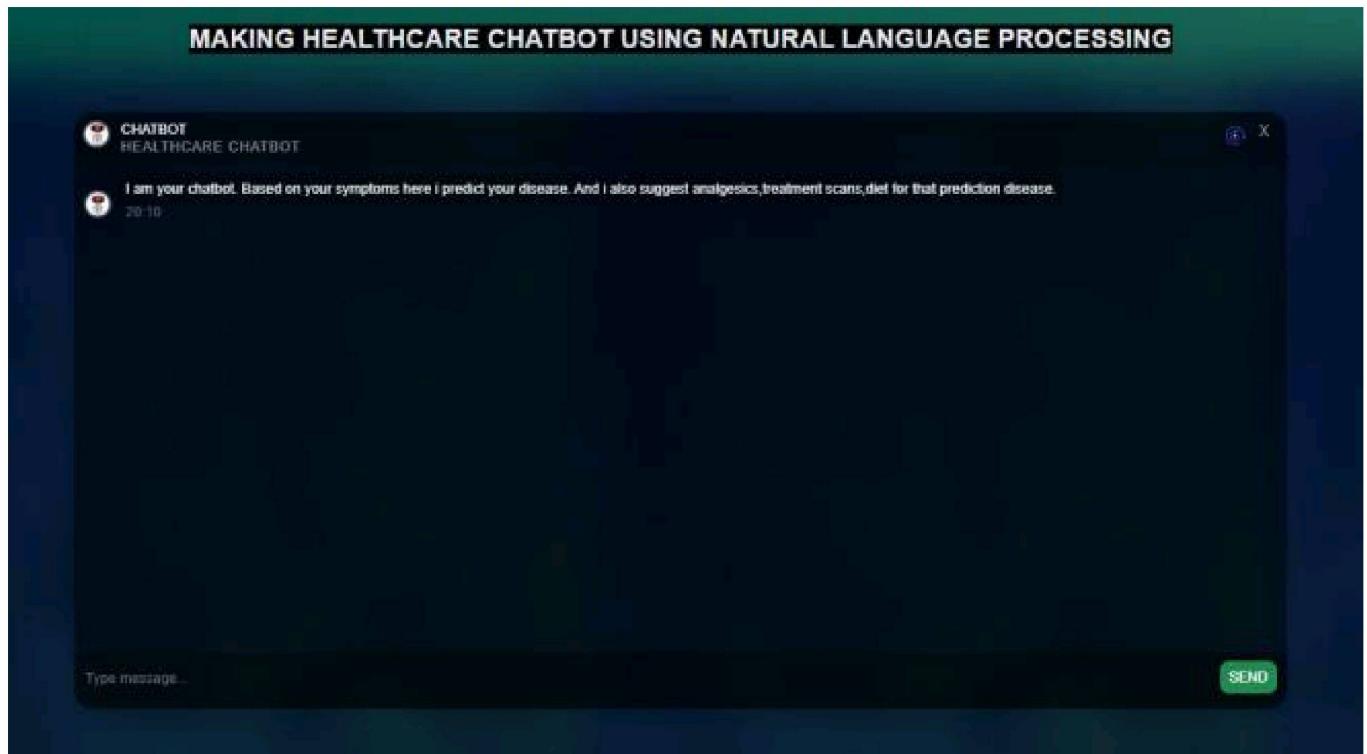
tiredness-->pred\_diseases: 'Heart failure',

analgesics: 'Carvedilol or Metoprolol', treatment scans: 'ACE inhibitors',

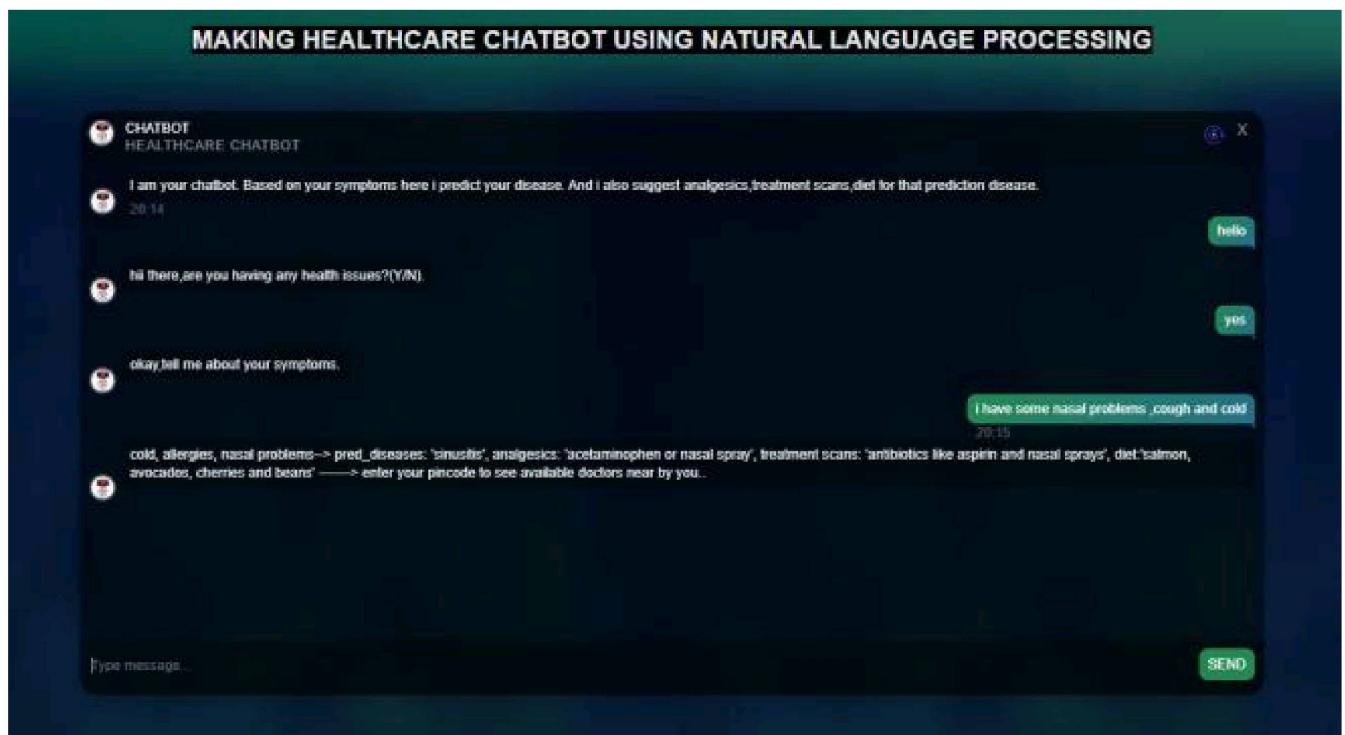
diet: 'Plain rice, fish, egg, milk and yoghurt'.

## APPENDIX 2

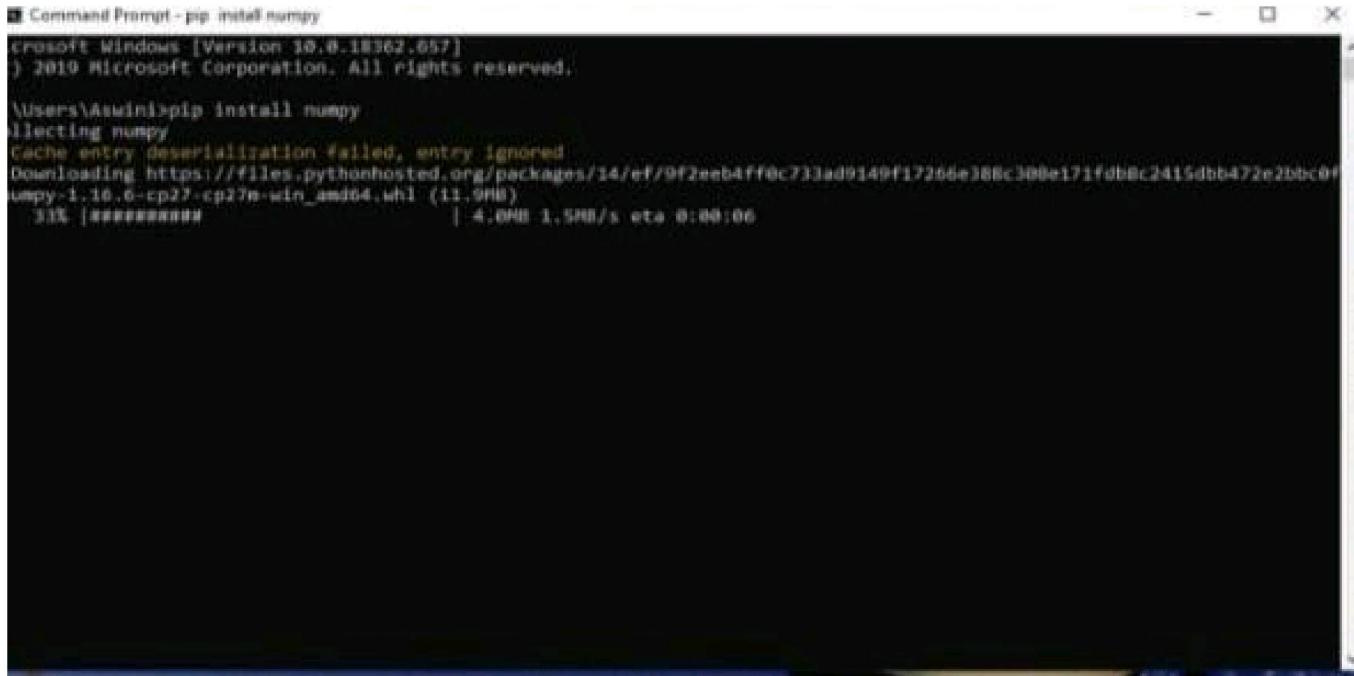
### SCREENSHOTS



CHAT BOT USER INTERFACE



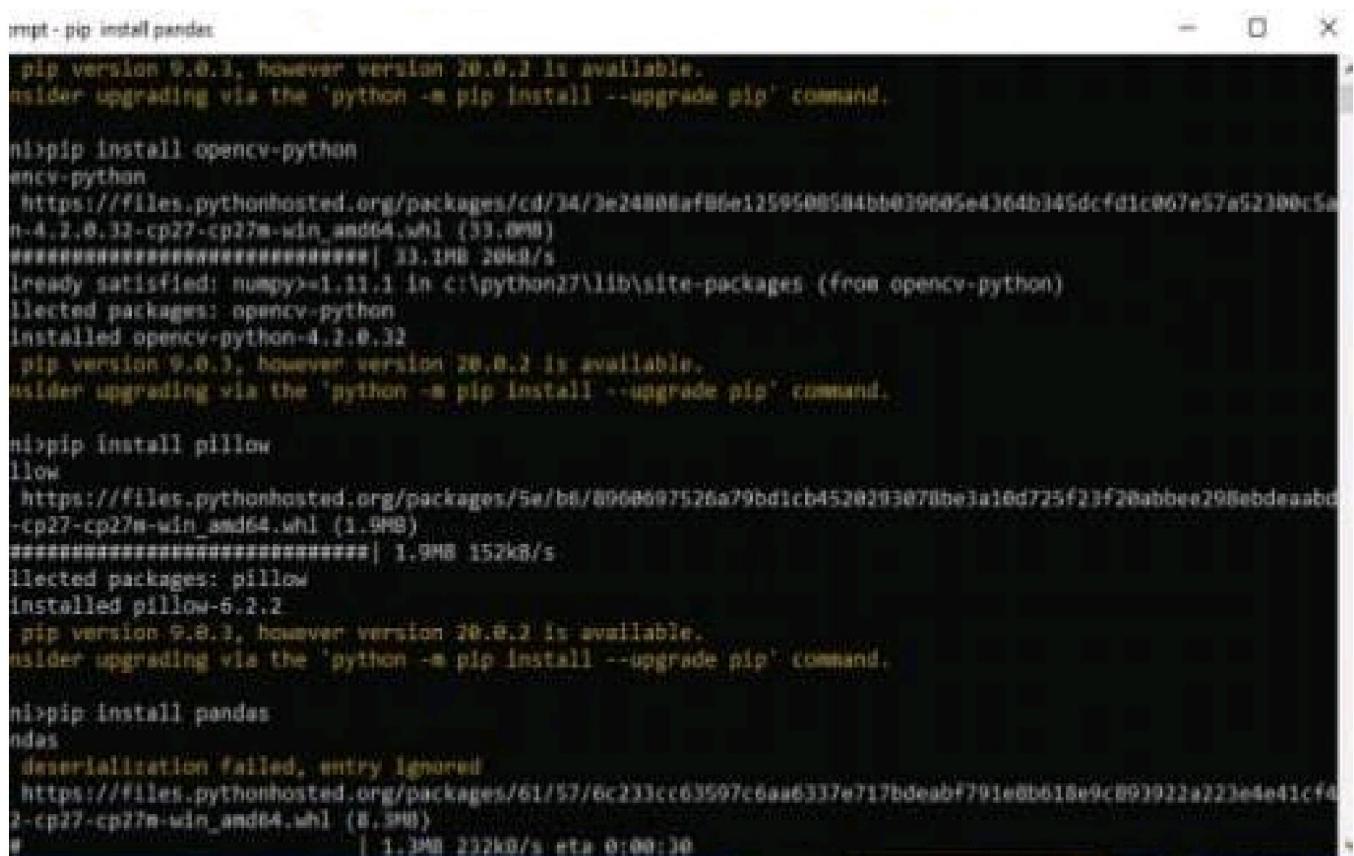
COMMUNICATION PAGE



```
Command Prompt - pip install numpy
Microsoft Windows [Version 10.0.18363.657]
Copyright © 2019 Microsoft Corporation. All rights reserved.

C:\Users\Aswin>pip install numpy
Collecting numpy
  Cache entry deserialization failed, entry ignored
    Downloading https://files.pythonhosted.org/packages/34/e1/9f2eeb4ff0c733ad9149f17266e388c398e171#q8bc2415dbb472e2bbc0/numpy-1.18.0-cp27-cp27m-win_amd64.whl (11.9MB)
      33% [=====] | 4.0MB 1.5MB/s eta 0:00:06
```

## LIBRARY FILE OF NUMPY



```
C:\Users\Aswin>pip install pandas
pip version 9.0.3, however version 20.0.2 is available.
Consider upgrading via the 'python -m pip install --upgrade pip' command.

C:\Users\Aswin>pip install opencv-python
Collecting opencv-python
  https://files.pythonhosted.org/packages/cd/34/3e24806af86e1259500584bb039605e4364b345dcfd1c067e57a52390c5a/opencv-4.2.0.32-cp27-cp27m-win_amd64.whl (33.0MB)
    33.0MB 20kB/s
Requirement already satisfied: numpy>=1.13.1 in c:\python27\lib\site-packages (from opencv-python)
Collecting opencv-python
  already satisfied: opencv-python
  installed opencv-python-4.2.0.32
  pip version 9.0.3, however version 20.0.2 is available.
  Consider upgrading via the 'python -m pip install --upgrade pip' command.

C:\Users\Aswin>pip install pillow
Collecting pillow
  https://files.pythonhosted.org/packages/5e/b8/8008097526a79bd1cb4520293078be3a10d725f21f28abbe298ebdeab...-cp27-cp27m-win_amd64.whl (1.9MB)
    1.9MB 152kB/s
Requirement already satisfied: pillow
  installed pillow-6.2.2
  pip version 9.0.3, however version 20.0.2 is available.
  Consider upgrading via the 'python -m pip install --upgrade pip' command.

C:\Users\Aswin>pip install pandas
Collecting pandas
  Cache entry deserialization failed, entry ignored
    https://files.pythonhosted.org/packages/61/57/6c233cc63507c6aa6337e717bdeabf791e00615e9c803922a723e4e41cf4/pandas-1.0.5-cp27-cp27m-win_amd64.whl (8.5MB)
      1.3MB 232kB/s eta 0:00:30
```

## FILES OF PANDAS

```

i have some nasal problems ,cough and cold
tfidf :  (0, 202)      0.11133870450855084
          (0, 113)      0.11133870450855084
          (0, 29)       0.11133870450855084
          (0, 221)      0.11133870450855084
          (0, 123)      0.11133870450855084
          (0, 39)       0.203127424272281
          (0, 276)      0.203127424272281
          (0, 188)      0.14397486328531503
          (0, 255)      0.10665375255868795
          (0, 196)      0.203127424272281
          (0, 351)      0.203127424272281
          (0, 9)        0.203127424272281
          (0, 257)      0.203127424272281
          (0, 326)      0.05731792775675753
          (0, 163)      0.203127424272281
          (0, 220)      0.203127424272281
          (0, 155)      0.406254848544562
          (0, 319)      0.203127424272281
          (0, 15)       0.05731792775675753
          (0, 310)      0.203127424272281
          (0, 332)      0.203127424272281
          (0, 110)      0.18129597401194208
          (0, 234)      0.203127424272281
          (0, 145)      0.406254848544562
          (0, 300)      0.203127424272281
          :
          (28, 175)     0.4284468757401365
          (28, 193)     0.21422343787006826
          (28, 132)     0.19592050348549248
          (28, 321)     0.18172364462933366
          (28, 120)     0.16031657808318403
          (28, 131)     0.18172364462933366
          (28, 250)     0.18172364462933366
          (28, 98)      0.10386449534157344
          (28, 231)     0.08463275484258913
          (28, 255)     0.12602449480406402
          (28, 326)     0.06772816441490306
          (28, 15)      0.06772816441490306
          (29, 293)     0.333333333333333337
          (29, 3)       0.333333333333333337
          (29, 320)     0.333333333333333337
          (29, 326)     0.333333333333333337

```

## OUTPUT OF TF-IDF

A	B	C	D	E	F	G	H	I	J	K	L	M	N
D	symptoms	disease											
		nasal congestion, itchy and watery eyes, sneezing, stuffy or runny nose, scratchy or sore throat, throat clearing, cough from postnasal drip.											
1	Allergy	Feel tired or lightheaded (sometimes with fainting) Weakness Fatigue easily Have decreased energy Appear pale											
2	anemia	Develop palpitations or rapid heart rate Experience shortness of breath											
3	cold/flu	Headaches, body aches, fever, and flu-like symptoms Nasal congestion, runny nose, and sneezing Cough											
4	asthma	Sore throat											
5	alzheimers	shortness of breath chest pain cough											
6	pregnancy	loss of orientation (to person, place, or time), agitation, irritability, quarrelsome ness, and											
7	hyperthyroid	a diminishing ability to care for him- or herself and to dress											
8	hypothyroid	absence of menstrual periods breast swelling and tenderness. Food cravings											
		a rapid heart rate, excessive sweating, intolerance to heat, tremor, nervousness, or agitation. Other symptoms can include fatigue, weight loss, hair loss, increased appet											
		fatigue, depression, mild weight gain, cold intolerance, sleepiness, constipation dry and coarse hair, dry skin, and muscle cramps. Blood cholesterol levels may be elevat											
		dehydration,											
		hunger,											
		increased urination, and											
		increased thirst.											
9	diabetes												
10	HIV AIDS	fever, swollen lymph nodes, joint and muscle aches, and sore throat. chills, night sweats, and mouth ulcers.											
11	high blood pressure	dizziness, shortness of breath, headache, and blurred vision nosebleeds, blood in the urine, fatigue, chest pain,											
12	Rheumatoid Arthritis	aches stiffness, muscle aches, low-grade fever, fatigue, lack of appetite, loss of energy . Joints can become warm, swollen, reddened, painful,											
		fatigue,											
		loss of appetite,											
		nausea,											
		jaundice (yellowing of the skin and eyes), and											
13	hepatitis B	pain in the upper right abdomen (due to the inflamed											
14	Dengue	headache, fever, exhaustion, severe muscle joint pain, swollen lymph nodes rash, fever, itchy rash, headache											
		fever and chills,											
		headaches,											
		nausea and vomiting, and											
15	Malaria	general weakness and body aches											
16	Chicken Pox	general weakness, fever up to 102 F, and red spots that start on the same day or so as the fever											
		Yellow discoloration of the skin, mucous membranes and											
		the whites of the eyes											
		Light-colored skin											
		Poor feeding											
		Lethargy/excessive sleepiness											
17	jaundice	Changes in muscle tone (either listless or stiff with arching of the back)											
18	Diarrhea	bowel movements are frequent watery. no signs of inflammation. cramping abdominal pain											
19	cataract	decrease in clarity of vision, not fully correctable with glasses. loss of contrast sensitivity. Disturbing glare in light											
		fever,											
		chills,											
		cough,											
		shortness of breath, and											
20	pneumonia	fatigue.											
		inability to urinate											
		painful, urgent need to urinate											
		pain or discomfort in the lower abdomen											
21	Urinary Retention	bloating of the lower abdomen											
		Waking up unrefreshed from lack of sleep											
		Daytime sleepiness and fatigue											
		Mood changes											
		Poor concentration and attention											
		Anxiety											
		Headaches											
		Lack of energy											
22	Insomnia	Increased errors and mistakes											
23	coronavirus	Difficulty breathing or shortness of breath, heavy cough, Persistent pain or pressure in the chest											

## TRAINED DATASET

## **REFERENCE**

## **REFERENCE**

- [1] Simon Hoermann, Kathryn L McCabe, David N Milne, Rafael A Calvo1,- Application of Synchronous Text- Based Dialogue Systems in Mental Health Interventions: Systematic Review, Journal of Medical Internet Research ,volume: 19 , issue 8 , 2019.
- [2] Saurav Kumar Mishra, DhirendraBharti, Nidhi Mishra, Dr.Vdoc: A Medical Chatbot that Acts as aVirtual Doctor, Journal of Medical Science and Technology,Volume: 6, Issue 3, 2020.
- [3] DivyaMadhu,Neeraj Jain C. J, ElmySebastain, ShinoyShaji, AnandhuAjayakumar, A Novel Approach for Medical Assistance Using Trained Chatbot,International Conference on Inventive Communication and Computational Technologies( ICICCT 2020).
- [4] HameedullahKazi,B.S. Chowdhry, ZeeshaMemon, MedChatBot: An UMLS based Chatbot for Medical Students, International Journal of Computer Applications (0975 – 8887) Volume 55– No.17,2021.
- [5] Doina Drăgulescu,Adriana Albu,Medi cal Predictions System, International Journal of Engineering Research and Applications , ISSN: 2248-9622 ,Vol. 2, Issue3 , pp.1988- 1996, 6 June 2021 .
- [6] Abbas Saliim I Lokman, Jasni Mohamad Zain, Fakulti Sistem Kom puter, KejuruteraanPerisian, Designing a Chatbot for Diabetic Patients,ACM Transactions on Management Information Systems (TMIS), Volume 4, Issue 2, August 2021 .
- [7] Pavlidou Meropi, Antonis S.Billis, Nicolas D.Hasanagas, Charalambos Bratsas,IoannisAntoniou,PanagiotisD. Bamidis, ConditionalEntropy Based Retrieval Model in Patient-Carer Conversational Cases,2021 IEEE 30th International conference on Computer-Based Medical System.

[8] BenildaEleonor V. Comendador, Bien Michael B. Francisco, Jefferson S. Medenilla, Sharleen Mae T. Nacion, and Timothy Bryle E. Serac,-Pharmabot: A Pediatric Generic Medicine Consultant Chatbot -, Journal of Automation and Control Engineering Vol. 3, No. 2, 2022.

[9] Gillian Cameron, David Cameron, Gavin Megaw, Raymond Bond, MauriceMulvenna, Siobhan O'Neill, Cherie Armour, Michael McTear,-Towards a chatbot for digital counselling ||,Journal of Medical Internet Research,2022.