

HEALTHCARE CHATBOT SYSTEM AND IOT BASED HEARTBEAT MONITOR USING ARDUINO

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Abstract—There are various treatments that are available for lots of diseases. No person can know about all the medicines and the diseases and their cure. So, the problem is, there isn't any place where anyone can have the details of the diseases of the Medicines. This paper presents the design & implementation of Healthcare Chatbot Application which monitors and gives a voice output for the recorded pulse bits of the user. It accesses the Data from Authenticated Persons from and provides the result for the pulse input rate on Mobile application. Designing a Android application having a authenticated login for the user. Show the Chatbot page Related to Healthcare, Recognize Medicines, Nearby Hospitals & Ambulance Services and Show the Data to the Patient. Health specialists have partial resources and are not able to personally monitor and support patients in their normal life. Against this phenomenon and due to the rising number of self-service services and digital health interventions, we examine how healthcare chatbots can be designed to well support patients and health professionals in beneficial settings beyond on-site consultations. Result of making this project is to make communication faster between patients and doctors, Patient can easily obtain data regarding basic factors such as pulse rate and consult a doctor using those data.

Keywords—Chatbot, Medicines, Pulse, Local Clinics, Hospitals.

I. INTRODUCTION

As people are getting busy according to their schedule day by day, they don't have time to reach the doctor over a long distance for checkup. So, our project provides the facility of providing an automated chatbot, which will chat with the patient automatically with the help of Artificial Intelligence and provide correct information to the patient according to his/her need. Our project will help to monitor the heartbeat or the heartrate of the concern patient who is suffering from heart problems such as blood pressure, heart attack, etc. Main scope of our project is, to provide appropriate/genuine information to the patient in a less time so that the needy person will be able to survive for long life.

II. IMPLEMENTATION DETAILS

Though chatbots one can connect with text or voice interface and get answer through artificial intelligence. Typically, a chat bot will connect with an actual individual. Chatbots are programs constructed to automatically involve with received messages. Chatbots can be automated to answer the same way each time, to answer inversely to messages comprehending certain keywords and even to use machine learning to familiarize their answers to fit the condition.

These bots attach with likely patients visiting the application, serving them discover specialists, booking their appointments, and getting them admission to the right treatment. In any case, the use of artificial intelligence in an industry where people's lives could be in question, still starts hesitations in people. It brings up problems about whether the job stated above must be allocated to human staff. This healthcare chatbot system will support hospitals to provide healthcare support online 24 x 7, it answers deep as well as general questions. By asking the questions in series it supports patients by controlling what exactly he/she is looking for.

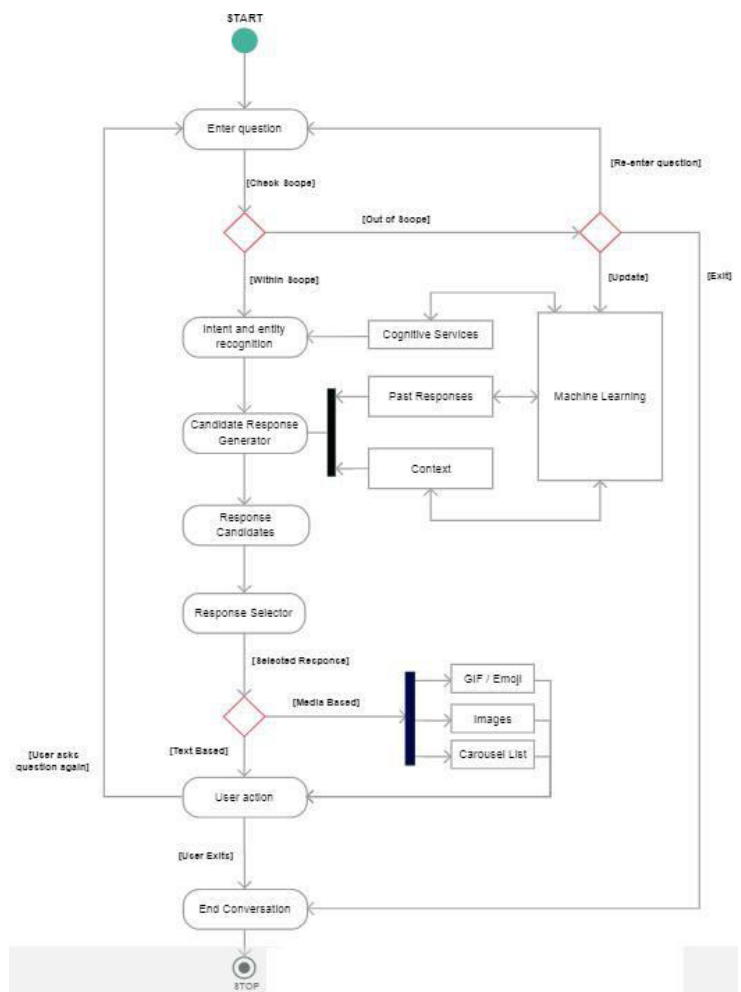


Fig. 1. System Functional Module

III. SOFTWARE AND HARDWARE REQUIREMENTS

Components Required:

- Arduino Uno
- Mega 2560
- Bluetooth Module HC-05
- Pulse Sensor / HRM / BPM
- 16x2 lcd
- Potentiometer
- 2n2222 npn transistors
- 10k Resistor
- lm7805 Voltage Regulator
- 330-ohm resistors pack
- female DC power jack socket
- 470 uf capacitors
- 5x7 cm vero board
- female headers
- connection wires
- Jumper Wires
- Bread Board
- 12v Adaptor
- PCB plate
- Digital Multimeter
- Vero Board / strip board

Circuit Diagram and Explanation:

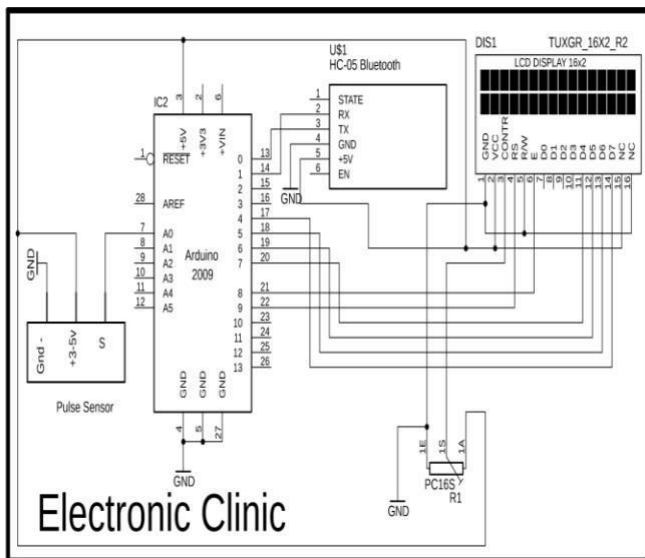


Fig. 2. Diagram for Arduino Base Heartbeat Pulse Rate Monitor

First of all, the Pulse sensor is also known as the heart rate monitoring sensor. This sensor module is accompanied with the transmitter and receiver LEDs. The phenomenon of light absorption of Hemoglobin is used in the measurement of heart rate. Light from a green LED on the bottom of the monitor is emitted on the blood vessels just below the skin. The light which is not absorbed but reflected back is detected by a Photodetector. Photodetector transmits an electrical signal when light strikes it. This analog signal is transformed into a digital signal, and slight variations of this signals are used to measure the heart rate.

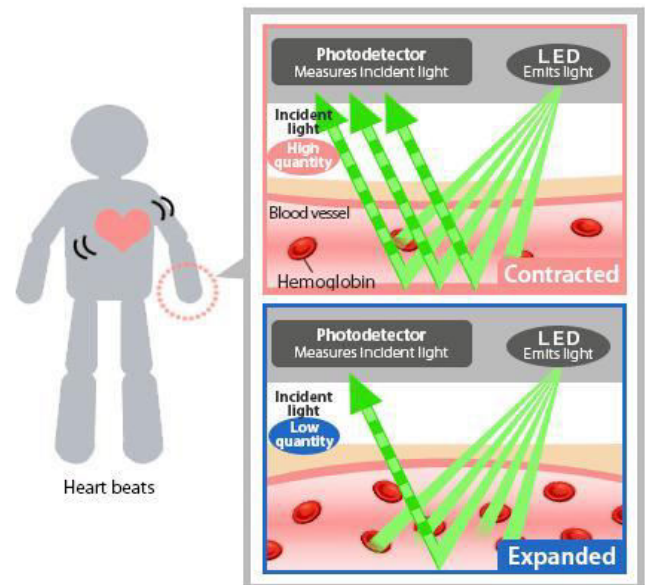


Figure 3: Pulse sensor working

Then connect the **Pulse Sensor with the Arduino**. The connections of the pulse sensor are very easy. The pulse sensor has three male headers which are labeled with 'S', '+' and '-'. 'S' is the Signal pin and will be linked with the analog pin of the Arduino. Plus pin which is the central pin is the VCC pin and this pin will be linked with the Arduino's 3.3 or 5volts. While the '-' pin is the ground pin and this pin will be coupled with the Arduino's Ground.

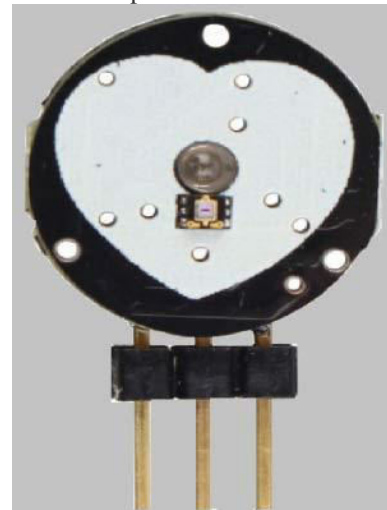


Fig. 4. Pulse Sensor for Heartbeat Detection

The HC 05 Bluetooth module +5volt or VCC pin is linked with the Arduino's 5 volts, the ground of the Bluetooth module is linked with the Arduino's ground. Connect Rx of the Bluetooth module with pin number 1 of the Arduino and attach the Tx of the Bluetooth module with pin number 0 of the Arduino.

The ground is linked with pin number 1, 5 and pin number 16. 5v from Arduino is linked with pin number 2 and pin number 15. The central pin of the variable resistor or potentiometer is linked with pin number 3 of the LCD...while the other two pins are linked with the ground

and 5v. Pin's 4 to 7 of the Arduino are linked with pins D7 to D4 of the LCD.

Pin number 8 of the Arduino is attached with the enable pin of the LCD. Pin number 9 of the Arduino is connected with the RS pin of LCD.

The vcc pin of the pulse sensor is linked with the 5v, but you can also attach this with 3.3v. The S pin of the pulse sensor is linked with the analog pin A0 and the ground pin of the pulse sensor is linked with the Arduino's ground.

IV. PROJECT INPUT AND OUTPUT AND SCREENSHOTS

The progress of the project can be tracked from thingspeak.com. The following chart shows the graph of the heart rate versus date.

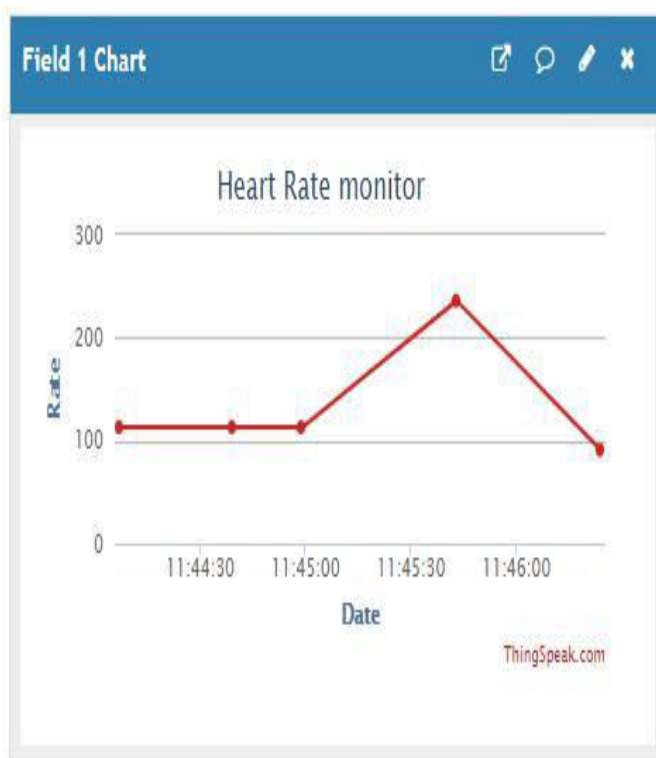


Fig .5. Heart rate Monitor

The following chart shows the graph of the pulse rate of a patient. This graph is achieved through the use of pulse sensor and Arduino.

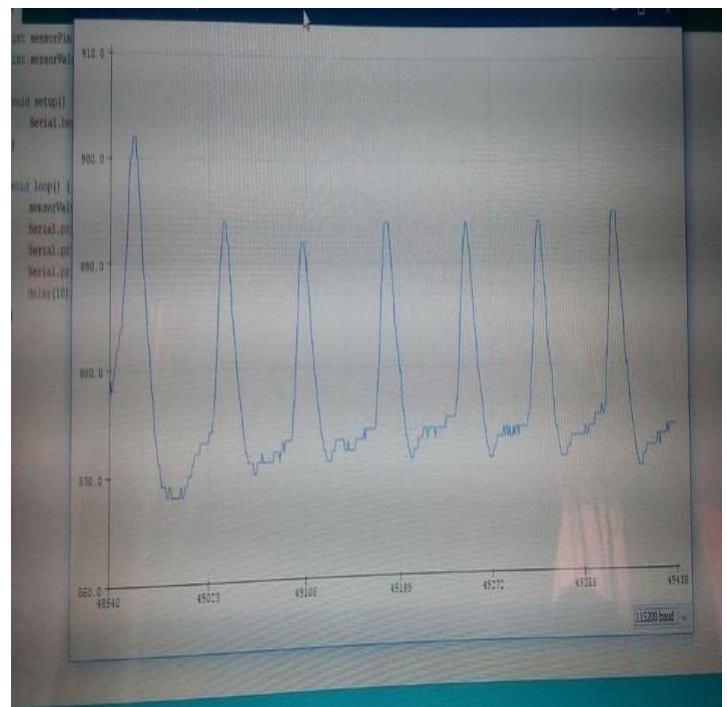
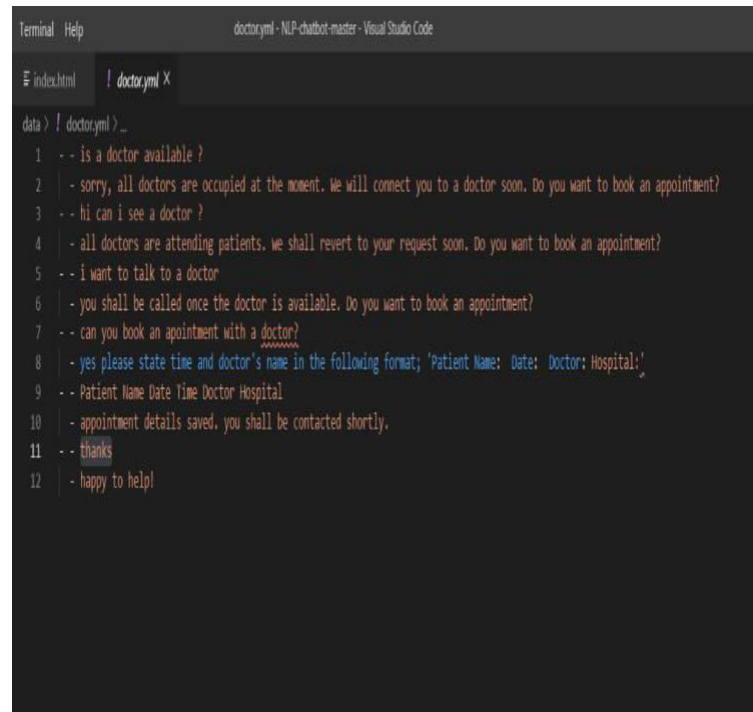


Figure .6. Pulse Bit Chart of Heartbeat Monitoring.

The following image shows the training of the chatbot through simple and basic questions and answers.



```

Terminal Help doctoryml - NLP-chatbot-master - Visual Studio Code
index.html ! doctoryml X
data> ! doctoryml _
1 - is a doctor available ?
2 - sorry, all doctors are occupied at the moment. We will connect you to a doctor soon. Do you want to book an appointment?
3 - hi can i see a doctor ?
4 - all doctors are attending patients. we shall revert to your request soon. Do you want to book an appointment?
5 - i want to talk to a doctor
6 - you shall be called once the doctor is available. Do you want to book an appointment?
7 - can you book an appointment with a doctor?
8 - yes please state time and doctor's name in the following format; 'Patient Name: Date: Doctor: Hospital:'
9 - Patient Name Date Time Doctor Hospital
10 - appointment details saved. you shall be contacted shortly.
11 - thanks
12 - happy to help!
  
```

Figure .7. Doctors Chats Training Questions & Answers

The following images show outputs for several situations or diseases of a patient discussed with the chatbot and its replies.

```
Terminal Help fracture.yml - NLP-chatbot-master - Visual Studio Code
index.html ! fracture.yml X
data > ! fracture.yml > ...
1 - my hand is aching.
2 - okay, did you get hurt, or it is a sudden aching.
3 - my leg is aching.
4 - okay, did you get hurt, or it is a sudden aching.
5 - my joint is aching.
6 - okay, did you get hurt, or it is a sudden aching.
7 - yes i got hurt.
8 - ok, is there a swelling or a physical deformity or bleeding at the aching region.
9 - it is a mild ache.
10 - ok, is there a swelling or a physical deformity or bleeding at the aching region.
11 - yes there is a swelling
12 - okay, it is a common symptom of fracture, should I book an appointment for you.
13 - yes there is a physical deformity.
14 - okay, it is a common symptom of fracture, should I book an appointment for you.
15 - yes it is bleeding.
16 - okay, it is a common symptom of fracture, should I book an appointment for you.
17 - yes i want to book an appointment.
18 - yes please state time and doctor's name in the following format; 'Patient Name: Date: Doctor: Hospital:'
19 - my hand is aching.
20 - okay, did you get hurt, or it is a sudden aching.
21 - my leg is aching.
22 - okay, did you get hurt, or it is a sudden aching.
23 - my joint is aching.
24 - okay, did you get hurt, or it is a sudden aching.
25 - yes i got hurt.
26
```

Figure .8. Fracture Chats Training Questions & Answers

```
Terminal Help cough.cold.yml - NLP-chatbot-master - Visual Studio Code
index.html ! cough.cold.yml X
data > ! cough.cold.yml > ...
63 - Okay, this is a symptom of cough , do you have cough?
64 - yes i have cough.
65 - You should take a spoon full of benadryl after your meal.
66 - ok, i will take the benadryl.
67 - let me know if you are feeling better after having benadryl.
68 - I took the dose of benadryl.
69 - Good, now take some rest and then let me know if you are feeling better after having benadryl.
70 - No, i am still not felling better after having benadryl.
71 - Ok, its not just a normal cough, you should consult a doctor.
72 - Can u book an appointment for me.
73 - yes please state time and doctor's name in the following format; 'Patient Name: Date: Doctor: Hospital:'
74 -
```

Figure .9. Cough & Cold Chats Training Questions & Answers

```
Terminal Help fever.yml - NLP-chatbot-master - Visual Studio Code
index.html ! fever.yml X
data > ! fever.yml > ...
1 - I am not feeling well.
2 - Okay. can you tell me what's wrong? what are your symptoms?
3 - My body temperature has raised.
4 - This is a symptom of fever, you should take a tablet of crocin after you have your meal.
5 - Ok, i will take the crocin.
6 - let me know if you are feeling better after having crocin.
7 - I took crocin.
8 - Good, now take some rest and then let me know if you are feeling better after having crocin.
9 - No, i am still not felling better after having crocin.
10 - Ok, its not just a normal fever, you should consult a doctor.
11 - Can u book an appointment for me.
12 - yes please state time and doctor's name in the following format; 'Patient Name: Date: Doctor: Hospital:'
13 - I am shivering.
14 - This is a symptom of fever, you should take a tablet of crocin after you have your meal.
15 - Ok, i will take the crocin.
16 - let me know if you are feeling better after having crocin.
17 - I took crocin.
18 - Good, now take some rest and then let me know if you are feeling better after having crocin.
19 - No, i am still not felling better after having crocin.
20 - Ok, its not just a normal fever, you should consult a doctor.
21 - Can u book an appointment for me.
22 - yes please state time and doctor's name in the following format; 'Patient Name: Date: Doctor: Hospital:'
23
24 - I am feeling weak.
25 - This is a symptom of fever, you should take a tablet of crocin after you have your meal.
26 - Ok, i will take the crocin.
27 - let me know if you are feeling better after having crocin.
28 - I took crocin.
29 - Good, now take some rest and then let me know if you are feeling better after having crocin.
30 - No, i am still not felling better after having crocin.
31 - Ok, its not just a normal fever, you should consult a doctor.
32 - Can u book an appointment for me.
33 - yes please state time and doctor's name in the following format; 'Patient Name: Date: Doctor: Hospital:'
34
```

Figure .10. Fever Chats Training Questions & Answers

```
Terminal Help generalhealth.yml - NLP-chatbot-master - Visual Studio Code
index.html ! generalhealth.yml X
data > ! generalhealth.yml > ...
1 - i feel sick
2 - okay. can you tell me what's wrong? what are your symptoms?
3 - i am sick
4 - okay. can you tell me what's wrong? what are your symptoms?
5 - i am not feeling well
6 - okay. can you tell me what's wrong? what are your symptoms?
7 - i do not feeling well
8 - okay. can you tell me what's wrong? what are your symptoms?
9 - i am not well
10 - okay. can you tell me what's wrong? what are your symptoms?
11 - i feel fine
12 - good to know. how may i assist you then?
13 - i am feeling fine
14 - good to know. how may i assist you then?
15 - i feel great
16 - good to know. how may i assist you then?
17 - i am feeling great
18 - good to know. how may i assist you then?
19 - i am great
20 - good to know. how may i assist you then?
21 - i feel awesome
22 - great to know. how can i assist you then?
23
24
```

Figure .11. General health Chats Training Questions & Answers

```
Terminal Help | headache.yml - NLP-chatbot-master - Visual Studio Code

index.html | headache.yml X

data > | headache.yml >
1 -- I have a headache
2 -- What kind of headache do you have : 1. Migraine headache - Intense throbbing pain on just one side of the head. 2. Cluster headaches -
3 -- I have a migraine headache
4 -- symptom noted. Migraines tend to be recurrent, and each attack may last up to 3 days. would you like to talk to a doctor?
5 -- I have a cluster headache
6 -- symptom noted. Attacks tend to occur in daily clusters that can persist for weeks or months. They typically take place at the same time
7 -- I have a tension headache
8 -- symptom noted. The cause of tension headaches is unclear, but stress, anxiety, and depression are common triggers. would you like to talk to a doctor?
9
```

Figure .12. Headache Chats Training Questions & Answers

```
index.html | greetings.yml X

data > | greetings.yml > [ ] > abc 1
1 -- hi there
2 -- hi. How are you feeling today?
3 -- Hello
4 -- Hi. How are you feeling today?
5 -- Hi
6 -- Hello. How are you feeling today?
7 -- Greetings!
8 -- Hello. How are you feeling today?
9 -- Hello
10 -- Namaste! How are you feeling today?
11 -- How are you feeling today?
12 -- Hi, How is it going?
13 -- The app is working great! How are you feeling today?
14 -- Hi, How are you feeling today?
15 -- I'm feeling fine. How are you feeling today?
16 -- Hi, How is it going?
17 -- It's a little busy today. How are you feeling?
18 -- Nice to meet you.
19 -- Thank you. How can I assist you? How are you feeling today?
20 -- How do you do?
21 -- I'm doing well. How are you feeling today?
22 -- How do you do?
23 -- I'm doing well. How are you feeling today?
24 -- Hi, nice to meet you.
25 -- Thank you. You too. How are you feeling today?
26 -- It is a pleasure to meet you.
27 -- Thank you. You too. How are you feeling today?
28 -- Top of the morning to you!
29 -- Thank you kindly. How are you feeling today?
30 -- Top of the morning to you!
31 -- And the rest of the day to you. How are you feeling today?
32 -- What's up?
33 -- Not much. How are you feeling today?
34 -- What's up?
```

Figure .14. Greeting Chats Training Questions & Answers

```
Terminal Help | index.html - NLP-chatbot-master - Visual Studio Code

index.html X | index.html

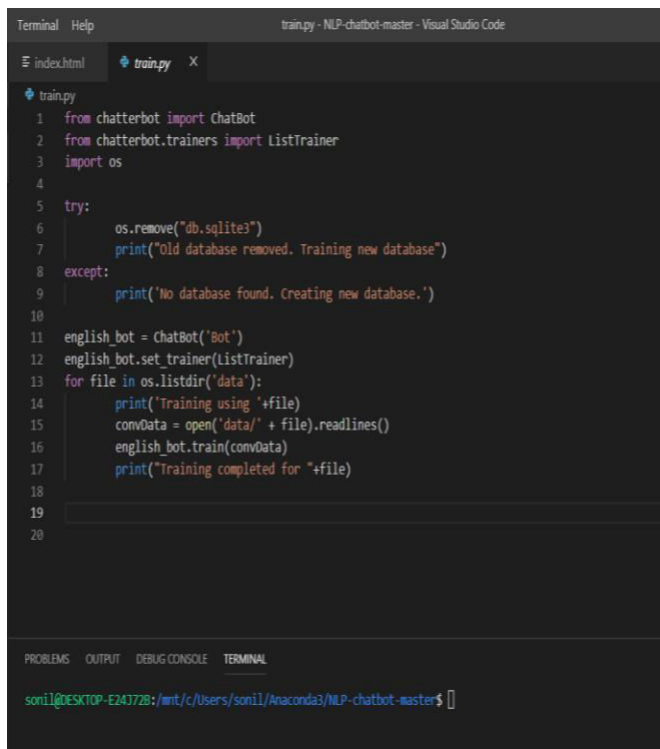
templates > | index.html
1 <!DOCTYPE html>
2 <html>
3 <head>
4 <link rel="stylesheet" type="text/css" href="/static/style.css">
5 <script src="https://ajax.googleapis.com/ajax/libs/jquery/3.2.1/jquery.min.js"></script>
6 </head>
7 <body>
8 <div id="chatbot">
9 <div id="chatbox">
10 <div class="botText"><span>Please try typing full sentences as I am still learning!</span></div>
11 <div class="botText"><span>I am a chatbot. You can begin conversation by typing in a message and pressing enter.</span></div>
12 <div class="botText"><span>Hi There! What is your name?</span></div>
13 </div>
14 <div id="userInput">
15 <input id="textInput" type="text" name="msg" placeholder="Message">
16 <input id="buttonInput" type="submit" value="Send">
17 </div>
18 <script>
19 function getBotResponse() {
20 var rawText = $("#textInput").val();
21 var userHtml = "<div class='userText'><span> + rawText + '</span></div>";
22 $("#textInput").val("");
23 $("#chatbox").append(userHtml);
24 document.getElementById("textInput").scrollIntoView(block: 'start', behavior: 'smooth');
25 $.get("/get", { msg: rawText }).done(function(data) {
26 var botHtml = "<div class='botText'><span> + data + '</span></div>";
27 $("#chatbox").append(botHtml);
28 document.getElementById("textInput").scrollIntoView(block: 'start', behavior: 'smooth');
29 });
30 }
31 }
32 $("#textInput").keypress(function(e) {
33 if(e.which == 13) {
34 getBotResponse();
35 }
```

Figure .13. Index Code for the Chatbot.

```
index.html | runpy X

runpy
1 from flask import Flask, render_template, request
2 from chatterbot import ChatBot
3 from chatterbot.trainers import ChatterBotCorpusTrainer
4 import os
5
6 from chatterbot import ChatBot
7 from chatterbot.trainers import ListTrainer
8
9 filename = int(os.listdir('saved_conversations')[0])
10 filename = filename + 1
11 file = open('saved_conversations/' + str(filename) + ".txt")
12 file.write("bot : Hi There! I am a medical chatbot. You can begin conversation by typing in a message and pressing enter.\n")
13 file.close()
14
15 app = Flask(__name__)
16
17
18 english_bot = ChatBot('Bot',
19 storage_adapter='chatterbot.storage.SQLStorageAdapter',
20 logic_adapters=[
21 {
22 'import_path': 'chatterbot.logic.BestMatch'
23 },
24 ],
```

Figure .15. Python Code for Running the program (Run.py)



```

1 from chatterbot import ChatBot
2 from chatterbot.trainers import ListTrainer
3 import os
4
5 try:
6     os.remove("db.sqlite3")
7     print("Old database removed. Training new database")
8 except:
9     print("No database found. Creating new database.")
10
11 english_bot = ChatBot('Bot')
12 english_bot.set_trainer(ListTrainer)
13 for file in os.listdir('data'):
14     print("Training using "+file)
15     convData = open('data/' + file).readlines()
16     english_bot.train(convData)
17     print("Training completed for "+file)
18
19
20

```

Figure .16. Python Coder for Training the bot.(Train.py)

V. ACKNOWLEDGMENT

We would like to thank our mentor, Prof. Jinesh Melvin for guidance and unwavering support throughout the project and the semester. We would like to thank our HOD, Dr. Satish Kumar L.Varma for their encouragement and motivation to learn and implement projects of sorts. Lastly, we would like to thank our principal, Dr. Sandeep Joshi for providing us opportunities to explore our domain and for motivating us to do better.

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