DATA COMMUNICATION NETWORKS

(ELE316T)

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COVIDified ?

Group 8

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1. ABSTRACT:

A *chatbot* is a virtual AI tool which acts as a human agent that can converse with the user. No one likes to go through online sites to find answers. And Customer care (calling customer support) is even more annoying sometimes and can be a time waste. Chatbots answer FAQ questions and solve the problems that can save the concerned employee time.

ChatBot working – The Chatbot technology treats the speech or text as an input, and then it searches for words for any matches. It will be using programming to conclude a best response. The basic normal chatbots give answers from the predefined FAQ page. Whereas the More advanced bots go off-script with full AI and machine learning interaction techniques.

Benefits - 24/7 access for your customers, Work faster than live agents, Have quality conversations with customers, Build stronger customer relationships, Escalate to support agents, Meet customer where they live etc.

Media has become the prime face for the public to know about pandemic that is going on, and there are many media channels that show cast the issue in different ways. We can't rely on social media for knowing the updates and letting your information known to someone in seek of assistance as there are many data breaches going on. The second wave of this deadly novel corona virus has hit us bad which needs more assistance, so in this case its tougher to have person to person attention for monitoring. Basically, one does not have minimal awareness on how to deal with, when a pandemic is outbroken. Also, a person is now hesitating to communicate or to open up to the other by the thought of being infected. As we are all together in these situations, assisting each other is what makes us humans.

That's where chatbots come in, which are handy and helps a lot to be your virtual assistant in assisting the people about the health conditions and suggesting ways to improve them. Also, available 24x7 whenever you need.

2. METHODOLOGY:

We are designing a chatbot to calculate the risk of covid19. The way the system works is like it is basically a server client system when a client login, server takes the basic information of the client like name, age and occupation. We have three python files – server.py client.py EncryptDecrypt.py. Initially we run server.py in the server side and the client (patient) has to run the client.py. Now the client login his details and then chatbot asks the client their occupation. If the occupation is other than doctor the server asks the basic questions in the way the doctor asks before examining the patient and from client responses the risk of covid19 is calculated and further steps are advised. Also, the responses are stored in encrypted form on the server. When the doctor login on the client side and enters the occupation as doctor the encrypted patient's details will be decrypted and downloaded, and then finally doctor can analyze the patient's situation.

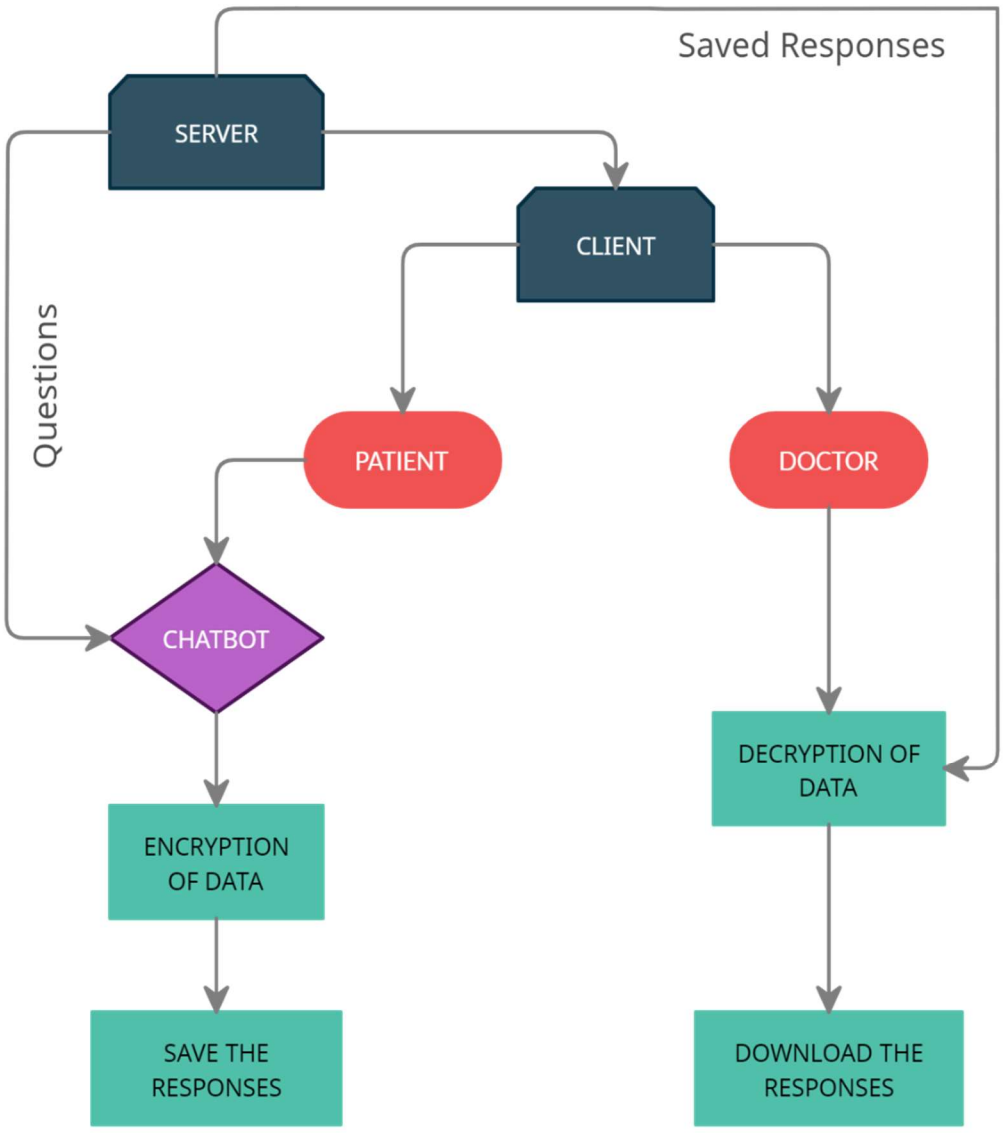
A client is basically a software or a computer that performs a service that is made available by the server. Meaning client requests server for a service. Whereas a server is a physical computer which is made to run services to meet the needs of the other computers. Servers can be any such as web server, database server.

Steps for implementation :-

1. Run server.py
2. Run client.py
    a. When the client is not a doctor.
        i. Server asks the basic details of the client (the occupation should not be doctor).
        ii. Server takes the questions from the text file which we have already made and asks the client.
        iii. With the responses from the client it calculates the risk percentage of covid 19.
        iv. The client responses are saved in encrypted form and saved on the server with filename "client's_name,age".
        v. When we type bye in the console the program will be terminated.

b. When the client is a doctor.
   i. Server asks the occupation when the client enters it as a doctor.
   ii. The responses of the previous patients which are saved in encrypted form are decrypted and then downloaded.

3. BLOCK DIAGRAM :



4. SIMULATION CODES :

Server.py :

```
import socket
import os
from cryptography.fernet import Fernet
import encryptFunctions

# encryptFunctions.write_key()
key=encryptFunctions.load_key()
fer=Fernet(key)

file = open('questions.txt', 'r')
Questions=[line for line in file]
size=len(Questions)
def decrypter(string):
    e=string.encode()
    encrypted=e
    decrypted_encrypted=fer.decrypt(encrypted)
    #print(decrypted_encrypted.decode())
    return decrypted_encrypted.decode()

def server_program():
    # get the hostname
    host = socket.gethostname()
    port = 5000  # initiate port no above 1024
    count=0
    answers=[]
    server_socket = socket.socket()  # get instance
    server_socket.bind((host, port))  # bind host address, port together
    server_socket.listen(50)
    conn, address = server_socket.accept()  # accept new connection
    print("Connection from: " + str(address))
    name= conn.recv(1024).decode()
    print("name:",name)
    Age= conn.recv(1024).decode()
    print("Age:",Age)
    Occupation= conn.recv(1024).decode()
    print("Occupation:",Occupation)
    if Occupation != "Doctor":
        while count<size:
#Receives data stream. It won't accept data packet greater than 1024 bytes
            que=conn.send(Questions[count].encode())
            ans = conn.recv(1024).decode()
            if not ans:
                # if data is not received break
                break
            if ans=="Y":
                answers.append(1)
            elif ans=="N":
                answers.append(0)
```

```
            print(name,"Q.no:",count+1,":",str(ans))
            count+=1
        percentage=(sum(answers)/len(answers))*100
        msg=" Dear "+name+" You have an approx "+str(percentage)+"
percentage chances of having COVID19 "
        if percentage>=75:
            msg+="\nYou are having a high risk of getting COVID19\nPlease
visit a nearby hospital & take a COVID test\nOr you may contact helpline"
        elif percentage<75 and 50<=percentage:
            msg+="\nYou are having an average risk of gettign COVID19\nSo
please make sure that you are quarantined for 2 weeks minimum"
        else:
            msg+="\nYou are having a low risk of having COVID19\nDon't
worry much\nTake Care."
        conn.send(msg.encode())
        conn.recv(1024).decode()
        path = 'D:\Project\chatbot\clients'
        f=open(os.path.join(path, name+".txt"), 'a')
        s="Patient name:"+name+"\n"
        for i in range(len(answers)):
            if answers[i]==1:
                a="|Yes"
            else:
                a="|No"
            s+=Questions[i]+"\n"+a+"\n"
        s=s.encode()
        s=fer.encrypt(s)
        f.write(s.decode())
        f.close()
    if Occupation=="Doctor":
        path = 'D:\Project\chatbot\clients'
        out=""
        out+="Questions\n"
        for i in range(len(Questions)):
            out+=Questions[i]+"\n"
        filenames = [i for i in os.listdir(path)]
        print(filenames)
        for fname in filenames:
            with open(os.path.join(path, fname)) as infile:
                count=0
                out+="\n"+"Patient Name:"+fname[:-4]+"\n"
                filedata=infile.read()
                decrypted_encrypted=decrypter(filedata)
                for line in decrypted_encrypted:
                    if line[0]=="Y" or line[0]=="N":
                        count+=1
                        out+="Q.no"+str(count)+": "+line+" "
        conn.send(out.encode())
    conn.close()  # close the connection

if __name__ == '__main__':
    server_program()
```

Client.py Code :

```
 1
 2 import socket
 3 def client_program():
 4     host = socket.gethostname()  # as both code is running on same pc
 5     port = 5000  # socket server port number
 6
 7     client_socket = socket.socket()  # instantiate
 8     client_socket.connect((host, port))  # connect to the server
 9     print("Enter your name:")
10     message = input(" -> ")  # take input
11     name=message;
12     client_socket.send(message.encode())  # send message
13     print("Please Enter your Age:")
14     message = input(" -> ")  # take input
15     Age=message
16     client_socket.send(message.encode())  # send message
17     print("Please Enter your Occupation:")
18     message = input(" -> ")  # take input
19     Occupation=message
20     client_socket.send(message.encode())  # send message
21     if Occupation != "Doctor":
22         print("Hi there! I'm a bot here to assess your covid-19 risk.");
23         print("Enter   'Y' for 'Yes'\n\t'N' for 'No'\n")
24         print("Type bye if you want to exit");
25     while ((message.lower().strip() != 'bye') and (Occupation!='Doctor')):
26         que = client_socket.recv(1024).decode()  # receive response
27         print('ChatBot: ' + que,end="")  # show in terminal
28         message = input(" -> ")  # again take input
29         client_socket.send(message.encode())  # send message
30         print("\n");
31     if Occupation=="Doctor":
32         print("Hey Doc, please checkout the file consisting of the details
33 of COVID patients")
34         fileData=client_socket.recv(8192).decode()
35         f=open("patientsDetails.txt","w")
36         f.write(fileData)
37         f.close()
38     client_socket.close()  # close the connection
39     print("Stay safe at home and rest.\n"
40           "Wash your hands often.\n"
41           "Maintain social distancing.\n"
42           "Make sure you monitor your symptoms.\n");
43
44 if __name__ == '__main__':
45     client_program()
```

EncryptDecrypt.py Code :

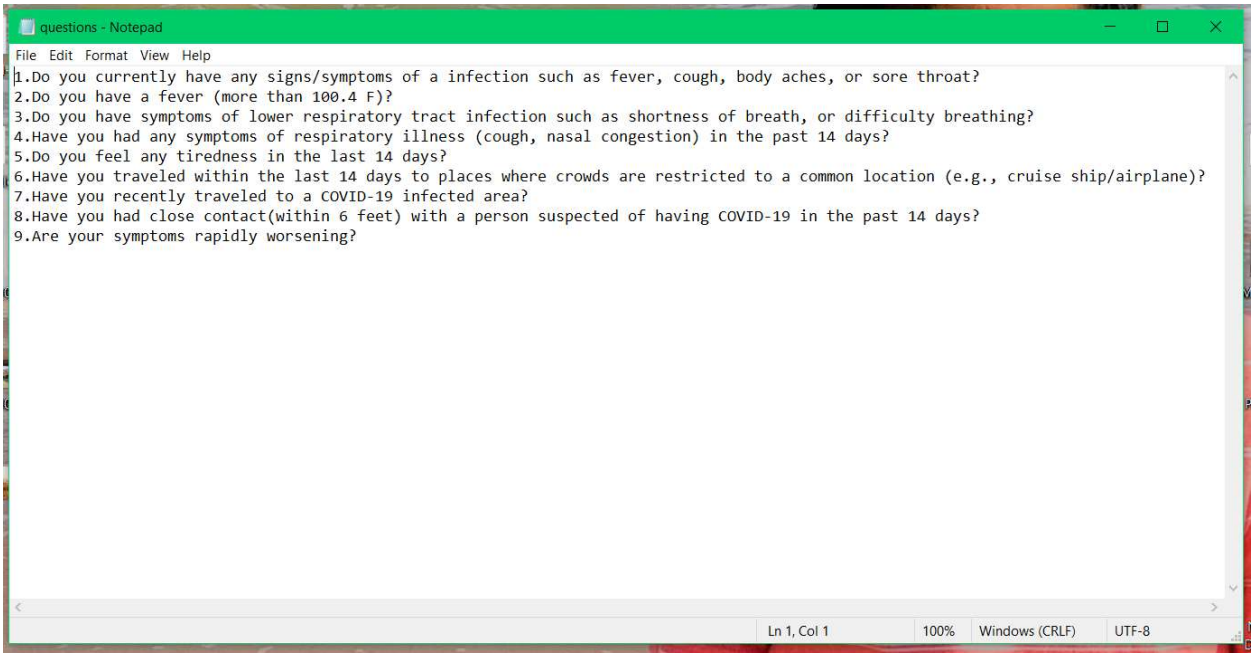
```
 1
 2 from cryptography.fernet import Fernet
 3 def write_key():
 4     key = Fernet.generate_key()
 5     with open("key.key", "wb") as key_file:
 6         key_file.write(key)
 7
 8 def load_key():
 9     return open("key.key", "rb").read()
10
11 def encrypt(filename, key):
12     """
13     Given a filename(str) and key(bytes),it encrypts the file and write it
14     """
15     f = Fernet(key)
16     # encrypt data
17     encrypted_data = f.encrypt(file_data)
18     # write the encrypted file
19     with open(filename, "wb") as file:
20         file.write(encrypted_data)
21
22 def decrypt(filename, key):
23     """
24     Given a filename(str) and key(bytes),it decrypts the file and write it
25     """
26     f = Fernet(key)
27     with open(filename, "rb") as file:
28         # read the encrypted data
29         encrypted_data = file.read() # decrypt data
30     decrypted_data = f.decrypt(encrypted_data)
31     # write the original file
32     with open(filename, "wb") as file:
33         file.write(decrypted_data)
```

5. RESULTS & DISCUSSIONS :

When we run the server.py
We get the corresponding IP address and port number.
Also it saves the responses of the patients for the time being.

```
In [3]: runfile('D:/Project/chatbot/server.py', wdir='D:/Project/chatbot')
Reloaded modules: encryptFunctions
Connection from: ('192.168.1.107', 50194)
name: Indra
Age: 20
Occupation: Artist
Indra Q.no: 1 : Y
Indra Q.no: 2 : Y
Indra Q.no: 3 : Y
Indra Q.no: 4 : Y
Indra Q.no: 5 : Y
Indra Q.no: 6 : N
Indra Q.no: 7 : Y
Indra Q.no: 8 : Y
Indra Q.no: 9 : Y
```

List of Questions :



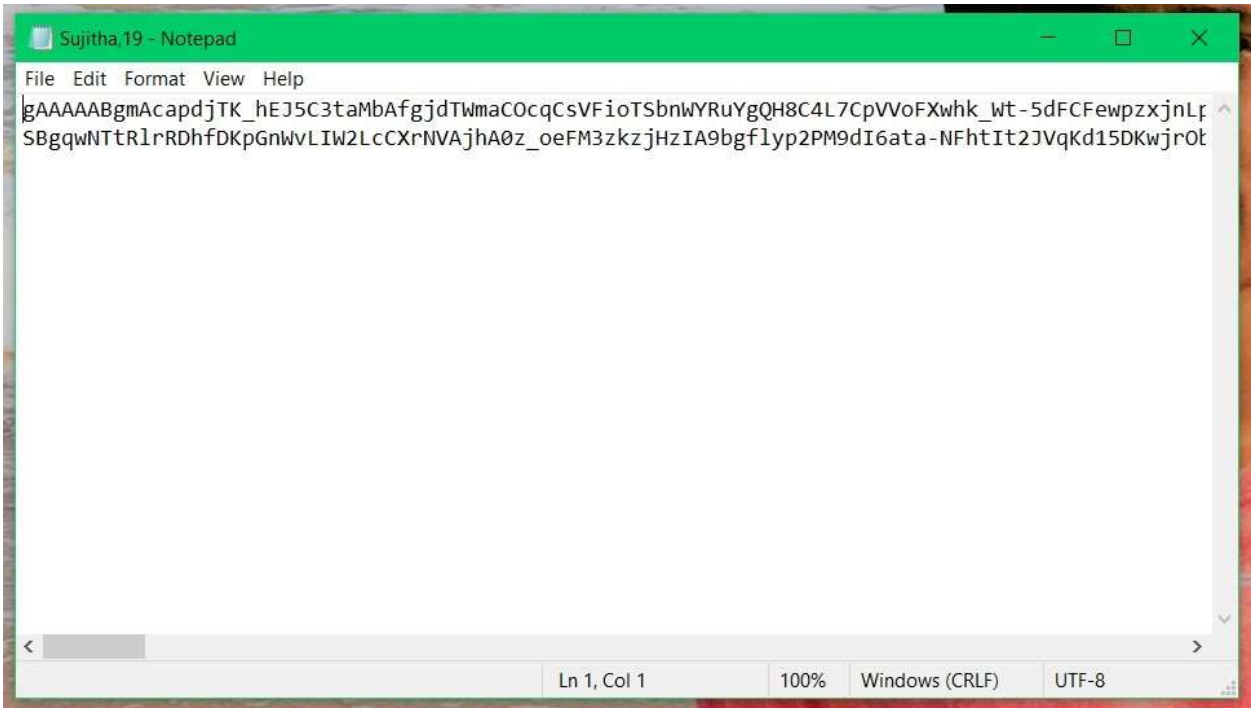
The questions are taken from the text file and can be modified as per our choice for better understanding and ease use.

When we run the client.py
Case 1 (When the risk is low) :
Console output:

```
In [4]: runfile('D:/Project/chatbot/client.py', wdir='D:/Project/chatbot')
Enter your name:
 -> Sujitha
Please Enter your Age:
 -> 19
Please Enter your Occupation:
 -> Student

Hi there! I'm a bot here to assess your covid-19 risk.

Enter   'Y' for 'Yes'
        'N' for 'No'
Type bye if you want to exit

ChatBot: 1.Do you currently have any signs/symptoms of a infection such as fever, cough, body aches, or sore throat?

 -> N


ChatBot: 2.Do you have a fever (more than 100.4 F)?

 -> N


ChatBot: 3.Do you have symptoms of lower respiratory tract infection such as shortness of breath, or difficulty breathing?

 -> N


ChatBot: 4.Have you had any symptoms of respiratory illness (cough, nasal congestion) in the past 14 days?

 -> N


ChatBot: 5.Do you feel any tiredness in the last 14 days?

 -> Y


ChatBot: 6.Have you traveled within the last 14 days to places where crowds are restricted to a common location (e.g., cruise ship/airplane)?

 -> N


ChatBot: 7.Have you recently traveled to a COVID-19 infected area?

 -> N


ChatBot: 8.Have you had close contact(within 6 feet) with a person suspected of having COVID-19 in the past 14 days?

 -> N


ChatBot: 9.Are your symptoms rapidly worsening?
 -> N


ChatBot:  Dear Sujitha You have an approx 11.11 percentage chances of having COVID19
You are having a low risk of having COVID19
Don't worry much
Take Care.
 -> bye


Stay safe at home and rest.
Wash your hands often.
Maintain social distancing.
Make sure you monitor your symptoms.
```

When we type bye after response from the chatbot we will terminated from the program.

Encrypted file of responses (client- Sujitha) :



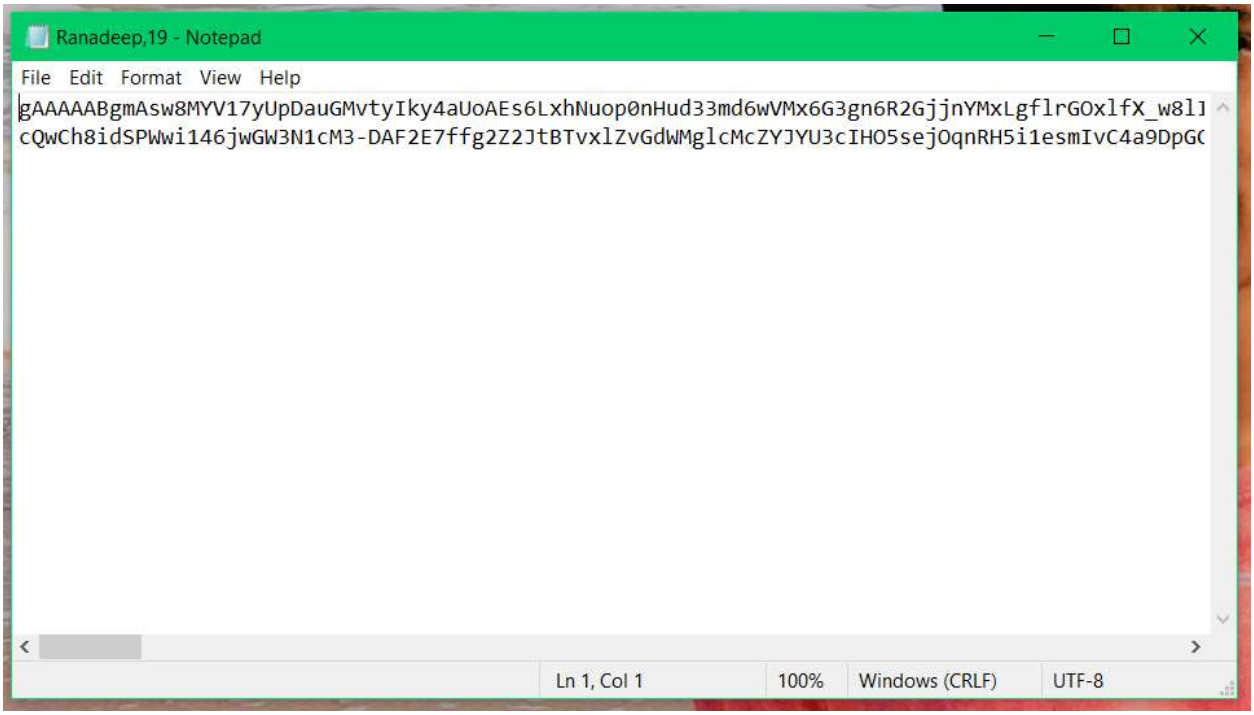
Filename is assigned in such a way that it gives the name and age of the client.

Case 2 (When the risk is average) :
Console output :

```
In [5]: runfile('D:/Project/chatbot/client.py', wdir='D:/Project/chatbot')
Enter your name:
 -> Ranadeep
Please Enter your Age:
 -> 19
Please Enter your Occupation:
 -> Student

Hi there! I'm a bot here to assess your covid-19 risk.

Enter   'Y' for 'Yes'
        'N' for 'No'
Type bye if you want to exit

ChatBot: 1.Do you currently have any signs/symptoms of a infection such as fever, cough, body aches, or sore throat?

 -> Y


ChatBot: 2.Do you have a fever (more than 100.4 F)?

 -> N


ChatBot: 3.Do you have symptoms of lower respiratory tract infection such as shortness of breath, or difficulty breathing?

 -> N


ChatBot: 4.Have you had any symptoms of respiratory illness (cough, nasal congestion) in the past 14 days?

 -> Y


ChatBot: 5.Do you feel any tiredness in the last 14 days?

 -> Y


ChatBot: 6.Have you traveled within the last 14 days to places where crowds are restricted to a common location (e.g., cruise ship/airplane)?

 -> Y


ChatBot: 7.Have you recently traveled to a COVID-19 infected area?

 -> Y


ChatBot: 8.Have you had close contact(within 6 feet) with a person suspected of having COVID-19 in the past 14 days?

 -> Y


ChatBot: 9.Are your symptoms rapidly worsening?
 -> N


ChatBot:  Dear Ranadeep You have an approx 66.67 percentage chances of having COVID19
You are having an average risk of gettign COVID19
So please make sure that you are quarantined for 2 weeks minimum
 -> bye


Stay safe at home and rest.
Wash your hands often.
Maintain social distancing.
Make sure you monitor your symptoms.
```

With the responses from the client chatbot addresses differently.
In the previous case the risk is 11.11 % and in this case the risk is 66.67 % and chatbot responded in a different way.

Encrypted file of responses (client- Ranadeep) :



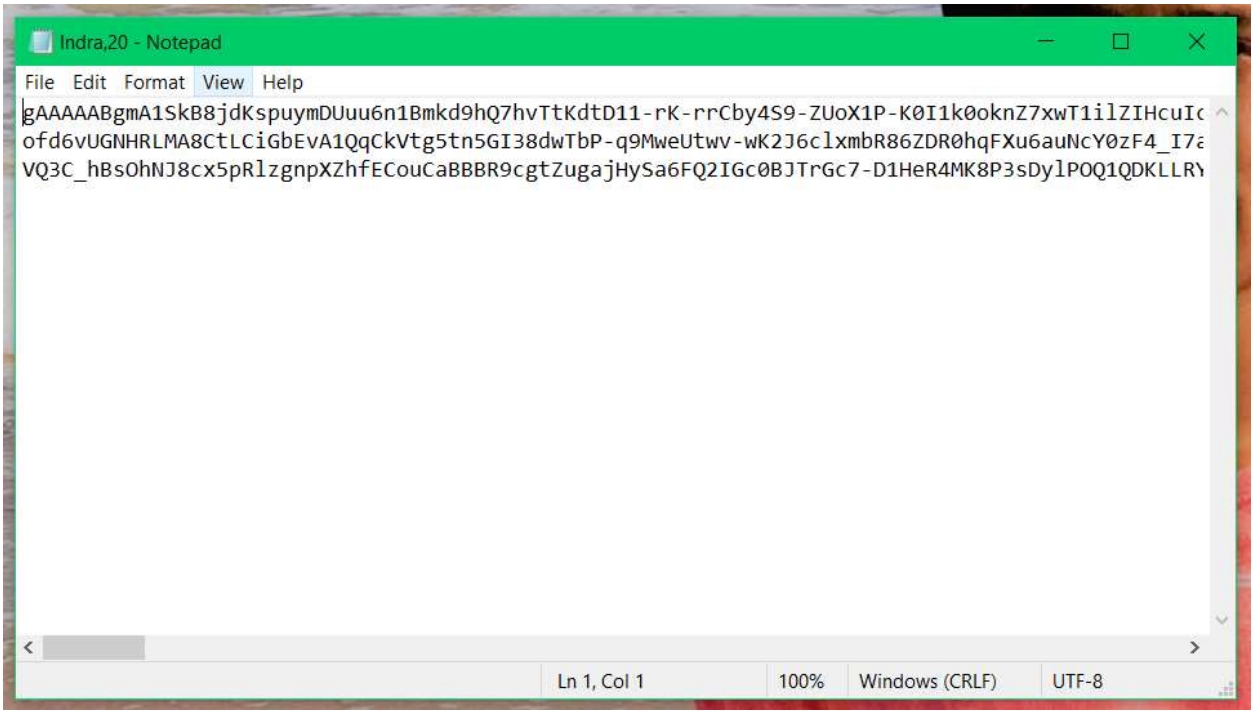
Filename is assigned in such a way that it gives the name and age of the client.

Case 3 (When the risk is high) :
Console output :

```
In [3]: runfile('D:/Project/chatbot/client.py', wdir='D:/Project/chatbot')
Enter your name:
 -> Indra
Please Enter your Age:
 -> 20
Please Enter your Occupation:
 -> Artist

Hi there! I'm a bot here to assess your covid-19 risk.

Enter   'Y' for 'Yes'
        'N' for 'No'
Type bye if you want to exit

ChatBot: 1.Do you currently have any signs/symptoms of a infection such as fever, cough, body aches, or sore throat?

 -> Y


ChatBot: 2.Do you have a fever (more than 100.4 F)?

 -> Y


ChatBot: 3.Do you have symptoms of lower respiratory tract infection such as shortness of breath, or difficulty breathing?

 -> Y


ChatBot: 4.Have you had any symptoms of respiratory illness (cough, nasal congestion) in the past 14 days?

 -> Y


ChatBot: 5.Do you feel any tiredness in the last 14 days?

 -> Y


ChatBot: 6.Have you traveled within the last 14 days to places where crowds are restricted to a common location (e.g., cruise ship/airplane)?

 -> N

ChatBot: 7.Have you recently traveled to a COVID-19 infected area?

 -> Y


ChatBot: 8.Have you had close contact(within 6 feet) with a person suspected of having COVID-19 in the past 14 days?

 -> Y


ChatBot: 9.Are your symptoms rapidly worsening?
 -> Y


ChatBot:  Dear Indra You have an approx 88.89 percentage chances of having COVID19
You are having a high risk of getting COVID19
Please visit a nearby hospital and take a COVID test
Or you may contact helpline
 -> bye


Stay safe at home and rest.
Wash your hands often.
Maintain social distancing.
Make sure you monitor your symptoms.
```

With the responses from the client chatbot addresses differently.
In the previous case the risk is 66.67 % and in this case the risk is 88.89 % and chatbot responded in a different way.

Encrypted file of responses (client- Indra) :



Filename is assigned in such a way that it gives the name and age of the client.

When client is a doctor
Console output:

```
In [4]: runfile('D:/Project/chatbot/client.py', wdir='D:/Project/chatbot')
Enter your name:
 -> Ananya Manoharan
Please Enter your Age:
 -> 30
Please Enter your Occupation:
 -> Doctor
Hey Doc, please checkout the file consisting of the detials of COVID patients.

Stay safe at home and rest.
Wash your hands often.
Maintain social distancing.
Make sure you monitor your symptoms.
```

When we type occupation as a doctor the responses of the patients will be downloaded in the text format.

Decrypted file of responses which can be opened by doctor:

```
Questions
1.Do you currently have any signs/symptoms of a infection such as fever, cough, body aches, or sore throat?

2.Do you have a fever (more than 100.4 F)?

3.Do you have symptoms of lower respiratory tract infection such as shortness of breath, or difficulty breathing?

4.Have you had any symptoms of respiratory illness (cough, nasal congestion) in the past 14 days?

5.Do you feel any tiredness in the last 14 days?

6.Have you traveled within the last 14 days to places where crowds are restricted to a common location (e.g., cruise ship/airplane)?

7.Have you recently traveled to a COVID-19 infected area?

8.Have you had close contact(within 6 feet) with a person suspected of having COVID-19 in the past 14 days?

9.Are your symptoms rapidly worsening?

Patient Name:Indra,20
Q.no1: N Q.no2: N Q.no3: N Q.no4: N Q.no5: N Q.no6: N Q.no7: N Q.no8: N Q.no9: N
Patient Name:Ranadeep,19
Q.no1: Y Q.no2: N Q.no3: N Q.no4: Y Q.no5: Y Q.no6: Y Q.no7: Y Q.no8: Y Q.no9: N
Patient Name:Sujitha,19
Q.no1: N Q.no2: N Q.no3: N Q.no4: N Q.no5: Y Q.no6: N Q.no7: N Q.no8: N Q.no9: N
```

The above file contains the patient details such as questions, clients name, age and response with each question.

6. CONCLUSION :

The chatbot helps in recording the covid symptoms observed and from the recorded data the doctor can analyze the main possibilities that are leading to get infected and can help in prescribing safety measures which helps in tackling the situation together. The main aspect of its working is to help in analyzing the data and to make conclusions on which are the most common symptoms and address them.

The risk in getting misinformation and the lack of effectiveness research is cause for concern. To avoid that Collaborations should be made among Government, healthcare workers, pharmaceutical industries for future pandemic preparedness.

Further work can be made to improve our model as to make it applicable of the human voice, also to add a decision support module to allow users getting an idea of the probability of being infected with COVID-19.