AI based healthcare chat bot system

M.V. Patil[1], Subhawna[2], Priya Shree[3], Puneet Singh[4]

Abstract— The main purpose of the healthcare chatbot system is to provide services in rural areas and government hospital for those people who are not able to take appointment or medical information from the doctors. They can solve their problem with the help of chatbot. With increasing population of India, increasing birth rate and decreasing death rate due to advancement in the medical field it has been observed that number of doctors are less to serve the need of the increasing population. This scenario can be better understood while walking through the cities government hospitals where the less availability of the doctors is the major cause behind the improper treatment of the patients and in certain scenario the resultant death so to encounter such cases there is a need of the smart and intelligent chatbot who can provide advice to the doctor and sometimes even to patient about what to do in such cases which ultimately results in the saving the life of hundreds of people. The AI based medical chatbot on which this project is based deals with providing medical advice in such scenario because sometimes doctors can even make mistake while observing the symptoms but the machine which is specifically developed for it cannot make such mistake. This AI based healthcare chatbot can take decision as per request of the patient. For this it uses its own database and in certain scenario where something is not available in its database as per request of the user, it collect the information from the search engine like google and give it to the user.

Index Terms—Chatbot, Health care, Artificial Intelligence, Natural Language Processing, Python, Symptoms, Google Collab

1 INTRODUCTION

A chatbot is an artificial intelligence software that can simulate a conversation with a user through messaging applications, website, mobile apps or through the telephone. It only represented the natural evolution of a question answering system leveraging Natural Language Processing. Fig.(a) shows how chatbot works internally.

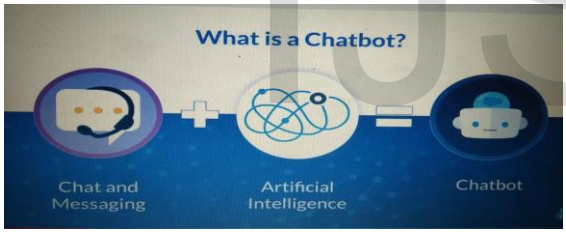

Fig.(a) Chatbot

The evolution of chatbots-

The Turing test was developed in the 1950s by a person called Alan Turing and the idea was a test that would evaluate whether a computer can be indistinguishable from a human being. And after the first chatbot came in 1960 named as ELIZA, it was made by Professor Joseph Weizenbaum.

Why are chatbots important?

A chatbot is often described as one of the most advanced and promising expressions of interaction between humans and machines Interaction between human and machines marks the advancement of technology in the form of a chatbot. Chatbots are applied in health education, diagnostics and mental state. A survey of conversational agents from 40 articles outlines chatbot taxonomy, specifies the main challenges and defines the types and contexts related to chatbots in health.[1]

How does a chatbot achieve this?

In the Fig.(b), the chatbot returns a response based on inputs from a user. The primary task that a chatbot performs is "User Request Analysis". The ability to spot the user's intent and extract information and relevant entities contained within the user's request is that the initial condition and the most relevant step at the core of a chatbot. Then the chatbot returns the most appropriate response for the user's request using NLP. Chatbots are used everywhere- messaging apps, healthcare, politics, customer service and many other applications.

Fig.(b) Architecture of Chatbot

It is a powerful AI software, and its applications streamline interactions between people and services, enhancing customer experience. At an equivalent time, they provide corporations to enhance the client's engagement method and operational potency by reducing the standard price of customer service. Although no systematic review of chatbots for lifestyle modification programs has been revealed, there are several reviews on chatbots covering health care problems starting from mental health support and smoking cessation to sickness identification [2].

Process- The proposed idea is to create a health care chatbot system using Artificial Intelligence that can diagnose the disease and provide basic details about the disease before consulting a doctor. The system provides text assistance; you can communicate with bot-like user friendly. The bot will provide that which type of disease you have based on the user's symptoms and clarify all the user's doubts.

The user can achieve the real benefit of a chatbot only when it can diagnose all kind of disease and provide the information. The system application uses question and answer protocol in

the form of a chatbot to answer user queries. The response to the question will be replied to based on the user query. The system is developed reduce to back the health care price and time of the users because it is not doable for the users to go to the doctors or consultants once straightaway required.

Why are chatbots a huge opportunity-?

Outsource mundane and repetitive jobs to computers-customer service- answering questions.

Handling simple repetitive queries

Handling can focus on more interesting issues.

Available instantaneously

Digital assistants to perform specific tasks.

The rest of the paper includes following sections. Section 2 presents Literature Review. Methodology and their algorithm are described in Section 3.Section 4 illustrates the Experimental Results and compared with existing chatbots. Finally, Section 5 and Section 6 concludes the proposed work and future scope respectively.

- *Priya Shree is currently pursuing bachelor's degree program in Electronics and Communication engineering in Bharati Vidyapeeth Deemed to Be University, Collège of Engineering, Pune, India, E-mail: shreepriya300@gmail.com*
- *M V Patil, Department of Electronics and Communication engineering in Bharati Vidyapeeth Deemed to Be University, Collège of Engineering, Pune, India, E-mail: mvpatil@bvucoep.edu.in*
- *Subhawna is currently pursuing bachelor's degree program in Electronics and Communication engineering in Bharati Vidyapeeth Deemed to Be University, Collège of Engineering, Pune, India, E-mail: mvpatil@bvucoep.edu.in*
- *Puneet Thakur is currently pursuing bachelor's degree program in Electronics and Communication engineering in Bharati Vidyapeeth Deemed to Be University, Collège of Engineering, Pune, India, E-mail: mvpatil@bvucoep.edu.in*

2 LITERATURE REVIEW

A literature review is an exploration and evaluation of the available literature in your given subject or chosen topic area. It provides the state of the art concerning the subject or topic you are writing about. A literature review has four main objectives: It analyzes the literature in your chosen area of study. The goal of a literature review is to increase awareness of the existing research and discussions relevant to a specific topic or area of study and to present that knowledge in the form of a written report. Conducting a literature review helps you build your knowledge in your field.

Flora Amato supported the construct of the deep machine learning and Artificial intelligence; it permits the applying to move with patient in an exceedingly manner that doctor does. For making such powerful application research worker has used Watson language service that is meant and trained by the blue combine platform [3].

PriyasankariM projected a plan during which it uses user dialogue. User dialogue may be a linear style that issue from symptom extraction to symptom mapping, wherever it defines the corresponding symptom then designation the patient wherever it is a serious or minor unwellness [4].

Benilda Eleonor introduced a Pharma Bot: A pediatric Generic medication advisor Chatbot. Pharma Bot, that may be an informal chatbot that is designed to bring down, counsel and provides info on generic medicines for youngsters. Human machine as a technology integrates totally different areas and therefore the process. The researchers used descriptive methodology within the study. The researchers use Left and Right Parsing formula [5].

3 METHODOLOGY

Python Libraries- A python library is a collection of functions for specific operations. They are especially effective for accessing the pre-written frequently used codes, instead of writing them from scratch every single time. Below flowchart Fig.1, depicts about the libraries of Python.

Pandas - It delivers fast, expressive, and flexible data structures to easily serve with structured and time-series data. Pandas make it possible to carry these operations like data analysis and modelling.

NumPy- It is one of the important packages for python contributing support for huge multidimensional arrays and matrices along with a variety of high-level mathematics functions to execute these functions swiftly.

Scikit Learn - It is effectively used for a variety of applications which include classification, regression, clustering, model selection, naive Bayes', grade boosting, K means and preprocessing.

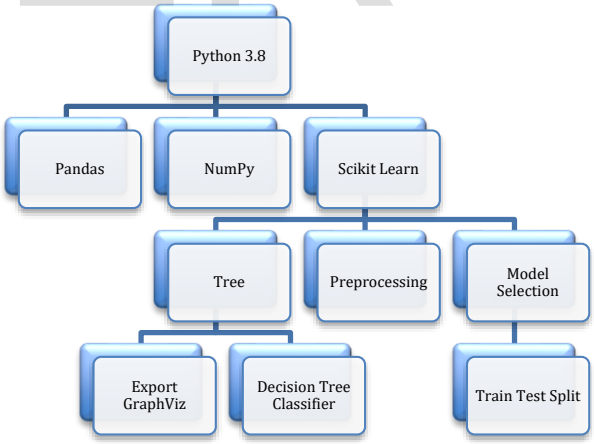

Fig.(1) Python Libraries

3.1 ALGORITHM:

The chatbot will provide the patient with Symptom 1, if the patient says "Yes" then the given disease is identified along with other

commonly related symptoms else it provides the patient with Symptom 2 to check and identify, if the patient says "Yes" then the given disease is identified along with other commonly related symptoms or else it provides the patient with Symptom 3 and this way the chatbot provides 43 symptoms to the patient to detect their disease, as shown in Fig.2.

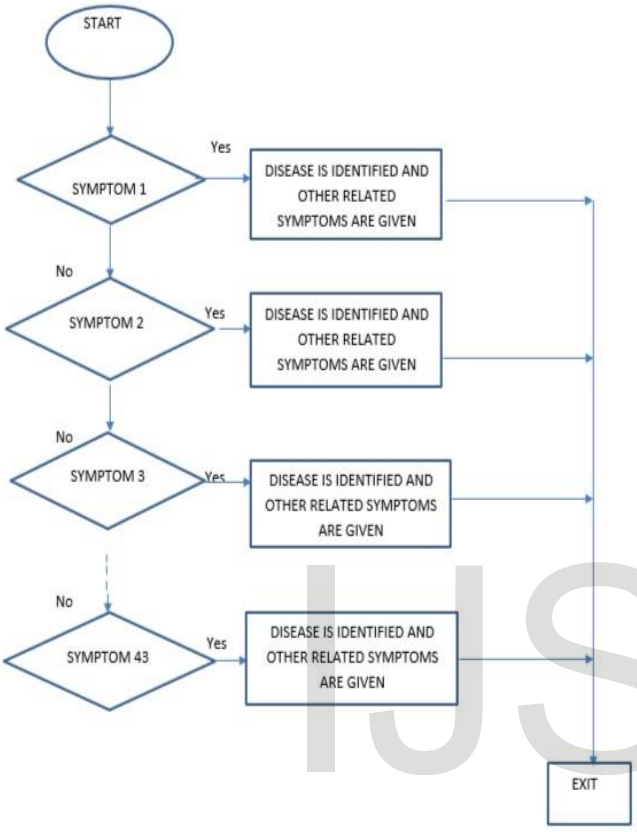

Fig.(2) Flowchart of program

4 EXPERIMENTAL RESULTS

Three different outputs are shown where the disease is identified from the present symptoms and other related symptoms are given from the AI based chatbot system.

Our system identifies the diseases and other related symptoms with given disease once the patient identifies and says "yes" for the present symptom. The fact that it provides not only the disease, but also other common symptoms make it different from the other projects of this kind.

a) DISEASE IDENTIFIED VERTIGO

Below output Fig.(a),shows that the patient is feeling unsteadiness and spinning movement, so he selected and said "yes" for unsteadiness where his disease "VERTIGO" is identified and other symptoms were also listed, from where he could easily see and check for other symptoms that he is facing and can face in near future if he does not get it treated.

```
Please reply Yes or No for the following symptoms
runny_nose ?
no
internal_itching ?
o
hip_joint_pain ?
no
polyuria ?
no
inflammatory_nails ?
no
swollen_extremeties ?
no
blood_in_sputum ?
no
yellow_crust_ooze ?
no
nodal_skin_eruptions ?
yus
unsteadiness ?
yes
['You may have (vertigo) Paroymsal  Positional Vertigo']
symptoms present  ['unsteadiness']
symptoms given ['vomiting', 'headache', 'nausea', 'spinning_movements', 'loss_of_balance', 'unsteadiness']
```

Fig.(a) Output

b) DISEASE IDENTIFIED PSORIASIS

Below output Fig.(b), shows that the patient has inflammatory nails and skin peeling, so he selected and said "yes" for inflammatory nails where his disease "PSORIASIS" is identified and other symptoms were also listed, from where he saw and checked for other symptoms that he is facing and can face in near future if he does not get it treated.

```
Please reply Yes or No for the following symptoms
runny_nose ?
NO
internal_itching ?
NO
hip_joint_pain ?
NO
increased_appetite ?
NO
inflammatory_nails ?
YES
['You may have Psoriasis']
symptoms present  ['inflammatory_nails']
symptoms given ['skin_rash', 'joint_pain', 'skin_peeling', 'silver_like_dusting', 'small_dents_in_nails', 'inflammatory_nails']
```

Fig.(b) Output

c) DISEASE IDENTIFIED DIABETES

Below output Fig.(c), shows that the patient feels excessive hungry, has increased appetite and feels extremely lazy, so he selected and said "yes" for increased appetite where his disease "DIABETES" is detected and other symptoms were also listed, from where he saw and checked for other symptoms that he is facing and can face in near future if he does not get it treated.

```
Please reply Yes or No for the following symptoms
throat_irritation ?
NO
internal_itching ?
NO
hip_joint_pain ?
NO
increased_appetite ?
YES
['You may have Diabetes ']
symptoms present  ['increased_appetite']
symptoms given ['fatigue', 'weight_loss', 'restlessness', 'lethargy', 'irregular_sugar_level', 'blurred_and_distorted_vision', 'obesity', 'excessive_hunger']
```

Fig.(c) Output

COMPARISON WITH EXISTING CHATBOT

- The Healthcare Chatbot we have built ask about the various symptoms and you must Answer is YES or NO format. On getting yes to a particular symptom it gives you the nearest possible disease or illness. Whereas Existing chatbot for e.g. (Your.MD) acts as a personal health assistant allowing users to not only check symptoms but also asks questions or take a health quiz. Our chatbot tells the highest possible outcome like disease or illness depending on the symptoms provided by the user which most of the chatbot do not do.
- Best part is that it not only gives disease or illness but also provide other symptoms, Others just provide the illness based on the report/data of many users which sometimes is problematic.
- Our algorithm is simple, sufficient and by modifying it we can add more features in our chatbot.

5 CONCLUSION

Currently artificial intelligent has developed to a point where programs can learn and effectively mimic human conversation. Chat bots have been around since 1966, but their popularity did not grow much until siri appeared in 2011 and then FB bot messenger. The market is constantly growing with many startups that recognize the potential for using chatbots in health care to support patients and providers.
Just as cars measure getting down to drive themselves, care higher cognitive process is facing its own automation build, shortly patients are ready to enter their current symptoms through a portal, with the assistance of associate degree intelligent agent and find associate of degree correct designation or prescription while not involving a person's doctor.

6 FUTURE SCOPE

The Field of healthcare and medicine has evolved and branched out thanks to influence of technology. When you investigate the future Artificial intelligence in healthcare industry chatbot form a vital element. As most of the doctors know their patients' medical history the moment they glance through the medical file .But the use of chatbot would make it simpler. Once the doctor is notified of the upcoming appointment for a patient the doctor can immediately skim through the patient's records to be able to interact better. For those patients that are on the strict diet routines, chatbot can help suggest diet charts, menus to suit their medical condition. The doctor could also choose to manually feed in the diet chart suitable or it could also be programmed.
There are chatbot that can converse with people who are in a state of depression or anxiety. The best part is that with superior language processing algorithms at their core, these bots give more empathetic and human like answers which can make the person feel better, instead of sounding like a machine talking.

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