Healthcare Chatbot using RASA

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ABSTRACT
With the help of different chatbots, a person can communicate with text or even audio interface and get a quick reply from the chatbot through AI i.e., artificial intelligence and its subset called machine learning to get back a response that fits to the situation. The proposed chatbot will help build a bridge between the patients and the doctors. It will provide accurate information about the different diseases. This assistant will help predicting the diseases based on symptoms, locate the hospital in their vicinity, booking an appointment and much more. By asking a simple series of questions, the chatbot is able to help the patients by guiding them what exactly they are looking for.

Keywords:-*AI, machine learning, NLP, chatbot, healthcare, disease, rasa*

INTRODUCTION

The definition of chatbot can be implied such as, Chatbots are programming applications which help in replicating human like interactions through voice or text-based messages or again both. It's a type of assistance embedded by rules and at times Computerized reasoning which engages with the client/users through various communication platforms. Chatbots continually require training and testing to fit with the great norms set by the designers. They have numerous applications in the area of user assistance and data gathering.

In today's era, a healthy body is very important factor in one's day to day life. It plays a big role in a person's life to live with active joy and pleasure, thus paving the path for a better life quality when they age. Taking care of health is very much important. In an emergency situation, immediate help should always be available. To reduce the cost of consulting the doctor every time and to improve the medical knowledge of the patient. The high cost of our healthcare system is because of the lack of patient engagement after they leave clinics or hospitals.

In this fast-paced world, people tend to ignore about their precious health as they're busy in their day-to-day life, they forget to take suitable precautions to live a healthier lifestyle and sometimes be less aware of their health status. Their tight schedule leaves them with no free time for periodic health check-ups and that they disregard any uneasiness shown by their body until it is too severe. Sometimes, it becomes too late for the consultation with the doctor as by that time the disease may have spread to a greater extent.

The proposed solution is to deliver a healthcare chatbot that uses AI and ML which will provide different services to the user and basic details about the disease like it's symptoms, cure,

treatment cost before counseling a doctor to downsize the healthcare costs and improve accessibility to clinical information. A text based conversational chatbot engages with patients about their medical conditions and gives a reliable diagnosis to support their symptoms.

Hence, people will have a thought about their health and have the proper protection. Healthcare chatbot has a great impact on the health and pharmaceutical sector. It is highly reliable as the factor of human error gets completely erased. So, this paper focuses on designing such a healthcare chatbot which is free of cost and up-and-running 24x7.

LITERATURE REVIEW

The author has developed a [1] medical chatbot which will diagnose the disease and then provides the basic details of the disease and prevention measures if the symptoms are normal but if the symptoms are severe then it can provide info about the necessary treatment and specialist doctor. The author has used natural language processing and python programming language along with flask. They have used sqlite3 for database purpose.

In this paper the author has developed an interactive talking chatbot. This chatbot basically focuses on suggesting appropriate diet plans to the user according to their weight and height and other factors. [2] The chatbot uses different dataset and provides the necessary output. They have used natural language processing and built the chatbot in python programming language using different libraries and data structures.

In this paper the authors have tried to build a chatbot for a particular hospital which will allow users to book appointments with doctor, consultation, various tests, etc. They have used Machine learning and different methodological like AES hashing and mapping [3]. They have tried to make a smart wireless interactive healthcare system which can early detect, diagnose and provide with the treatment of the decease.

In this paper the authors [4] have created a chatbot application using machine learning that can diagnose the disease and provide the solution or connect with a doctor. The patient's symptoms are predicted using pattern matching. They have also provided a map with the location of nearby doctors using Google maps API. They have used NLP and NLU for this application. They have trained this chatbot using Dialog Flow tool.

The authors [5] think that it has become a great challenge for hospitals and healthcare workers to manage a high number of cases for Covid-19, thus there is a need for an effectively designed chatbot which could provide all the safety measures and precautions required for the virus which can be done by a physical doctor.

The idea in this paper is to create a Chatbot that can diagnose the disease [6]. Technologies used are RNN, Deep Learning, NLP, NLG. User sends text or voice message with the help of Google API. One of the supervised ML algorithms named SVM Algorithm is used for classification. Different kinds of letters such as suffixes or prefixes are removed with an algorithm named Porter. SQL is used for database. Tokenization is used. This is Web based system.

In this paper author have written the importance of Chatbot in healthcare

field. Chatbots can decrease documentation burden by storing health records electronically. Chatbots will also tell whether you are seriously ill and needs to meet a doctor. The enhancement in Chatbots can be done more with the help of Machine Learning, NLP, Computer Vision, Virtual faces.[7]

The Chatbot has been made for patients the patients will communicate symptoms through voice or text along with the age of the patient then the Chatbot will give the information on the disease and will provide medication to the patient.

The technology used is NLP Algorithm used is SVM and big dataset is used for good accuracy [8]. This Chatbot gives instant answer to the patients while there is no need to take appointment of doctors and that's time consuming.

According to this paper [9], the Chatbot will give the medicine as per the symptoms of the patient and if some symptoms are not in the database, then it will just collect that information. Chatbot plays a very vital role in such critical situations. Chatbot is available for 24x7 for patients.

The motion of the robot is controlled by the Bluetooth HC-05 through smartphone app. Here Mic is input device and Speaker is output device if the database is unable to find the data for the patients, then it will fetch data from google server.

This paper talks about [10] pediatric medicine Chatbot. The Chatbot gives information on generic medicine for children. Left and right parsing algorithm is used to come up with the result. After consultation with Chatbot the chatbot will prescribe generic medicines including proper intake, dosage, drug reaction, precaution. The developed system can be used by the parent of the patients who need medical assistance in taking the right generic medicine for certain ailment.

PROPOSED SYSTEM

Project Goals and Requirements

We have tried to reduce the gap on artificial intelligent conversational agents/chatbots in the medical field. Thus, the proposed system will take the symptoms of the patients as input and then by applying various machine learning algorithms, will predict the disease based on the symptoms.

The design and development of the bot should be such that it should bring the common people and the medical experts, hospitals, nursing homes closer, thereby reducing the gap between them with minimal efforts.

Similarly, the framework which is to be used to build the bot should be easy to use for non-technical users and also it should provide all the necessary tools and modules which are required to make the bot.

So, the above needs led us to select RASA OPEN SORCE as a framework of choice to develop and deploy our chatbot in a sound technological environment. Python is also used as a programming language.

As Python has various built-in modules which will provides efficient functionalities of machine learning. This will also enhance the features of the bot and will make it more user-friendly. MySQL is used for the database.

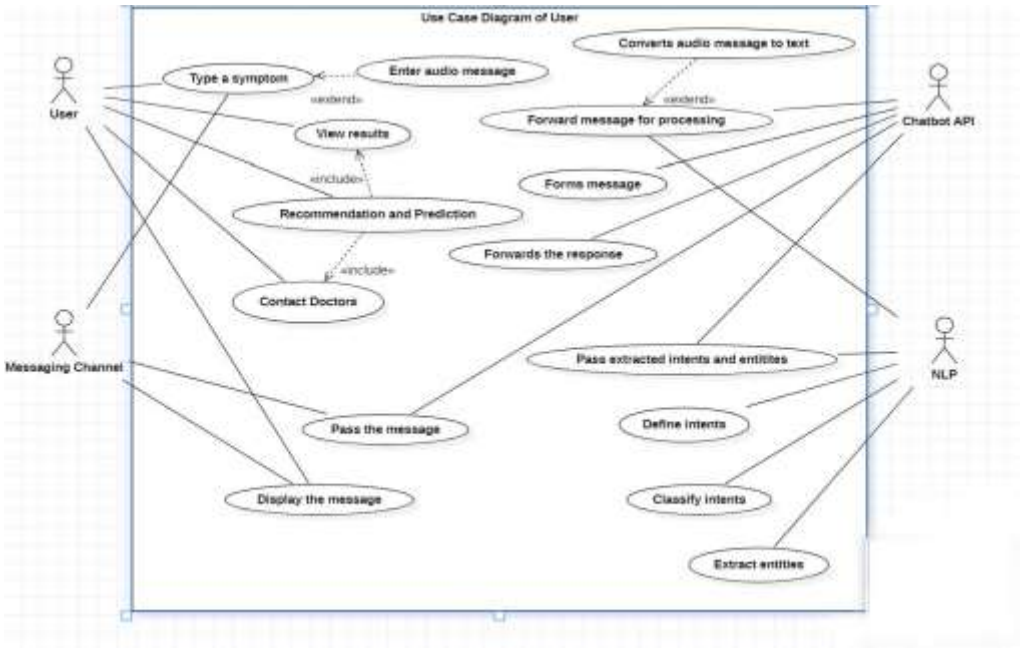

Fig.1:-*Use Case Diagram of Chatbot User*

Implementation

The input parameters include the symptoms which are faced by the users. Users will first enter the symptoms and depending on the symptoms the bot will predict the disease by performing machine learning algorithm. This is the key feature of our chatbot however user can also get the basic info on different diseases, the symptoms related to that or the different hospitals and nursing homes which are nearby them. Thus, the system is developed to so that the users can be aware of any future problems and they can take actions accordingly .

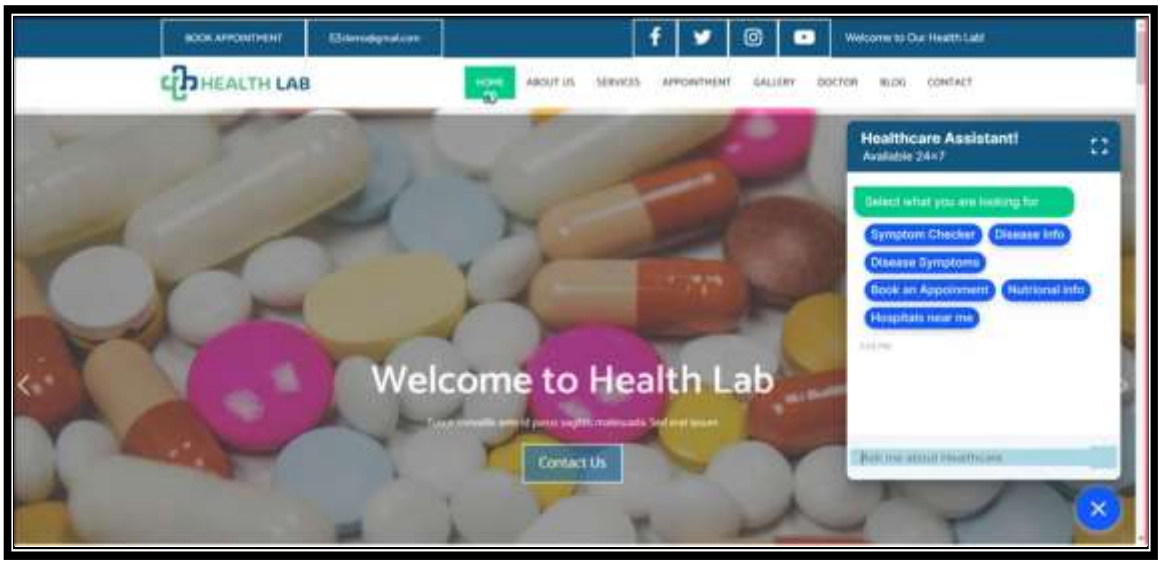

Fig.2:-*GUI Interface*

NLU Core Model Training:
The user's message is divided into two parts namely: entity recognition and intent classification. Entity recognition includes identifying the info which is used by the bot and the info is present in the user's message.

Intent classification is identifying the intent of the user and then predicting the next action accordingly. Another important aspect of the chatbot is the "stories".

The concept of stories is used by the RASA OPEN SOURCE in order to train a chatbot efficiently and related to our domain. Stories are a form of training data to train the dialogue management models.in this stories the input provided by the users are expressed as corresponding intents and the responses related to classified intent are expressed as actions. Thus, to provide the best user interaction we have created different types of stories with different intents. Thus, increasing the efficiency of the bot.

RESULTS
The trained model is running as designed and by adding more intents, the bot can predict more accurately thus enhancing the user experience. The chatbot is also trained for giving multiple responses to the same questions which gives a human-like touch in the conversation. Following figures are the results and outputs of the services provided by the Healthcare chatbot.

User Input	Bot Response
Hello	Hey! How can I help?
What is your name	I am a Healthcare Assistant
What can you do for me?	Select what you are looking for:
Can you book me an appointment?	Sure! First, I will need some details…
Can you tell symptoms of malaria?	1)Fever 2) Headache 3) Chills
Can you locate a hospital near me?	Please provide me with your city name
Thank You	Happy to Help!
Who is prime minister of USA?	Sorry! I didn't get you. Ask me about healthcare
Bye	Goodbye! Take care

Fig.3:-*Result table*

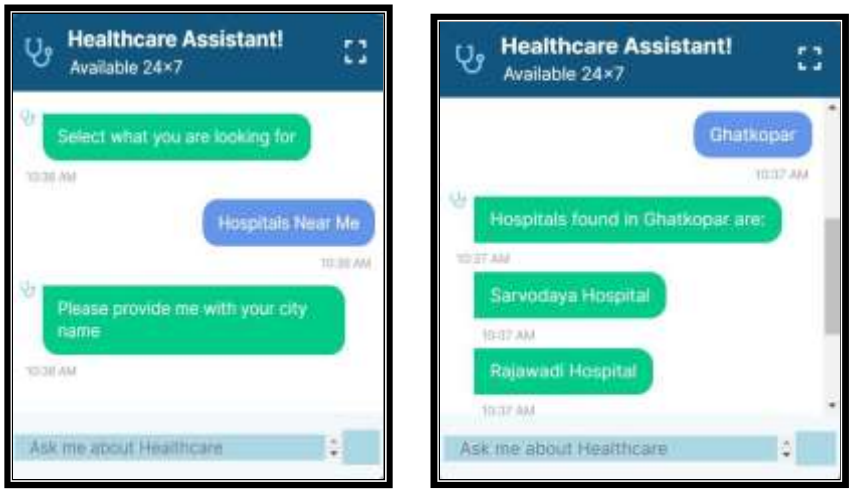

Fig.4:-*Hospital Locator*

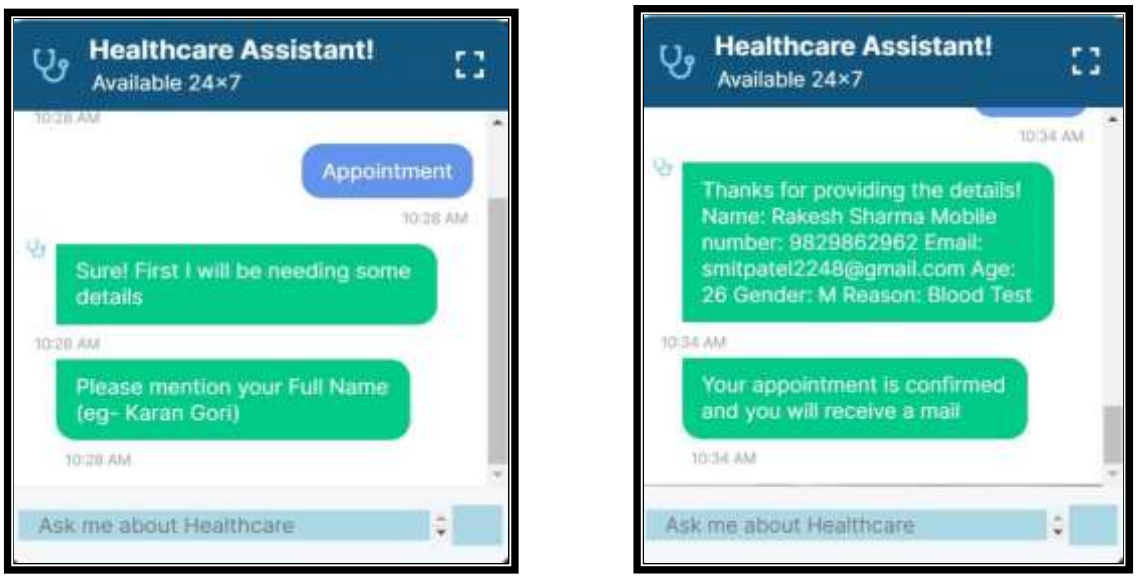

Fig.5:-*Appointment Booking*

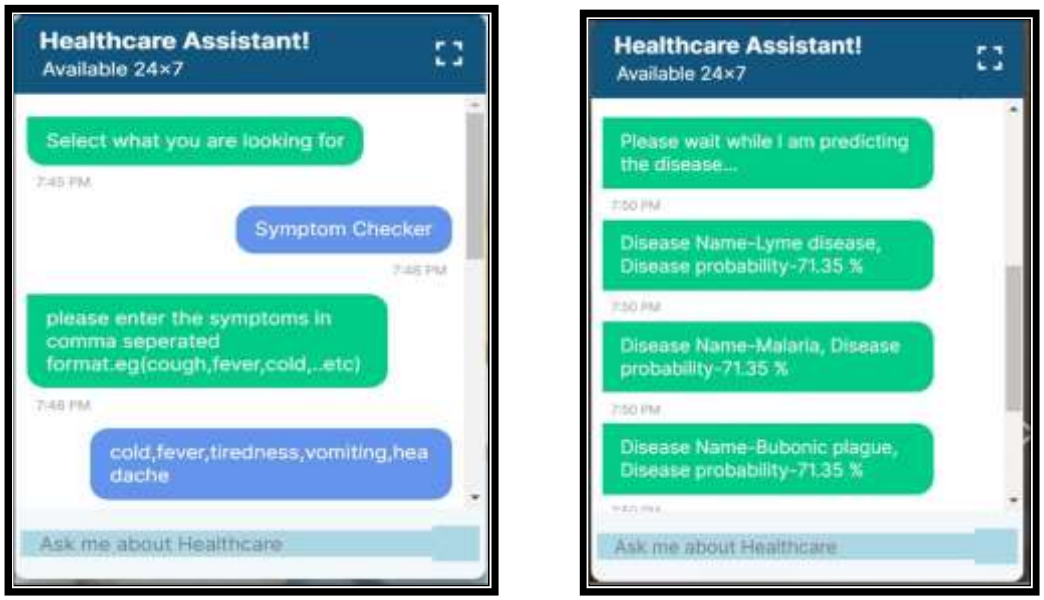

Fig.6:-*Disease Prediction*

CONCLUSION

Thus, we have successfully proposed a healthcare chatbot system using the RASA Framework. As technology is growing in various domains, healthcare is one such important domain.

So, our healthcare chatbot helps the patients to get the instant information related to the disease with 24x7 service.

This proposed system will help our country in healthcare domain. And such services will help the patient to get a better understanding of the problems they are facing. It will also help in reducing the burden from hospitals when there are many patients to handle.

Building a well-trained bot for any services should be the topmost priority for any organizations.

This proposed system will help our country in healthcare domain.

FUTURE SCOPE

To reduce the difficulty of texting we would also integrate the voice-based conversation which will make the chatbot more interactive and user-friendly.

Thus, we would keep on increasing the service capability, efficiency and also to decrease the operational cost of the medical consultancy services by using this chatbot. Also, to recommend the specialized doctors for the disease predicted thereby helping patients to take appropriate actions.

To predict the cost of the treatment related to the predicted disease. It can be deployed on many social media platforms like Facebook, WhatsApp. It can be designed to make calls and appointments directly with the hospital for medical checkups.

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