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EMERGENCY PATIENT CARE SYSTEM USING CHATBOT

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Abstract: ***To lead a good life, taking care of health is very much important. In an emergency situation, immediate help should always be available. The proposed idea is to create an application with a medical chatbot using Machine Learning that can diagnose the disease and provide probable diseases before consulting a doctor. To reduce the cost of consulting the doctor every time and to improve the medical knowledge of the patient, the chatbot is built. The patient's symptoms are predicted by pattern matching. The patients are also provided with the SOS button and a map showing the nearby doctors in this application to get immediate help. The map works with help of Google Maps API The doctors can also view and update the medication profile of the patient through this application so that patient doesn't have to carry the written prescription all the time.***
Keywords: Machine Learning, pattern matching, SOS, Google Maps API, medication profile

I. INTRODUCTION

Machine Learning is based on how any device perceives its environment and takes actions based on the perceived data to achieve the result successfully. The term "machine learning" is applied when a machine mimics "cognitive" functions that human associate with other human minds, such as "learning" and "problem-solving". Machine learning gives the supreme power to mimic the human way of thinking and behaving to a computer. A chatbot is a computer program which hosts a conversation through auditory or textual methods. These programs are designed to provide a clone of how a human will chat and thereby it acts as a conversational partner rather than humans. For various practical purposes like customer service or information acquisition, chatbot is being used in the dialogue system. Mostly chatbots use natural language processing for interpreting the user input and generating the corresponding response but certain simpler systems search for the keyword within the text and then provides a reply based on the matching keywords or a certain pattern. Today, chatbots are the virtually available assistants such as Google Assistant and etc. Non-assistant applications have chatbots for various purposes like entertainment, research, and social bots which promote product, candidate, or issue. Chatbots are such kind of computer programs that interact with users using natural languages. For all kind of chatbots, the flow is the same, though each chatbot is specific in its own area knowledge that is one input from a human is matched against the knowledge base of chatbot. Chatbots work basically on Artificial intelligence, so using this capability we have decided to add some contribution to the Health Informatics The high cost of our healthcare system can is because of the lack of patient engagement after they leave clinics or hospitals. Various surveys in this area have proved that that chatbot can provide healthcare in low costs and improved treatment if the doctors and the patient keep in touch after their consultation. To answer the questions of the user, chatbot is used. There is less number of chatbots in the medical field. The proposed system provides a text-to-text conversational agent that asks the user about their health issue. The user can chat as if chatting with a human. The bot then asks the user a series of questions about their symptoms to diagnose the disease. It gives suggestions about the different symptoms to clarify the disease. Finally, the chatbot gives probable diseases. Our bot's best application would be as a preliminary diagnosis tool that patients could use to assess their symptoms before going to the doctor. The system shows the nearby doctors through a map with their specialization. The system also contains a panic or SOS button, which when pressed sends an SMS to the emergency contact list. This helps the people to help the user immediately.

II. LITERATURE REVIEW

The paper gives information regarding products which is useful for consumers to obtain what they want exactly. Question Answering (QA) systems can be referred to as information accessing systems which try to answer natural language queries by giving answers suitable answers making use of attribute available in natural language techniques [1].The system takes a plain text as input and answering all type of questions output by a qualified user is the output. The purpose is to provide a solution to the problem. This paper helps in recognizing the reality in texts and giving the past content for developing a conversation which is used in middle-school CSCL scenarios[2]. A smart chatbot [3] for customer care by using Software as a Service which analyzes the message of each application server. It helps the user to resolve the issue by providing a human way interactions using LUIS and cognitive services which are implemented on AWS public cloud.Admin feeds input to the machine so that machine can identify the sentences and taking a decision itself as a response to a question. The database used in the project is MySQL. The illustration and execution of SQL in the pattern matching operation is required. The conversation can be done so that it can add some knowledge to the database as it has not been modelled before. If in case the input sentences in the database did not match then it will be remodelled [4]. The evaluation of sentence equivalence is completed with bigram that splits the input sentence into two

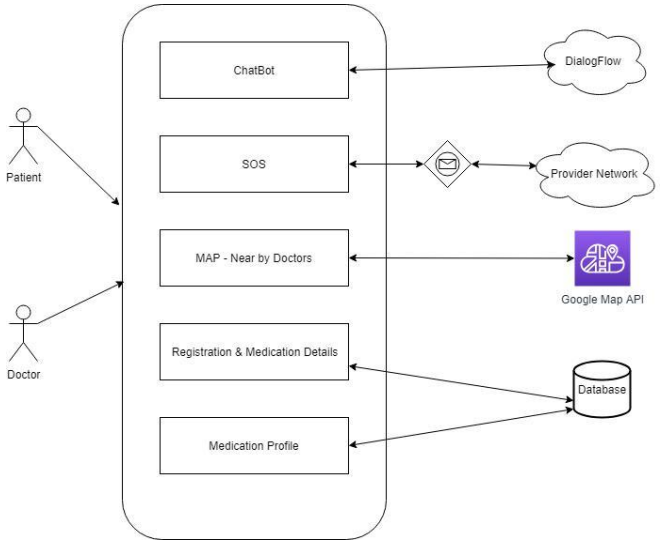
parts. The data of chatbot are deposited in the database. The database is appointed as information storage and the predictor is used for storing the function and perform pattern matching. This application can be developed by using the programming language of Pascal and Java[5]. Paper uses artificial intelligence to predict the diseases based on the symptoms and give the list of available treatments. It can facilitate us to figure out the problem and to validate the solution[6]. The author gives chatterbot which is based on AIML (Artificial Intelligent Markup Language) structure [7]for training the model and uses Microsoft voice synthesizer and identifies the word spoken by the user. Natural language processing is used for understanding and Microsoft speech recognition is used for speech recognition and speech synthesis is used for speech to text and text to speech so people understand it easily.

III. PROPOSED SYSTEM

There are countless cases where a digital personal assistant or a chatbot could help physicians, nurses, patients or their families. Better organization of patient pathways, medication management, help in emergency situations or with first aid, offering a solution for simpler medical issues: these are all possible situations for chatbots to step in and ease the burden on medical professionals.The figures below show the overall architecture of the emergency patient care system application.

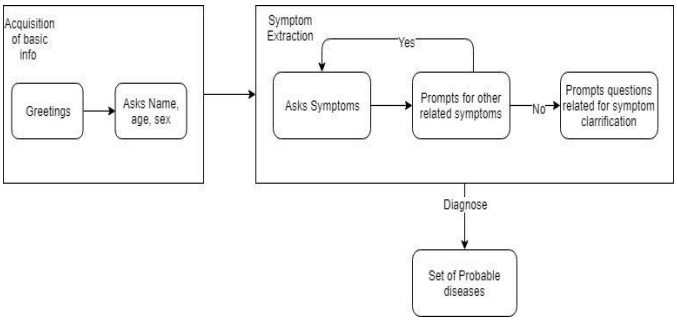
A. Registration:

In this proposed system, the patient or the doctor registers with their login details and medical details. These details are then stored in a database.



B. Medical Chatbot:

Both the doctor and the patient is provided to access the medical chatbot, which is trained using a chatbot tool called Dialogflow. Dialogflow is an end-to-end, build-once deploy-everywhere development suite for creating conversational interfaces for applications, platforms, and devices.The medical chatbot contains three main conversational phases, namely, acquisition of basic information, symptom extraction and diagnosis. The medical chatbot starts off by asking the name, age and sex of the user and then enters into a loop of symptom extraction by asking for the symptom and asks the user if there are any symptoms needed to be added. Then collectively the medical chatbot prompts the user some related question with choices and based upon the choices selected by the user, the disease is diagnosed and a set of probable diseases is shown to the user. Upon clicking on the disease will take the user to google where the user can know the detailed information about the disease.



C. Connecting with Doctor:

The patient can be connected with the doctor by searching the doctor with his specialization or name. After getting connected, the doctor can view the medication details of the user which is available in the database. The doctor can also update the medication profile of the user and this medication profile will be stored in the database. The user can view this medication profile. The user can also view the nearby doctors registered with the app in the map which is implemented using Google map API.

D. SOS:

The system is also provided with SOS option. The user can perform the SOS operation automatically or manually. This SOS operation is used to send a normal text message to the emergency contact list which the user gives during the registration process. The normal text message consists of the current location of the user. This text message can be sent by clicking a button manually or automatically by shaking the phone. The shake of the phone is sensed by accelerometer manager.

IV. ALGORITHM

A. Natural Language Understanding (NLU):

Natural language understanding is a branch of artificial intelligence that uses the computer software to understand the input made in the form of sentences in text or speech format. NLU communicates with individuals and understands their intent. NLU is even programmed with the ability to understand meaning in spite of common human errors. Elements of NLU are:

Intent: intents are the intentions of the end-user, these intentions or intents are conveyed by the user to the medical chatbot.

Entities: the metadata about the intent is called “Entities”.

B. Natural Language Processing (NLP):

Chatbot takes some combination of steps to convert the customer’s text or speech into structured data that is used to

select a probable answer. Natural Language processing steps:

Sentiment Analysis: Tries to learn if the user is having a good experience or after some time the chat should be forwarded to the human.

Tokenization:The NLP divides a string into pieces or tokens that are linguistically symbolic or are differently useful for the application.

Named Entity Recognition: The medical chatbot looks for categories of words, like the name of the product, the user's name or address, whichever data is required.

Normalization: The medical chatbot processes the text to find common spelling mistakes or typographical errors that might the user intent to tell the medical chatbot. This makes the chatbot act like a human.

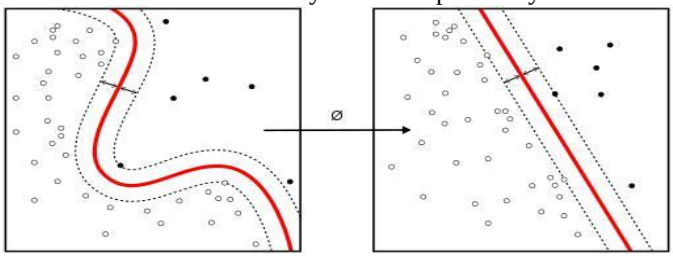
Dependency Parsing: The medical chatbot looks for the objects and subjects- verbs, nouns and common phrases in the user's text to find dependent and related phrases that users might be trying to convey.

Example,
Gather as many actual user questions or commands. The users might phrase the same kind of request in many different ways like 'I have a neck pain', 'my hand is paining'.
Once we have a list of examples, sort them into categories based on the capabilities we want our application to support. These categories represent the intents we define. For the previous example, the category(intent) is#pain.

Then we can use an entity to represent what the user wants to turn off. To do this we create an entity called @partand give the following possible values: i.neck ii.hand. For each value, we can specify synonyms like scruff. Listing multiple ways that user might refer to the same value helps improve the application accuracy.

When the user's input is received, the conversation recognizes both intents and entities. The medical chatbot then uses these to provide the best answer.

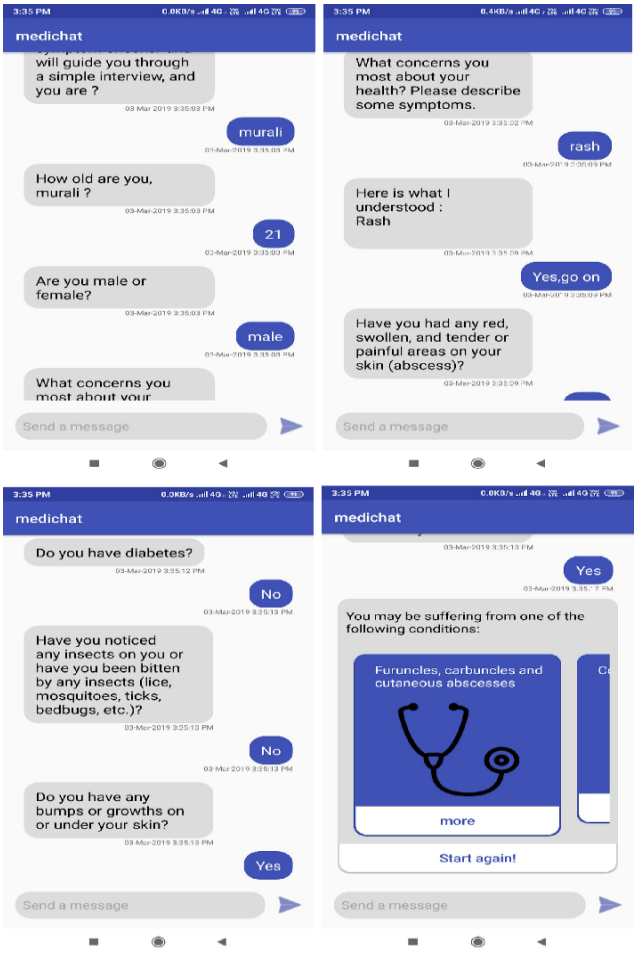
C. Multinomial Naive Bayes:
Multinomial Naive Bayes is an algorithm for text classification and Natural language processing. This classifier is naive because it treats every word independently.



We use NLTK (natural language toolkit) for two things. One is breaking up sentences into words (tokenization) and another is reducing words to their stem (stemming). Here Lancaster stemmer is used.
The data is organized into 2 dictionaries: corpus_words (each stemmed word and the number of occurrences), class_words (each class and the list of stemmed words within it).
Each word from the given sentence is tokenized, stemmed, and lowercased. The input data is transformed into training data.
Each class generates a total score for the number of words that match.
For example, consider,
class: greeting
"how are you ", "good morning", "hi".
Few sample Input sentence classification: input: "hello good morning" term: "hello" (no matches) term: "good" (class: greeting) term: "morning" (class: greeting) classification: greeting (score = 2)
But in some cases, two or more classes will be with the same score. So, the algorithm is improved by accounting for the commonality of each word. The word "is" should carry a lower weight than the word "sandwich" in most cases, because it is more common.
Score is calculated for each word in the sentence by, score += (1/corpus_words[stemmer.stem(word.lower())]).

V. RESULT AND DISCUSSION

The user has text to text communication with the medical chatbot. The chatbot suggests the user with probable diseases. The result as follows:



VI. CONCLUSION

In this paper, we have presented a system for the patients to get instant help in an emergency situation using medical chatbot and SOS option. The user can also view nearby doctors in whichever location he is in and can view his/her medication profile through the application. The user can take advantage of this application as every data is kept online and provides a real-time experience.

VII. FUTURE ENHANCEMENT

The medical details are more important and should not be disclosed to anyone. No one should have any access to the medical details of the user. So, the database which stores the medical details of the user should be encrypted. Even if someone accesses the database without the knowledge of the user, only the encrypted data should be shown to him. To reduce the difficulty of texting, a voice-based conversation in the medical chatbot will be created. An integrated messaging system will also be provided, so that, the patient can send a message to the doctor, which he has been connected with.

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