Healthcare Chatbot system using multinomial naïve Bayes algorithm.

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ABSTRACT

In the current situation of covid-19 we faces the barrier for performing various task health consultation is one of them. Taking care of our and our family's health is most important but due to that situation it gets difficult. For the solution of this problem machine learning and chatbot application idea step in.
Machine learning is one of the core of artificial intelligence. With the help of that system can take the data, search patters, uses various algorithms and learn and improve itself using the data. The Chatbots is a tool which is use to communicate with user using natural language processing. Nowadays the use of Chatbots has widely spared for everywhere. Chatbots are getting use in health industry which will help to solve health problems. Chatbot for health consultation are becoming popular. This Chatbot will be very helpful for the healthcare industries as well as patient. With the study of various symptoms and solutions over that our system will provide satisfying solutions over symptoms and medications as well as doctors recommendation. Using multinomial naïve Bayes algorithms by calculating the probability of each word occurrence it will generate the accurate result over the input data.

Keyword: - *Chatbot, Healthcare, Medications, consultation, Machine learning, Multinomial naïve Bayes algorithm.*

1. INTRODUCTION

Chatbot are conversational tool which is known as virtual humans and virtual assistance, it is an artificial intelligence program design to simulate human conversation via text to language. Several positive viewpoints are created on the potential uses of health care chatbots at intervals the selling and business world.

Traditionally medical consultation is between patient and doctor physical face to face. But due to covid-19 situation it becomes difficult which leads to delay operational communication. For instance, patients and their caregivers typically face various challenges getting timely medical recommendation and data from health care suppliers. The increasing demand for health care services additionally places an outsized burden on health care suppliers thanks to the shortage of medical professionals.

By using advance artificial intelligence technology barriers moon-faced by patients in seeking timely health data and to cut back the burdens posed on medical experts.

Chatbots in health care could have the potential to produce patients with access to immediate medical data, provide diagnoses according to the medical problems. 30% of participants showed that they had personal expertise with the employment of chatbots for health-related problems. Physicians were additionally given an inventory of presently obtainable health care chatbots, to look at their understanding with multiple interfaces that might be accessed by patients.

2. LITERATURE SURVEY

2.1. Chatbot for healthcare system using artificial intelligence

Health care is extremely vital to steer a decent life. The thought is to form a medical chatbot mistreatment computing which will diagnose the malady and supply basic details regarding the malady before consulting a doctor. The chatbot enforced mistreatment pattern comparison within which the order of the sentence is recognized and saved response pattern. N-gram technique is used to extract words from sentence. Here n-gram is employed for comparison and deduction of the input with case knowledge mistreatment Moro phonemes and phonemes because the deciding parameter. Likelihood analysis for the highest match is performed.

2.2 Medbot: conversational artificial intelligence powered chatbot for delivering tele-health after covid-19

Telemedicine are often employed by medical practitioners to attach with their patients throughout the recent Coronavirus eruption, while trying to cut back COVID-19 transmission among patients and clinicians. Within the current growing age of digitization, computer science (AI) battery-powered chatbots area unit enjoying a number one role by informatory the perform of a virtual assistant that would manage a voice communication via speech or matter strategies. A chatbot could be an informal agent that communicates with user's victimization tongue.

3. PROPOSED SYSTEM

The main goal of the healthcare system is to provide relevant solutions regarding health questions. And to reduce time and cost for consulting a doctor. In the healthcare Chatbot system user will be communicate with Chatbot regarding the problems and Chatbot will provide the answers by analyzing the user input.
This system won't be include any health care person or team for answering real time unless it is requested by user or needed. Healthcare Chatbot system will be using artificial intelligence for processing with data and giving answers.
There are mainly 2 modules are present training and testing we will be providing large amount of database having data of symptoms and solutions, doctors recommendation, medicines recommendation, etc. In the training module we train our module by providing this data and in testing module we check if the module is able to answers user questions properly or not.

3.1. System design
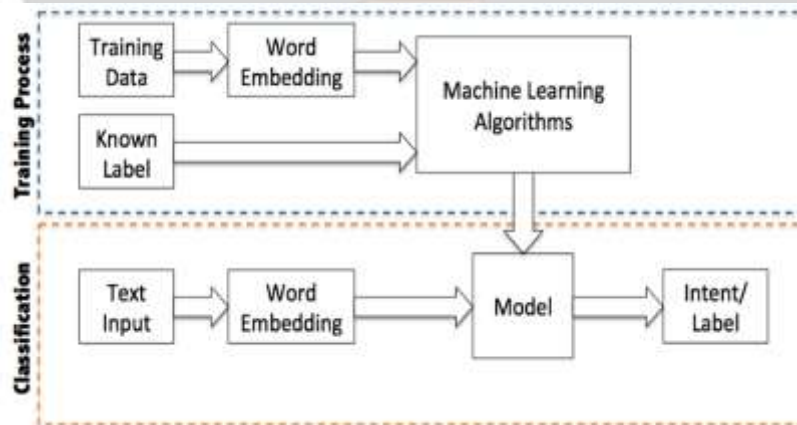
Fig 1: system architecture

Symptoms and regarding solutions, medication dataset is used to train the main machine learning model. The dataset given to the model classified using machine learning algorithm i.e. multinomial naïve Bayes algorithm. The algorithms converts the data into known labels using word embedding. When the user/patients provide input system algorithms applies to the user input data and system will provide the answers matches to the dataset.
The purpose of this system is to develop chatbot in web application which will be used for different hospital websites as well as individually. Firstly, chatbot will be use to disease analysis through symptoms entered by user and provide medications accordingly. It will also help to schedule appointment for particular doctors.

This system contains 2 main modules:
1. **User** – In that module there are two main functions:
   - Login / Registration – User can register first and login to the system so Chatbot can analyze the data and suggest for relevant solutions.
   - User input – Besides login / Registration user can directly start the conversation by going to chat option and give input to the Chatbot.
2. **Training process** - In this actual training and procession and searching data get perform by using these 3 module:
   - Training data: system already have some training data for to process with user input.
   - Word embedding: User input get accepted and extracted into keywords for searching the relevant answers according to the keywords.
   - Searching with keyword: Keyword which are extracted from the user input get search in the database. And answer is provided to the user.

3.2. System flow
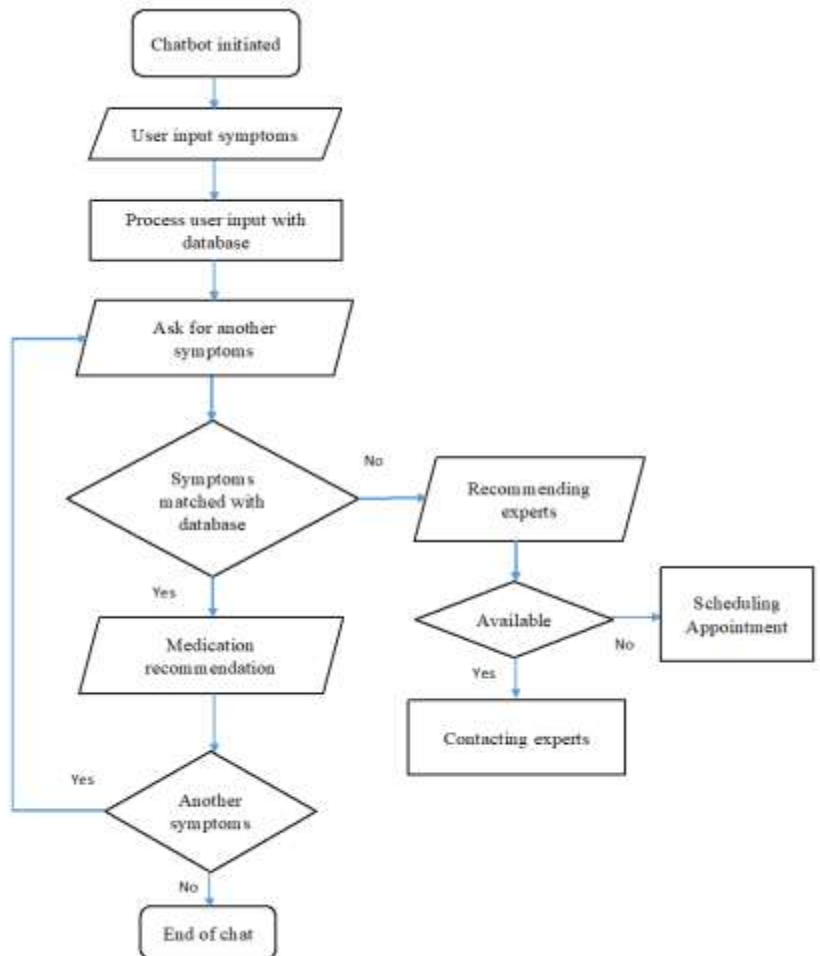
Fig 2: Flow diagram

This flow diagram will help to understand the flow structure of the system. When user will provide symptoms as input the input will analysed with the help of maltinomial naïve bayes algorithm. Input will be coverted into labels

and keyword. That labels will matched with the output form the dataset and output will be provided. If a patients need to meet the doctor or schedule an appointment then system will provide the feature accordingly. This system will help to reduce consultation time and heathcare staff requiremets for specific consultation.

3.3 Multinomial naïve Bayes algorithm

Multinomial Naive Bayes is one in every of the foremost well-liked supervised learning classifications that's used for the analysis of the specific text information. Text information classification is gaining quality as a result of there's a vast quantity of knowledge obtainable in email, documents, websites, etc. that has to be analysed. Knowing the context around a certain type of text helps in finding the perception of a software or product to users who are going to use it.

This classifier work on probability calculated form Bayes theorem. Bayes theorem, developed by Thomas Bayes, calculates the likelihood of an occurrence occurring supported the previous information of conditions associated with an occurrence. It's supported the subsequent formula:

$P(A|B) = P(A) * P(B|A)/P(B)$

Where we have a tendency to square measure conniving the likelihood of sophistication A once predictor B is already provided.

$P(B)$ = prior probability of B

$P(A)$ = prior probability of class A

$P(B|A)$ = incidence of predictor B given category A likelihood

This formula helps in scheming the likelihood of the tags within the text.

Calculate Likelihood. Probability are the chance of a word occurring during a document providing the document belongs to a selected class.

$P(Word/Category)$ = (Number of occurrence of the word in all the documents from a category+1) divided by (All the words in every document from a category + Total number of unique words in all the documents).

Steps to implement multinomial naïve Bayes algorithm

Step 1 – Take user data as and input

Step 2 – removing stop words and steaming filter our tag

Step 3 – list out the tags and apply probability

Step 4 – Store the data according to the probability form highest order

Step 5 – Comparing the data with the dataset

Step 6 – Return the respond according to the tag

Step 7 – Display Bot response

4. FUTURE SCOPE

1)   Therapy Chatbots - A Chatbot may be trained to produce assistance to the mental state of the patient.

2)   Automating small business tasks – Business executives are looking to automate the routine paperwork, scheduling, timesheet entry, accounting by 82, 79, 78, and 69% respectively.

3)   Patient's Personal Assistant - Chatbots are likely to be used as a nurse who can track the patient's wellbeing, vital parameters, and may then transfer the notes in an exceedingly summarized report back to the doctor for clinical evaluation.

5. CONCLUSIONS

Chatbots square measure beyond question useful. Those within the care business will implement them on their sites to assist patients get timely medical recommendation, schedule appointments, send daily reminders, and even send invoices. The usage of Chatbot is user friendly and might be utilized by anyone United Nations agency is aware of the way to kind in their own language in mobile app or desktop version.

The purpose of our healthcare Chabot is to give service to people who are suffering from health problem or disease by suggesting them solution regarding their problems. To give them 24x7 availability and try to solve their problems related to health.

This is the best solution for individual who are busy with their job schedules. They are doing not ought to wait within the queue for hours to induce a meeting with a doctor anytime instead they'll chat with the larva. Our medical chatbot give medical help to the patients for a few of the overall diseases like fever, cold, typhoid, malaria, jaundice etc.

6. ACKNOWLEDGEMENT

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