Voice Chat Bot in Healthcare System

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Abstract

On-Demand Architecture refers to the economic activity created by technology companies to meet consumer demand through the immediate provisioning of goods and services. Our On-Demand Service Delivery models ensure that customers benefit from the quick availability of Services and when you need them. Healthcare payers, providers, and medical assistants are also beginning to leverage these AI-enabled tools to simplify patient care and cut unnecessary copays. Before contacting a doctor, the objective behind developing a voice chat bot using AI and ML is to identify the ailment and offer basic information about it. The chat bot simply keeps the data in the database in order to recognise the sentence keywords and make a choice and answer the query based on the user's facts. Before contacting a doctor, the objective behind developing a voice chat bot using AI and ML is to identify the ailment and offer basic information about it. The chat bot simply keeps the data in the database in order to recognise the sentence keywords and make a choice and answer the query based on the user's facts.

This research describes a healthcare speech chatbot that predicts illness accuracy using a machine learning approach. To anticipate the illness, numerous machine learning techniques may be utilised. The Support Vector Machine learning approach is generally used to achieve precise prediction and improve model efficiency. To produce the conversational style, the technology employs Natural Language Processing. People can spend less time in hospitals and obtain low-cost or free care by using this technique.

Keywords- *Chatbots Medical services, Internet, Data collection, Medical diagnostic imaging, Automation*

Introduction

Artificial intelligence has progressed to the point where programmes can learn from people and successfully simplify human communications, which is critical. Siri, Apple's AI assistant that is part of the standard software for its devices, is one of the most well-known instances of chat bots in recent history. Siri popularised chat bots in 2011. . Chat bots are entering the healthcare profession and can assist in the resolution of health issues. Health and fitness chat bots are becoming increasingly popular in the market. Last year, Facebook began enabling healthcare organisations to construct Messenger chat bots that would then connect with users. Health Tap, the first startup to offer a health bot on the Messenger app, is an excellent example. It enables users to ask medical-related questions and obtain responses. This method was intended to decrease the user's healthcare costs and time, as it is not possible for the user to see the physicians when they are urgently required. It is most commonly utilised in rural areas when doctors are unavailable. The system will accept the user's input of symptoms and then diagnose the symptoms and provide a specific result based on the input supplied. The interfaces are created independently utilising java programming languages.

1.1 Literature Survey

1] Artificial Intelligence Chatbot for Healthcare SystemVinod Kumar Shukla and Lekha Athota: June 2021
In this study, the chatbot maintains data in a database in order to recognise sentence keywords, make a query choice, and answer queries. Languages are used to calculate ranking and sentence similarity. performed N-gram, TFIDF, and cosine similarity are used. Each sentence from the supplied input sentence will be scored, and additional comparable sentences will be found for the query.

2] June 2018: A Medical Chatbot
Mrs. Rashmi Dharwadkar and Dr. Neeta A. Deshpande discuss the medical conversation bot in this study. How the medical chat bot truly works, how it responds to user/patient requests, and how it classifies words to provide the greatest accuracy/result

3] Medical Chatbot (Medibot): February 2020
Prakhar Shrivastav and Nishant explain automatized medical chatbots that are conversationally built with technology in mind in this research.

1.2 Existing System

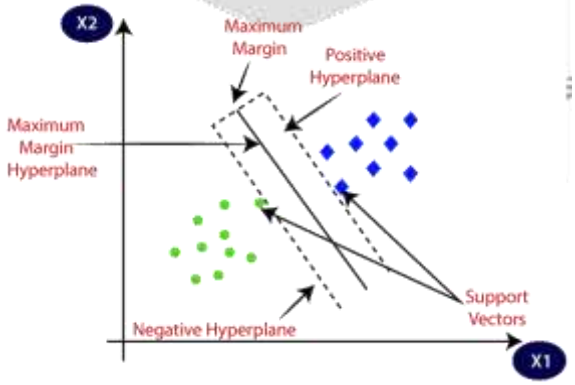
The chatbots were capable of communicating. However, there were certain flaws that necessitated the development of a more powerful chatbot capable of communicating with consumers in a more friendlier manner. Previously, chatbots were unable to communicate adequately. They were trained using only a little amount of data. As a result, they were unable to comprehend the long inquiries.

1.3 Methods And Technique

Many machine learning methods, such as KNN and Support Vector Machine, were used to train the model in this study. The algorithm that has been developed Support Vector Machine produces the finest results. As a result, this method was chosen as the best match.

1] SVM

SVMs are a sort of supervised machine learning technique that may be used for classification and regression applications. They are based on the concept of locating the hyperplane in a high-dimensional space that divides various classes the most. An SVM method will learn a model that can predict the class label of fresh, unseen data from a collection of labelled training data in a classification challenge. The model is represented as a hyperplane in a high-dimensional space, and the aim is to discover the hyperplane that separates the various classes the most. The margin is the distance between the hyperplane and the nearest data points, and the purpose is to maximise the margin to make the model more robust.



In SVM, there are different terms used in our model. They are:

[1] Support Vectors:
SVM selects the extreme points/vectors that aid in the creation of the hyperplane. These extreme examples are referred to as support vectors, and the method is referred to as Support Vector Machine.

[2] Hyperplane:
The SVM algorithm's purpose is to find the optimal line or decision boundary for categorising n-dimensional space so that we may simply place fresh data points in the proper category in the future. A hyperplane is the optimal choice boundary.

[3] Margin Hyperplane:
The one with the shortest distance to the nearest data points from both classifications. We call it the hyperplane with the greatest margin.

How SVM works?

SVM use a hyperplane to categorise fresh data points into the appropriate category. SVM's main goal is to maximise the margin between data points in distinct classes from a hyperplane.
The straight line that best classifies the data point is called a hyperplane. A hyperplane's equation can be written down. as:
$y = mx + c$ ------[1]
From this equation, we can derive two types of hyperplanes:

[1] Positive Hyperplane:
The point that is present above the hyperplane makes the model to draw the plane whose value is negative. The equation can be:
$wx1 + c = -k$ -----[2]
where k can be any negative value.

[2] Negative Hyperplane:
The point that is present below the hyperplane makes the model to draw the plane whose value is positive. The equation can be:
$wx2 + c = k$
where k can be any positive value.

The main of SVM is to maximize the margin difference so as to best separate the point into classes.
So, we can take advantage of the above two equations.

We get equation:
$w(x1-x2) = 2k$ ----[3]

We can convert this into vector by dividing it by magnitude of w:
$W(x1-x2)/||w|| = 2k/||w||$

Now maximize this margin difference given constraints such that:

$yi*(wxi+b) >= 1$

Cost Function:
So, from above, we can write cost function as:

Cost Function:

$$\min_{w} \frac{1}{2}\sum_{i=1}^{n} w_i^2 + C\sum_{j=1}^{m} max(0, 1 - t_j \cdot y_j)$$

This is the overall process of Support Vector Machine Classifier. This algorithm works same as described above. For non-linear data points, SVM uses kernel functions such as rbf, polynomial, etc

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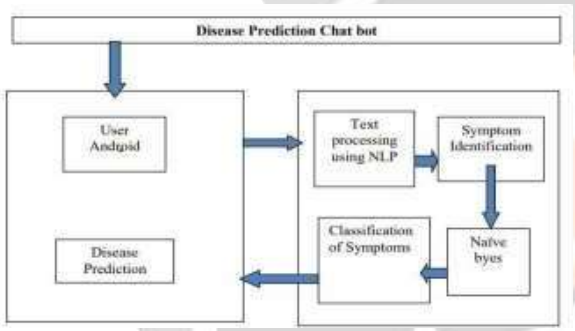
1.4 Proposed System

Chatbots are conversational virtual assistants that automate user interactions. Chatbots are driven by artificial intelligence and interpret natural language using machine learning techniques. The primary goal of this document is to provide users with modest health information. The bot initially prompts the user to submit information such as his name, age, and so on. Following that, the bot begins the process, such as forecasting the condition, recommending precautions and home cures, and so on. The bot is the trained model that uses a machine learning algorithm to provide replies to the user questions that it has been trained for.



Conclusion

The major goal of this suggested chatbot is to assist individuals by providing them with both text-based and voice-based counselling services. Not everyone has easy access to mental health treatments. People may obtain companionship 24 hours a day, seven days a week by employing this chatbot. Although the planned chatbot in this project has been established, it is regretful to note that this chatbot still considers aside from providing a different answer every time. Training with more datasets can enhance model prediction accuracy even further. Furthermore, the flow of the discussion for the chatbot is difficult to create. Aside from the absence of psychological understanding and expertise, there is no assurance that the user will follow the instructions. Although the chatbot believes itself capable of providing a connected answer even when it is beyond the scope of the conversation flow, this limits the chatbot's ability to execute all duties entirely and affects the quality of the mental healthcare service. However, certain attempts have been made to improve user experience, such as introducing emoticons to talks. Furthermore, a typing indication was included to emulate human typing behaviour. Because colour may communicate a product's essential mood, tone, concept, and connotation, chilly colours like blue or green were used in the chatbot UI to give the user a sense of calm and trust. In short, the suggested chatbot cannot be regarded a flawless chatbot capable of providing 100 percent accuracy.

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