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Automated Medical Chat Bot

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Abstract: *A conversational system called an automated medical chatbot makes use of artificial intelligence to help patients virtually. The chatbot can evaluate symptoms, diagnose illnesses, suggest medicines, organise appointments, and provide emotional support using natural language processing and machine learning techniques. With the use of this technology, patients now have an easy way to obtain healthcare services from the comfort of their own homes. Additionally, by doing mundane activities and offering rapid assistance to patients, the chatbot might lessen the stress on healthcare staff. To protect patient data and privacy, ethical and security issues must be taken into account. The creation of automated medical chatbots offers a great chance to change the healthcare sector and improve accessibility to healthcare globally. For further theory explanation about this topic, see our Review Paper under the references*

Keywords: Automated Medical Chatbot, Natural Language Processing-(NLP),Voice Based Model, Name Entity Recognition-(NER), Machine Learning-(ML)

I. INTRODUCTION

An automated medical chatbot is a piece of artificial intelligence (AI) software that converses with patients, medical personnel, and carers using machine learning and natural language processing. It is intended to help users by offering medical guidance, responding to inquiries about ailments, drugs, and treatments, and setting up doctor appointments. Automated medical chatbots' capacity to offer instant support to patients, minimising the need for them to wait for appointments or visit healthcare facilities for minor difficulties, is one of their main advantages. These chatbots can also assist healthcare workers in managing their workload by responding to questions and offering basic medical advice, freeing up doctors and nurses to concentrate on more complicated cases.

An automated medical chatbot that makes use of Natural Language Processing (NLP) engages consumers in conversation while dispensing medical knowledge and recommendations. NLP is a subfield of AI that gives computers the ability to read, understand, and even write human language. Medical chatbots can analyse user input, spot patterns, and deliver pertinent responses using NLP techniques.

II. LITERATURE REVIEW

Computer programmes known as automated medical chatbots can mimic conversations with human users. They are frequently used in the healthcare industry to inform and support patients, respond to inquiries, and even diagnose ailments.

The volume of research on the potential advantages of automated medical chatbots is expanding. According to one study, people who use chatbots to manage their chronic illnesses are more likely to follow their treatment regimens and experience better overall health results. According to a different study, chatbots can help patients with their mental health.

Nevertheless, using automated medical chatbots carries some potential hazards as well. One worry is that chatbots would not be able to provide patients with accurate or comprehensive information. Another worry is that patients can rely too heavily on chatbots and neglect to see a doctor when necessary.

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In general, automated medical chatbot research is still in its infancy. The advantages of these instruments, however, appear promising. Automated medical chatbots have the potential to significantly enhance healthcare outcomes with proper development and application.

The following are some potential advantages of automated medical chatbots:

- Greater accessibility to healthcare: Regardless of a patient's location, chatbots can offer them 24/7 help and information about healthcare. Patients who reside in rural locations or have trouble obtaining regular healthcare services may find this to be extremely helpful.
- Improved patient involvement: Chatbots can get patients more involved in their own treatment and educate them about their ailments. This may result in better treatment plan compliance and improved general health results.
- Cost savings: Chatbots can lower healthcare expenses by facilitating more effective care delivery. Patients with chronic diseases who require continuing care may benefit most from this.

Sr no	Title	Authors	Year	Country	Description
01	Model of Multi-turn Dialogue in Emotional Chatbot	Chien-Hao Kao, Chih-Chieh Chen, Yu-Tza Tsai.	2019	Kaohsiung, Taiwan	In this paper we combined the multiturn dialogue model and sentiment recognition model to develop a chatbot, that is designed for used in daily conversations rather than for specific tasks.
02	The Potential of Chatbots: Analysis of Chatbot Conversations	Mubashra Akhtar, Julia Neidhardt, Hannes Werthner	2019	Moscow, Russia	To reach this goal, chat conversations are interpreted as sequences of events and user inputs are analyzed with the help of text mining techniques. The study shows that based on users' written conversational contributions, valuable insights on users' interests and satisfaction can be gained.
03	An Overview of Artificial Intelligence Based Chatbots and An Example Chatbot Application	Naz Albayrak, Aydeniz Özdemir	2018	Izmir, Turkey	In this paper, we present the general working principle and the basic concepts of artificial intelligence based chat bots and related concepts as well as their applications in various sectors such as telecommunication, banking, health, customer call centers and e-commerce.
04	Artificial intelligence marketing: Chatbots	Uroš Arsenijevic, Marija Jovic		Belgrade, Serbia	In this paper, the chatbot is analyzed as an artificial intelligence tool in marketing, its today's application, as well as its future potential in the above-mentioned field.
05	Intelligent Chatbot for Easy Web-Analytics Insights	Ramya Ravi	2018	Bangalore, India	In this fast-moving data-driven world, it is vital that we draw the accurate insights to make the right decisions at the right time. In terms of online websites, there are many web analytics tools that will give us performance reports. However, it is tedious and time consuming to master the tools leave alone to derive insights to understand the business impacts.

II. MATERIALS AND METHODS

2.1 Proposed System

To ensure a medical chatbot's efficacy, accuracy, and usability, a sophisticated procedure called development is involved. The chatbot must first be planned and designed with the target audience's medical requirements in mind. The team must also choose the medical topics the chatbot will cover and compile sufficient information about them.

Chatbots use natural language processing (NLP), a crucial technology, to analyse and comprehend user input in natural language. Algorithms must be created by the development team in order to correctly process and reply to user inquiries. The chatbot can interpret the user's purpose using these algorithms, which are based on established rules or machine learning models, and respond appropriately.

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2.2 Methodology

Collecting a sizable corpus of text data pertinent to the medical domain is the first stage in developing a medical chatbot. Many other sources, including medical journals, books, and patient records, can be used to gather this information.

The data gathered will next be processed using natural language processing (NLP) methods. Lemmatization, stemming, and other operations like tokenization will be required for this. The purpose of this phase is to transform the text input into a form that the chatbot can easily understand.

Training a machine learning model to produce answers to user queries is the last phase. The text data that was acquired in step 1 and processed will be used to train the machine learning model

III. SYSTEM ARCHITECTURE

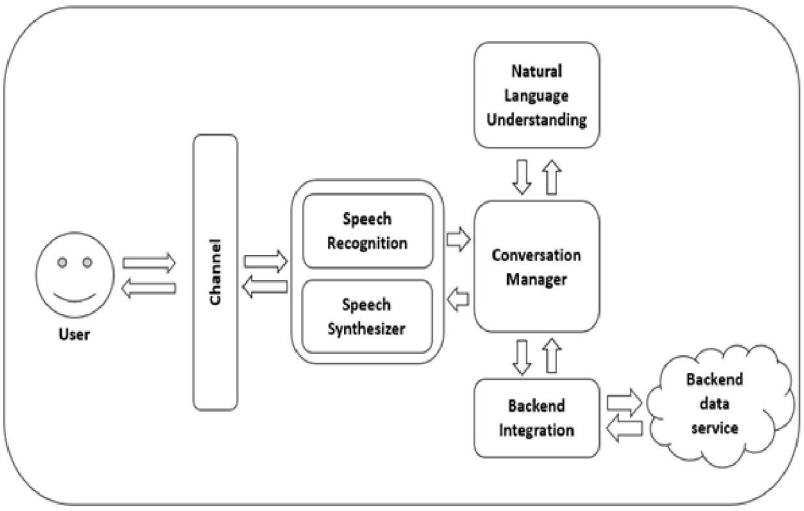

Figure 1: System Architecture

Algorithm :

Natural Language Processing (NLP):

It is a branch of computational linguistics and artificial intelligence (AI) that focuses on how computers and human language interact. NLP is the process of creating algorithms and methods that allow computers to comprehend, interpret, and produce human language in a useful and meaningful manner.

It is an area of research that focuses on how computers and human language interact. It entails creating computational models and methods that allow machines to comprehend, decipher, interpret, and produce natural language.

NLP's primary goal is to close the communication gap between humans and machines. The grammatical rules, idiomatic idioms, ambiguities, and context-dependent meanings that make up human language make it complicated and nuanced. In a computational form, NLP aims to capture and represent this complexity.

Named Entity Recognition (NER) :

NER algorithms are used to recognize and extract particular items from user input, such as anatomical words, symptoms, drugs, and medical diseases. This makes it easier for the chatbot to comprehend and respond to the user's problems.

Machine Learning (ML)

A dataset of medical knowledge, comprising symptoms, diagnosis, therapies, and other pertinent information, can be used to train the chatbot using ML algorithms. This data can be used by ML models to identify patterns and produce precise recommendations and replies.

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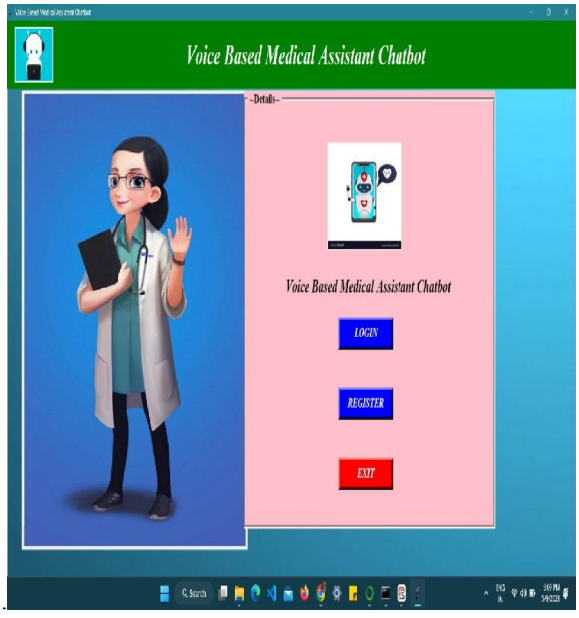
IV. RESULT

The goal of the chatbot was to engage the user in conversation and use the user's listed symptoms to match the illness in order to diagnose the user. The chatbot must be adaptable in order to handle varied natural language interactions. This is good for an LSTM model since LSTMs favour sequential input like that seen in spoken language, where the meaning of a word depends on the words that came before it.

The model consisted of a flatten layer, embedding layer, LSTM with 10 hidden layers, input layer, and dense layer with Softmax activation. As the loss function, sparse categorical cross entropy was used, and the Adam optimizer was used for training. After 320 training iterations and a learning rate lambda of 0.001, the model's peak accuracy of 97.22% was reached.

	Models	Accuracy
0	Logistic Regression	0.814634
1	Decision Tree Classifier	0.985366
2	Random Forest Classifier	0.985366
3	SVM	0.882927
4	KNN	0.926829
5	GaussianNB	0.765854
6	BernaulliNB	0.824390
7	XGBoost	0.985366

Accuracy of the Model



Homepage

Login Page

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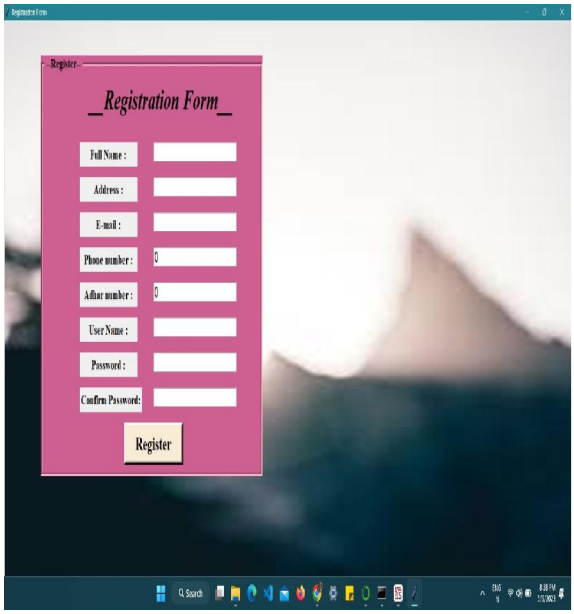
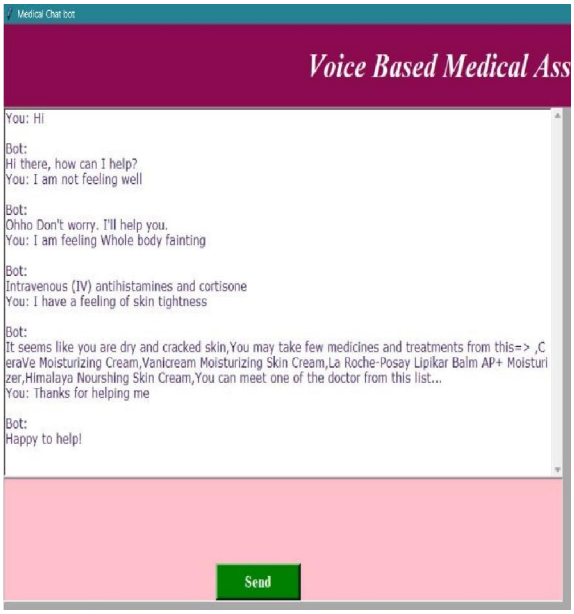


Registration Page



Main Interface

V. CONCLUSION

In this research, it is suggested to create an application that trains an NLP algorithm to predict disease from symptoms using information from a database of disease symptoms and treatments. By enabling health organisations to enter the data necessary to anticipate the disease and its treatment, our programme streamlines the treatment process. Our findings demonstrate that the application has an accuracy rate of over 90% in predicting the disease and its course of treatment. Our research has implications for physicians and healthcare institutions in rural locations.

Declaration by Authors

- Ethical Approval: Approved
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- Conflict of Interest: The authors declare no conflict of interest.

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