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HEALTHCARE CHATBOT

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Abstract:
As the interest in Machine Learning and AI continues to grow, we can expect to see new technologies hitting the market, influencing our daily lives. One such technology gaining traction is Virtual Assistant Bots, also known as Chatbots. These Chatbots have evolved from simple menu or button-based interfaces to keyword-based, and now to more advanced contextual-based systems. Among these advancements, the contextual-based Chatbots stand out as the most sophisticated, using techniques from Machine Learning and Artificial Intelligence to learn and respond more effectively to user queries in specific domains.
The idea behind our project is to develop a medical chatbot capable of diagnosing diseases and providing basic information about them before users seek professional medical advice. This could potentially help in cutting down healthcare costs and making medical knowledge more accessible through the use of such chatbots. Chatbots are essentially computer programs designed to converse with users using natural language.
In our project, we are focusing on providing people with quick and accurate predictions of diseases based on their symptoms. To achieve this, we are utilizing the Decision Tree algorithm for disease prediction. The integration of Chatbots in healthcare has the potential to greatly impact the industry by offering predictive diagnoses and improving accessibility to medical information.

Index Terms **-** Disease Prediction, Machine Learning Algorithm, Decision Tree Algorithm, Chatbot.

I. INTRODUCTION

In recent decades, people have been tirelessly engaged in their daily endeavors, often overlooking the importance of prioritizing their health consistently. This negligence can ultimately compromise their overall well-being. However, the integration of Artificial Intelligence has opened avenues for delivering healthcare services conveniently and affordably to individuals. Maintaining optimal health is invaluable, directly impacting our quality of life. The primary aim of this paper is to address this objective by providing accessible healthcare solutions.Modern society heavily relies on advanced technology, which has become deeply embedded in our daily lives. Consequently, Artificial Intelligence is thriving, particularly in research domains, with a significant focus on disease prediction. Leveraging big data analysis enhances the accuracy of risk assessment, facilitating disease prediction and prevention.

Although e-healthcare services are crucial, they encounter challenges in implementation, particularly in developing nations where awareness and infrastructure are lacking. Many individuals seek healthcare information online, underscoring the need for accessible online medical platforms. Our platform seeks to bridge this gap by providing medical assistance and guidance to users. By integrating a chatbot equipped with Natural Language Processing (NLP), users can efficiently interact and receive disease predictions. This study proposes a disease prediction chatbot utilizing NLP and machine learning algorithms, specifically the Decision Tree algorithm, to enhance communication and healthcare accessibility.

II. LITERATURE SURVEY

[1] A counseling chatbot application offers conversational support for mental health care, utilizing emotion recognition methods and a chat assistant platform. However, it lacks consideration for the user's psychiatric status through continuous monitoring.

[2] Text-based healthcare chatbots can effectively support patients and health professionals in therapeutic settings beyond one-on-one consultations. However, they do not provide face-to-face care and may encounter limitations in situations where such care is necessary.

[3] This paper presents a healthcare chatbot system designed to assist staff by automating the patient intake process. However, it lacks inclusion of additional diseases, and a thesaurus of symptom synonyms is also recommended.

[4] This text-to-text conversational tool prompts users about their health issues, allowing them to chat as if conversing with a human. However, it does not provide detailed information or features such as assessing the duration and intensity of symptoms.

[5] The proposed method introduces a chatbot-based mobile healthcare service capable of promptly responding to accidents in daily life and changes in chronic disease patients' conditions. It also proposes a human-robot interaction framework for efficient chatbot service implementation, despite being text-based without advanced features.

[6] Conversational agents encounter various technical,design,and linguistic challenges, particularly in healthcare settings. While Introducing the concept of Conversation User interface (CUI) for health, there are technical limitations such as inaccurate voice messages and network-related corruptions affecting the timing of bot reminders.

[7] This program offers a framework and resources based on AAP, AFP, and ACP recommendations to facilitate skill development in self-care. While a scripted text messaging platform appears feasible and well-received by patients and caregivers, it's tailored for individuals with special health needs transitioning into adolescence..

[8] The system employs a question-and-answer protocol in the form of a chatbot to address user queries, with complex questions answered by an expert. However, it is relatively time-consuming.

This chatbot aims to help users understand their symptoms and provide basic disease diagnosis. Nevertheless, it features a complex interface, is time-consuming, and incurs high installation costs .

[10]A chatbot, an interactive software application, simulates natural user interactions based on AI modeling. The proposed dataset and prototype model offer quick assistance for common medical conditions but are limited to such conditions.

[11]Utilizing both the KNN algorithm and decision tree classifier, the chatbot selects the more accurate output. However, the utilization of both algorithms results in increased time consumption.

III. EXISTING SYSTEM

Several drawbacks exist in current text-based chatbot systems. These include the lack of immediate responses for patients, who often must wait extended periods for acknowledgment from experts. Additionally, these systems typically have a limited number of diseases included in their dataset, which restricts their diagnostic capabilities. Furthermore, technical issues such as inaccuracies in voice messages further impede the effectiveness of these existing systems.

IV. PROPOSED SYSTEM

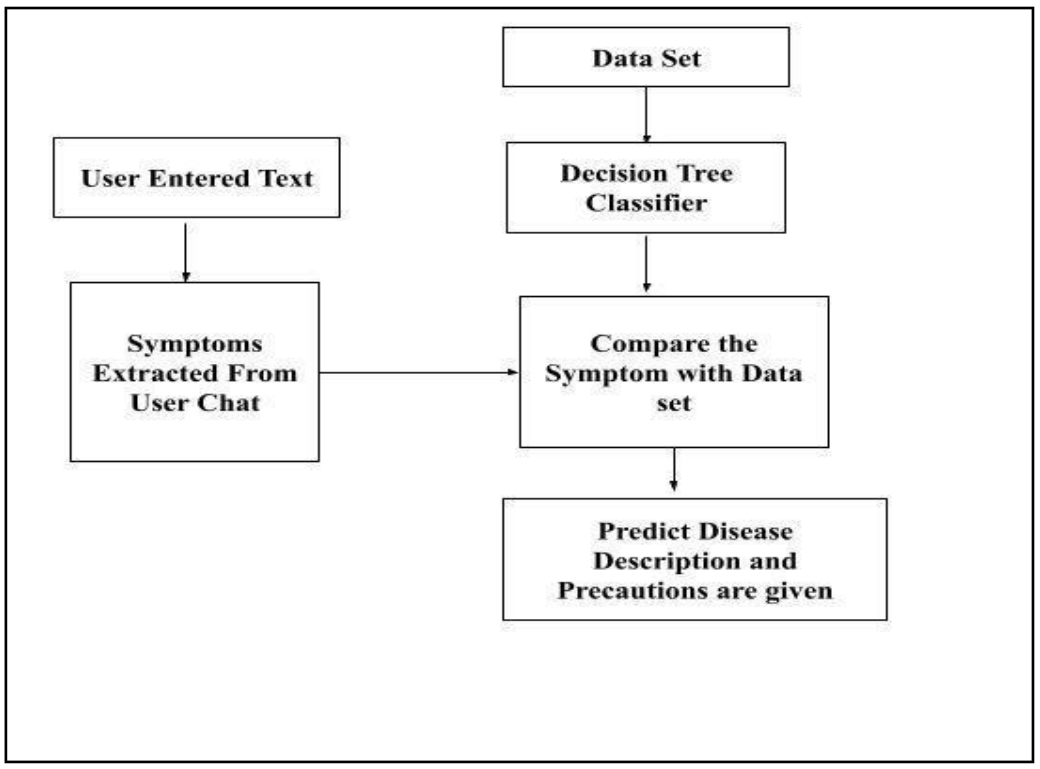
In our system, users have the option to communicate with the chatbot through text. The chatbot responds using a combination of voice and text formats. It identifies diseases based on the users' queries and provides suggestions and recommends specialist doctors accordingly. Importantly, our system can handle multiple users simultaneously without experiencing any delays or lagging.

4.1 Objectives

1. Extracting symptoms from user chat messages
2. Classifying and predicting diseases using a decision tree classifier.
3. Developing a healthcare chatbot capable of predicting diseases based on input symptoms.

4.2 Overall Algorithm

1. Enter the user query into the chatbot interface.
2. Extract relevant details from the user's chat input.
3. Utilize the Decision Tree classifier algorithm to analyze the query.
4. Retrieve responses such as disease predictions and precautionary measures from the chatbot and provide them to the user.
5. Exit the process.



V . ARCHITECTURAL DESIGN

Figure 1:Architectural Design

Initially, the chatbot prompts the user to provide their name, along with one major symptom they are experiencing and the duration of that symptom. In the subsequent step, the chatbot requests specific details about the symptom the user is facing. For example, the user may type "0" for heavy fever or "1" for mild fever. Following this, the bot presents a series of symptoms, prompting the user to respond with "yes" or "no" accordingly.

The Decision Tree is a supervised learning technique utilized for both classification and regression problems, with a preference for solving classification issues. It operates as a tree-like structure, where internal nodes represent dataset features, branches denote decision rules, and each leaf node signifies an outcome. Decision nodes facilitate decision-making and feature multiple branches, while leaf nodes represent the final outcomes without further branches. Decisions or tests are based on the dataset's features.

The algorithm engages users with a series of questions and arrives at a solution accordingly. It predicts the disease and provides necessary precautions based on the obtained information.

5.2 Modules

These are the modules in our proposed system.

5.2.1 Admin Module

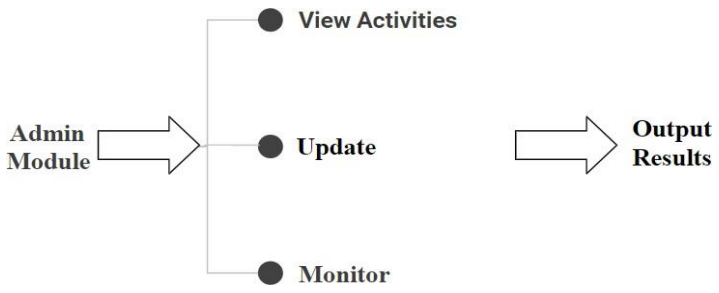


Figure 2 :Admin Module

5.2.2 User Module

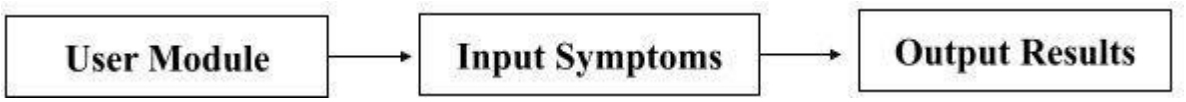


Figure 3: User Module

VI. DESIGN

We developed a website that uses HTML as a framework.HTML describes the structure of a web page semantically andoriginally included for the appearance of the document.

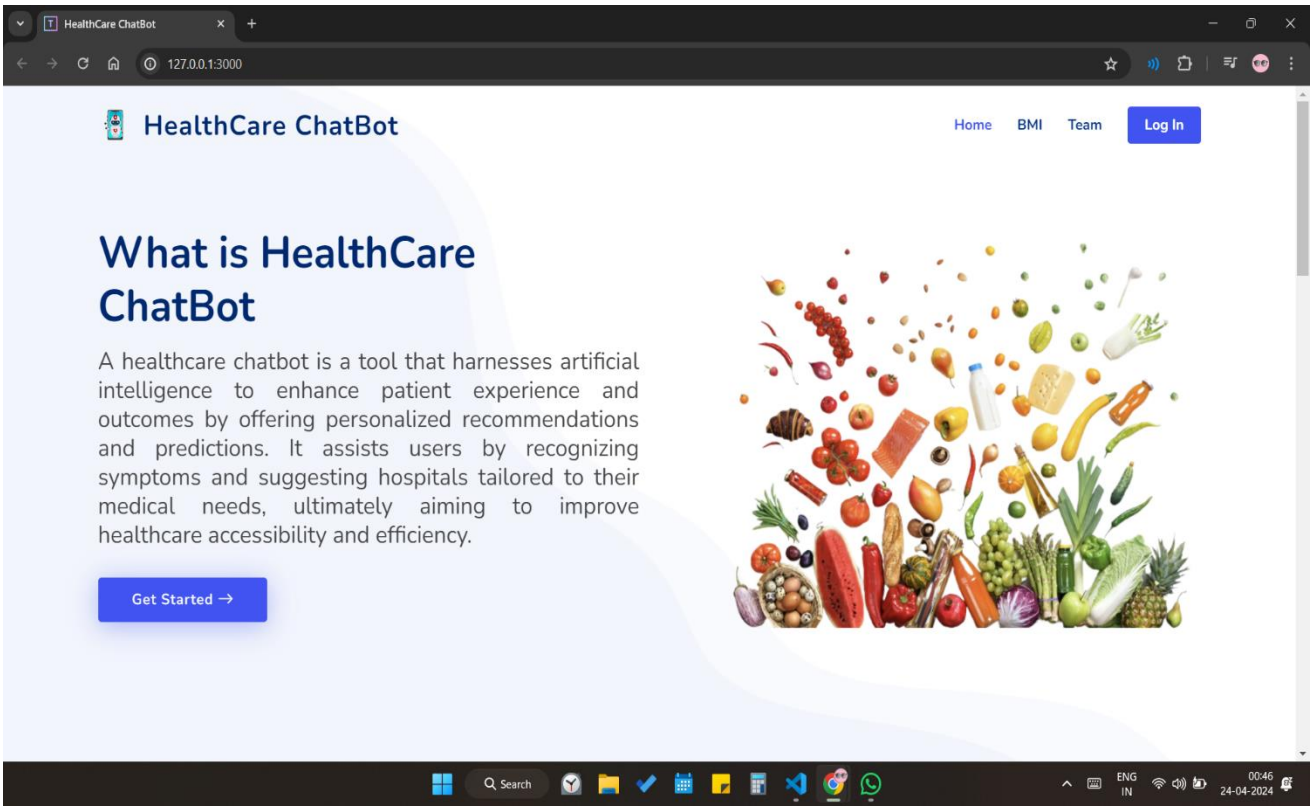


Figure 4: Home Window

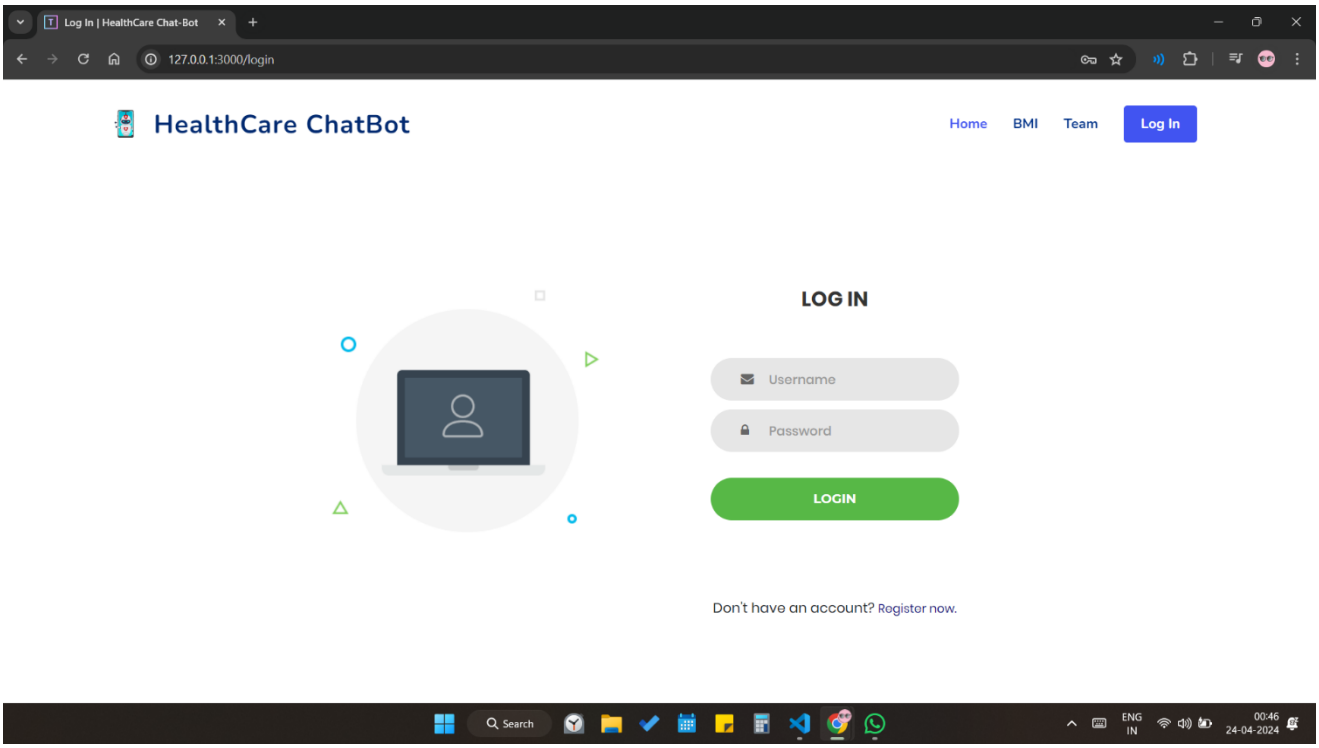


Figure 5: Login Window

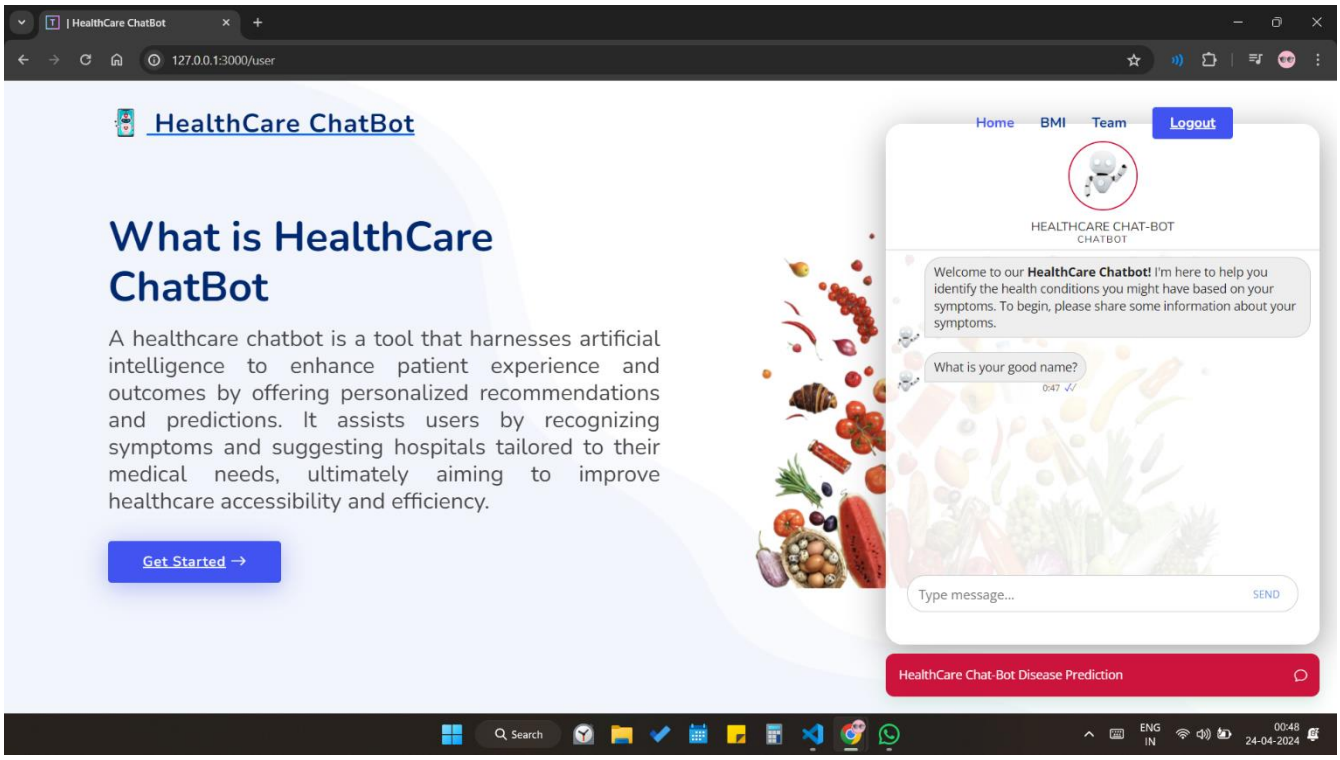


Figure 6: Chat Window

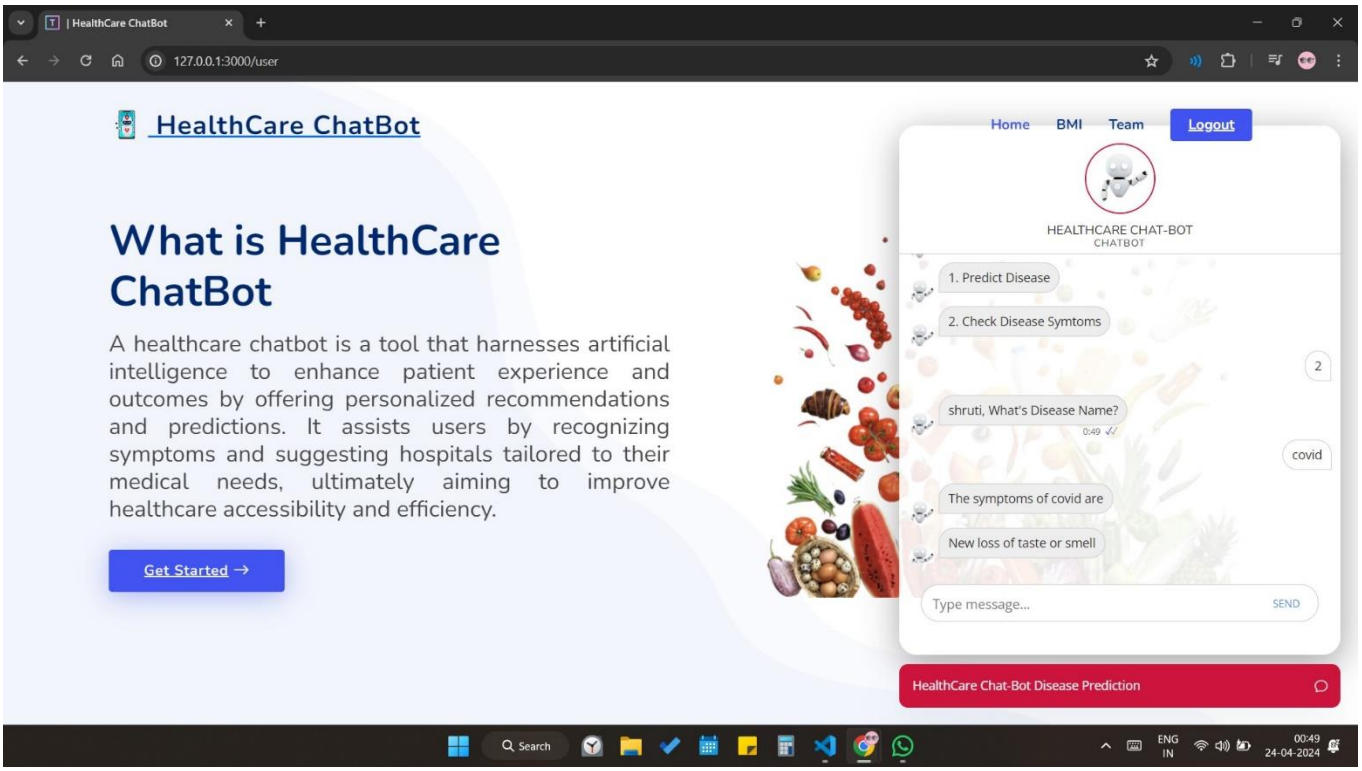


Figure 7: Output Result

METHODOLOGY

The Decision Tree algorithm falls under the supervised learning category and is capable of addressing both regression and classification tasks. Decision trees utilize a tree-like structure, with each leaf node representing a class label and attributes depicted on internal nodes of the tree. The decision-making process within a decision tree involves navigating through the tree based on specific attribute values: if the value is less than a predefined threshold, the algorithm traverses to the left child node; if it's greater, it moves to the right child node.Once the disease is identified, additional details about the disease are appended, along with necessary precautions to be taken. If a user has experienced a particular symptom for more than 13 days, the chatbot advises consulting a doctor. Otherwise, it suggests taking precautions as a preventive measure. Subsequently, the chatbot provides a basic description of the predicted disease to help the user understand their condition better. Voice responses are integrated into the chatbot using the pyttsx3 library, a text-to-speech conversion tool in Python. This library operates offline and is compatible with both Python 2 and 3.The proposed Chatbot system operates on the Decision Tree algorithm, responding to user queries using the aforementioned approach.

VII. RESULT AND DISCUSSION

The proposed system offers an efficient, cost-effective, and user-friendly solution for patients seeking personalized health guidance through one-on-one conversations with the chatbot. By leveraging the chatbot's assistance, users can input their symptoms and receive corresponding solutions promptly.The system's accessibility from any location and at any time adds to its convenience, with the chatbot operating around the clock, 24/7.Through manual calculations, we determined the system's accuracy to be 78.24%, further validating its reliability in providing accurate responses and guidance to users.

VIII. ACKNOWLEDGMENT

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