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AI Health Care Bot System Using Python

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Abstract: *This project seeks to develop an AI health information bot using Python. The bot will provide reliable health information from a comprehensive knowledge base, guide users through a symptom assessment process (without offering diagnosis or medical advice), and promote healthy habits with personalized recommendations. It will also connect users to appropriate resources, such as local healthcare providers or credible online information. To achieve this, the bot will leverage Natural Language Processing and potentially explore Machine Learning for improved understanding and response generation. Furthermore, ethical considerations regarding disclaimers, data privacy, and bias mitigation will be paramount in the development and deployment of this AI health bot. The bot's performance will be evaluated through user testing and analysis of user satisfaction, accuracy of provided information, and effectiveness in achieving set goals. Future work will involve continuous improvement through ongoing learning and adaptation based on user feedback and advancements in the field of AI for healthcare. By combining these elements and addressing ethical considerations, this project strives to create a valuable AI health bot that empowers individuals to make informed decisions about their health and well-being, while emphasizing the importance of seeking professional medical advice from qualified healthcare providers.*

Keywords: Artificial Intelligence, Healthcare, Python, Chat bot, Natural Language Processing, Machine Learning, Diagnosis.

I. INTRODUCTION

AI in healthcare refers to the application of artificial intelligence technologies within the healthcare sector to enhance patient care and outcomes. This involves creating and implementing intelligent systems capable of performing tasks typically carried out by humans, such as diagnosing illnesses, analyzing medical images, and offering personalized treatment suggestions. Healthcare is essential in our lives, yet many people are preoccupied with their jobs and are often engrossed in online activities, neglecting their health. As a result, they tend to avoid visiting the hospital for minor issues. To address this, we propose developing a healthcare chat bot system using Python, NLP, and machine learning algorithms. This system will identify illnesses and provide detailed information about them before a doctor's consultation. It will help patients better understand their conditions and take steps to improve their health.

This is an automated chat robot design to answer users frequently asked questions, earlier natural language processing techniques were using to design this robot but its accuracy of giving correct answer was less and now due to Deep Learning algorithms accuracy of giving correct answer increase, so here using python deep learning project we are building CHATBOT application to answer users questions. To implement this technique first we train deep learning models with the train data (all possible questions answers) and whenever users give any question then application will apply this test question on train model to predict exact answer for given question. Earlier companies were hiring humans to answer users queries but by using this application we can answer users question without using any

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manpower. Chabot can be described as software that can chat with people using artificial intelligence. Chabots are generally used to respond quickly to users. Chabots, a common name for automated conversational interfaces, present a new way for individuals to interact with computer systems. Traditionally, to get a question answered by a software program involves using a search engine or filling out a form. A Chabot allows a user to simply ask questions in the same manner that they would address a human. There are many well-known voice-based catboats currently available in the market: Google Assistant, Alexa and Siri. Chabots are currently being adopted at a high rate on computer chat platforms. To implement this project, we are using python deep learning neural networks and NLTK (natural language processing API) to process train and test text data.

Objective:

Our Objective is to Develop an AI-powered healthcare chatbot system using Python and CNN algorithm to provide instant and accurate health-related information, connect users with nearby doctors and medical facilities, and increase awareness about healthcare among the population, particularly in rural areas, thereby improving accessibility and affordability of healthcare services in India. Future work includes implementing audio and face recognition for enhanced user interaction and emergency support functionalities.

II. LITERATURE SURVEY

[1] The aim of this paper is to enhance intelligent treatment using Machine Learning technology to streamline the decision support system. It comprehensively addresses the diagnosis of heart disease by monitoring an individual's heartbeat. The framework allows users to set pulse rate parameters. Once these limits are set, the system monitors the heartbeat and alerts the individual whenever their pulse exceeds a certain level, indicating a high pulse rate and the risk of a heart attack. Authors Ahmed M . Alaa and Senthil Kumar Mohan experimented with a combination of different factors and achieved an 88.7% accuracy rate using a random hybrid forest.

[2] This paper focuses on classic supervised binary classification, utilizing various attributes in the data set. The data set includes plasma glucose concentration, blood pressure (mmHg), body mass index, age (years), and more. Several elements, each with specific features, are used to identify individuals affected by the disease. To address the problem, the data must be analyzed, necessary adjustments made, an ML algorithm applied, a model trained, its performance evaluated, and various algorithms tested to achieve the most accurate results. In developing software or websites, it is crucial to identify system requirements by accurately gathering expected data to facilitate communication between providers and customers.

[3] This paper emphasizes the need to develop a framework that simplifies disease prediction for end-users without requiring a doctor or specialist visit. It effectively identifies various diseases by analyzing patient symptoms using different Machine Learning models. This section of the paper presents the accuracy results of various algorithms, such as Decision Tree (DT) with 90.2% accuracy, Random Forest (RF) with 95.28% accuracy, and Naive Bayes (NB) with 88.08% accuracy. The paper also explains how advancements in technology within the health industry provide solutions for patients by offering recommendations from specialists and facilities, guiding them on where to seek treatment and which expert to consult for specific diseases. The healthcare industry collects data from patient databases by applying data mining and Machine Learning techniques.

This paper offers a heart disease prognosis using supervised learning algorithms, including SVM, KNN, and Naive Bayes. The data set contains 3000 objects with 14 features. From extensive literature review, it was observed that most research utilized a disease data set containing only 303 objects with 14 features. Naive Bayes produced the best results, with high accuracy (86.6%) and quick processing time, while Decision Tree achieved an accuracy of 78.69%, and KNN achieved 77.85% accuracy.

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III. METHODOLOGY

A. Collection of Data Sets

In this stage, two datasets are used as input: one for multiple symptoms-based disease prediction and another text file data set for the chat bot application with question and answer pairs.

B. Understanding Features of Data Sets

In the early lifestyle disease data set, various features are taken as input, with each disease classified based on the type of feature (status 1 or 0) and the disease name used as the label. For the chat bot application, the text file data set includes features as questions and labels as answers.

C. Pre- processing the Data

At this stage, the disease data set is processed to extract features and labels, while the chat bot text file data set is pre-processed using NLP techniques.

D. Splitting Data into Training and Testing Datasets

The data set is divided into two parts using the test- train split function, with 80% as the training set and 20% as the testing set. Training features are referred to as train_x and labels as train_y. These values are used to train the algorithm, and the test data is used to evaluate the accuracy of each disease data set.

E. Applying the ML Decision Tree Algorithm to the Data set

At this stage, the pre- processed disease data set is used as input, and the trained features and labels are provided to the fit function to train the model. Through the web application, users can select symptoms and receive a predicted disease diagnosis.

F. Accuracy Results

After training, the test set is input into the algorithm to assess the dataset's accuracy. The accuracy results from the testing phase are crucial for validating the effectiveness and utility of the developed AI healthcare bot system in aiding patient consultation and disease prediction.

Module Description:

1. Automated Disease Prediction through Machine Learning: This system employs machine learning algorithms such as random forest, decision tree, and logistic regression for automatic disease prediction. The medical data is trained using all three algorithms, and the best performing algorithm is selected as the primary model for final predictions.
2. Chat bot Service: Through this service, users can register on the web application and utilize a chat bot to receive automatic responses generated from trained question-and-answer data. Natural language processing (NLP) techniques are employed for this purpose.
3. Online Doctor Booking Service: This service enables users to book appointments with doctors based on predicted diseases obtained from machine learning algorithms using input symptoms. Users can schedule appointments according to available timings and receive confirmation from the doctor.
4. Online Medicine Ordering Service: Users have the option to purchase medicines from an online store, add products to their cart, and proceed with payment using this service.

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IV. SYSTEM ARCHITECTURE

While the A System architecture is a conceptual model that defines the structure, behavior, and various views of a system. An architecture description is a formal representation of a system, organized to support reasoning about its structures and behaviors.

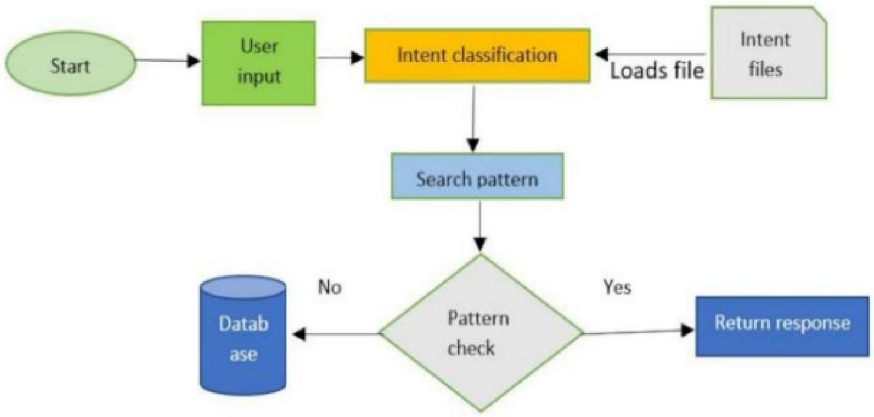

Fig.1: Design Flow Diagram

3-Tier Architecture: The three-tier software architecture, which emerged in the 1990s, addresses the limitations of the two-tier architecture. This architecture introduces a middle tier (server) between the user interface (client) and data management (server) components. The middle tier handles process management, where business logic and rules are executed, and can support hundreds of users (compared to only 100 users in a two-tier architecture) by offering functions such as queuing, application execution, and database staging. The three-tier architecture is employed in scenarios where an efficient distributed client/server design is required. Compared to the two-tier architecture, it offers enhanced performance, flexibility, maintainability, reusability, and scalability. Additionally, it conceals the intricacies of distributed processing from the user. These attributes have contributed to the widespread adoption of three-layer architectures, particularly in Internet applications and net- centric information systems.

Advantages of Three-Tier:

- Separates functionality from presentation.
- Clear separation – better understanding.
- Changes limited to well define components.
- Can be running on WWW.
- Effective network performance

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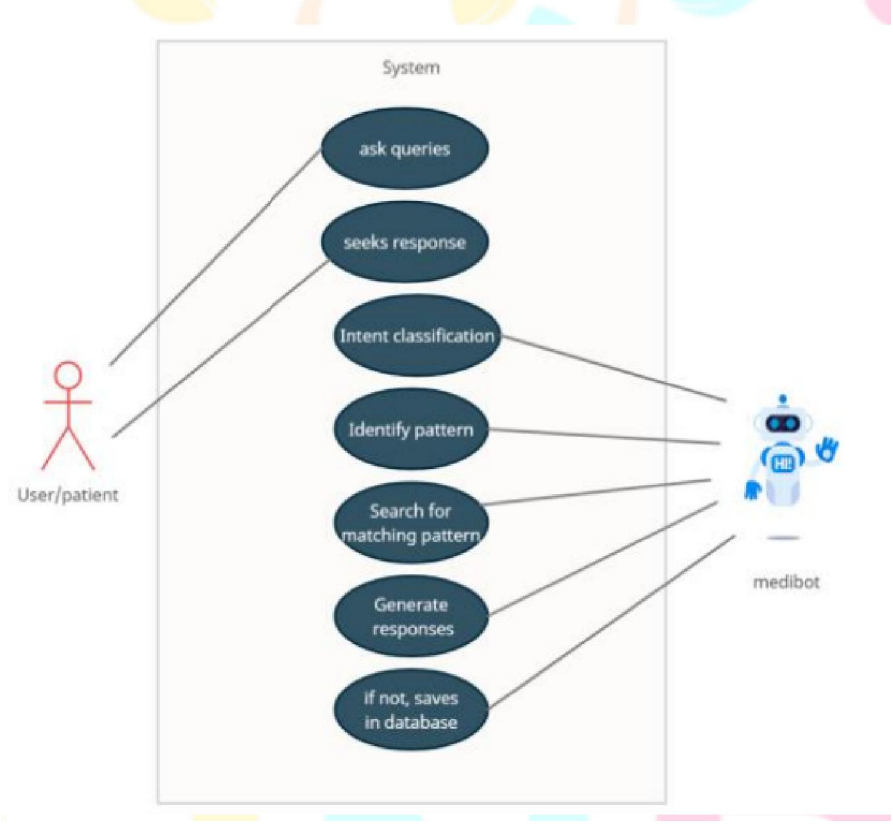

Fig.1: Process Diagram between Patient And Medibot

V. CONCLUSION

We have successfully developed a machine learning algorithm capable of accurately predicting diseases based on input of six symptoms. Additionally, our application assists customers in booking appointments and purchasing medicine, as well as facilitating contact with doctors. Our application integrates a machine learning-based medical assistant that utilizes various algorithms to predict diseases. The most accurate algorithm is incorporated into a Flask web framework, allowing us to design a health website encompassing doctor appointment booking, chat bot assistance, medicine ordering, and disease prediction services all in one platform. In today's busy world, many individuals neglect to seek medical advice when unwell. Implementing a chat bot can address this issue by enabling users to diagnose their ailments without consulting a doctor directly. Acting as a virtual doctor, the chat bot analyzes users' symptoms and recommends appropriate healthcare steps. Our datasets contain comprehensive information on diseases and corresponding healthcare measures.

The Intent of this paper is to increase the awareness of health among the people. In current days, many people show their lazy behavior and don’t consult a doctor during a time of illness so the implementation of a chatbot will help the people to diagnose the disease without consulting a doctor. The chatbot will act as a virtual doctor. The user will prescribe their symptoms of their illness and the chatbot will analyze the disease and suggest the necessary healthcare steps that need to be taken. In the datasets it includes information regarding diseases and health care steps

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