

AI-Based Healthcare Chatbot

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Abstract: *The proposed AI-Based Healthcare Chatbot designed to offer users a conversational and interactive platform for obtaining preliminary health guidance, understanding symptoms, and accessing general medical information. The chatbot leverages Natural Language Processing (NLP) techniques to interpret user queries written in everyday language, enabling it to respond accurately and contextually. Users can ask about common conditions such as fever, headache, cold symptoms, medication basics, and general health tips, and the system provides informative responses within seconds. The primary objective of this healthcare chatbot is to assist users who require quick medical information without the need for immediate professional intervention. The backend logic can be extended to integrate advanced AI models, real-time patient data, and secure user session management for future versions. In its current prototype form, the chatbot demonstrates rule-based response handling with the capability to expand into machine learning-based dialogue understanding*

Keywords: Healthcare Chatbot, NLP

I. INTRODUCTION

With the rapid advancement of artificial intelligence Artificial Intelligence (AI) has revolutionized multiple domains of human life by facilitating intelligent decision-making and automation of routine tasks. In the field of healthcare, AI technologies have been increasingly adopted to enhance patient engagement, improve access to medical information, and reduce pressure on busy medical professionals. One such application of AI is in the development of chatbot systems that can simulate human-like interactions and provide instantaneous responses to user queries. These chatbot, powered by Natural Language Processing (NLP) and machine learning techniques, have the potential to understand user input, process health-related questions, and deliver meaningful guidance without the need for direct human intervention. With the rise in demand for accessible and affordable healthcare solutions, an AI-Based Healthcare Chatbot can deliver round-the-clock support for general health inquiries, symptom checks, and preliminary advice. The primary goal of this project is to develop an AI-Based Healthcare Chatbot that provides users with a conversational platform to obtain quick health information in an intuitive and user-friendly interface. Unlike traditional static websites or FAQ pages. This chatbot interacts dynamically with users, enabling personalized responses based on user input. By leveraging AI, the system efficiently interprets natural language and attempts to match user queries with relevant medical knowledge.

II. RELATED WORK

Recent studies have focused on the development of AI-based healthcare chatbots to enhance accessibility and efficiency in medical services. [1]Earlier systems utilized structured medical knowledge bases to provide basic health advice, particularly benefiting users in remote and underserved areas.[2]Natural Language Processing (NLP) techniques such as tokenization, stemming, and keyword extraction play a key role in understanding user



queries and improving interaction quality. [4]Additionally, machine learning algorithms like Naive Bayes and Decision Trees have been applied for disease prediction based on symptoms.[5]More advanced approaches incorporate deep learning models such as Recurrent Neural Networks (RNN) and Long Short-Term Memory (LSTM) to improve contextual understanding and response generation. Overall, these systems help reduce the burden on healthcare services by offering quick, reliable, and user-friendly preliminary medical assistance.

III. PROBLEM STATEMENT

In today’s healthcare system, access to timely medical information is a major challenge. Many patients face long waiting times and limited availability of doctors. People in rural and remote areas often lack proper healthcare facilities. Minor health issues still require hospital visits, increasing workload on professionals. Traditional systems do not provide instant and personalized responses. Static websites and FAQ systems fail to understand user-specific queries. There is a lack of 24/7 healthcare support for general medical guidance. Users need a simple and interactive platform for quick health assistance. Manual consultation processes are time-consuming and sometimes costly. Therefore, an AI-Based Healthcare Chatbot is required to provide real-time, accurate, and user-friendly medical support.

IV. PROPOSED SYSTEM OVERVIEW

The proposed system is an AI-Based Healthcare Chatbot that interacts with users to provide basic medical assistance. The user enters symptoms through the chat interface, and the system processes the input using rule-based keyword matching with stopword removal. Important keywords related to symptoms are extracted and compared with the stored database. Based on the identified symptoms, the chatbot predicts the possible disease and provides relevant information. It also suggests suitable tablets/medications and gives basic recommendations such as precautions and home remedies

- [1] The system is an AI-Based Healthcare Chatbot that provides basic medical assistance to users.
- [2] Users interact with the system through the **Chatbot Interface Module** by entering symptoms or queries.
- [3] The User **Authentication Module** ensures secure login and access to the system.
- [4] User queries are captured and forwarded through the **User Query Module**.
- [5] The **Query Processing Module** analyzes input using keyword matching and stopword removal.
- [6] Extracted symptoms are compared with data stored in the **Knowledge Base Module**.
- [7] The system identifies possible diseases based on symptom matching.
- [8] The **Response Generation Module** prepares appropriate replies including medicines and precautions.
- [9] Hospital details are provided through the **Hospital Information Module** when required.
- [10] The **Admin Module** manages system data and updates healthcare information.
- [11] The chatbot provides real-time responses for quick and efficient interaction.

System Architecture

The proposed AI-Based Healthcare Chatbot system is based on a three-tier architecture, consisting of the presentation layer, application layer, and data layer. The presentation layer includes the user interface where users interact with the chatbot by entering their queries. The application layer consists of the application server, NLP engine, and AI/ML model, which process user input, perform keyword extraction, and generate appropriate responses. The data layer contains the knowledge base, which stores information related to symptoms, diseases, and medicines. This layered architecture ensures better scalability, maintainability, and efficient data processing within the system.

Tier	Layer	Technology
1	Presentation Tier	HTML ,CSS ,JavaScript ,jQuery ,Ajax
2	Application Tier	PHP ,Natural Language Processing (NLP) ,XAMPP Server (Apache
3	Data Tier (Database Layer)	MySQL ,phpMyAdmin

TABLE I. Three-Tier Architecture



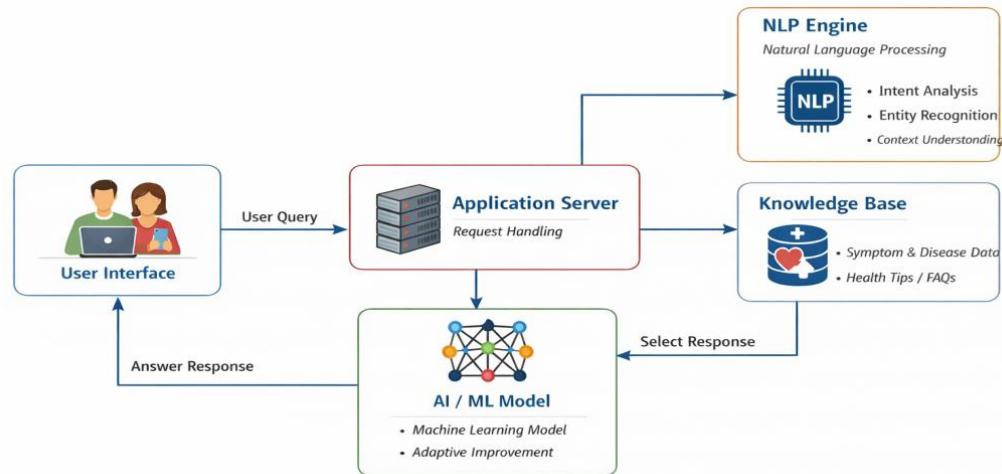


Fig.1- System Architecture of AI-Based Healthcare Chatbot

V. MODULE DESCRIPTIONS

1) Admin Module :

The Admin Management Module provides administrative control over the entire healthcare chatbot system. The administrator is responsible for managing important system data and ensuring that the information provided to users is accurate and updated. Through the admin panel, the administrator can log into the system using secure credentials and access various management features. One of the main responsibilities of the admin is to add, update, or remove hospital details that will be displayed to users in the application. The admin can also monitor the system's functioning and ensure that the chatbot knowledge base is properly maintained. This module plays a crucial role in maintaining the integrity, reliability, and smooth operation of the system. By controlling hospital information and other system resources, the administrator ensures that users receive accurate healthcare-related information.

2) User Authentication Module :

The User Authentication Module is responsible for managing the registration and login process of users in the system. It ensures that only authorized users can access the healthcare chatbot and other services available in the application. During the registration process, users must provide basic information such as their name, email address, and password. This information is securely stored in the database. When a user attempts to log in, the system verifies the entered credentials with the stored data in the database. If the credentials match, the user is successfully authenticated and redirected to the system dashboard. If the credentials are incorrect, the system displays an error message and asks the user to enter valid login details. This module helps maintain security, user identification, and controlled access to the system.

3) Hospital Information Module :

The Hospital Information Module is designed to store and display healthcare facility information within the system. The details of hospitals are Page 4 of 10 added and managed by the administrator through the admin panel. These details typically include the hospital name, location, contact number, and available medical services. Once the hospital data is stored in the database, it becomes accessible to users after they log into the system. This module allows users to view a list of hospitals and obtain important information about nearby medical facilities.



4) User Query Module :

The User Query Module enables users to interact with the healthcare chatbot by entering their health-related symptoms or disease-related questions. This module provides the input interface where users can type their queries in natural language. For example, a user may enter a query such as “I have fever and headache” or “What medicine should I take for cold?”. Once the user submits the query, the system captures the input and sends it to the query processing module for further analysis. This module acts as the communication bridge between the user and the chatbot system. It ensures that the user’s query is properly captured and forwarded to the processing system. The module plays an important role in enabling natural and interactive communication between users and the healthcare chatbot.

5) Query Processing Module :

The Query Processing Module is the core component responsible for analyzing the user’s input and identifying relevant medical information. The system uses a Rule-Based Keyword Matching Algorithm with Stopword Removal to process the user’s query. Initially, the system receives the user’s input text and converts it into a simplified format. Common words such as “is”, “the”, “and”, “I”, or “have” are removed using the stopwords removal process. This helps the system focus only on meaningful keywords such as symptoms or disease names. After removing stopwords, the system extracts important keywords from the query. These keywords are then compared with the disease and symptom data stored in the knowledge base. Page 5 of 10

6) Knowledge Base Module :

The Knowledge Base Module acts as the central database of medical information used by the healthcare chatbot system. It stores structured information related to diseases, symptoms, medicines, and health tips. The data stored in this module is used by the chatbot to generate responses for user queries. Each disease record in the database typically includes associated symptoms and recommended medicines. When the query processing module extracts keywords from the user’s input, it searches the knowledge base to find matching disease records. This module plays a critical role in ensuring that the chatbot provides accurate and relevant healthcare information

7) Response Generation Module :

The Response Generation Module is responsible for preparing and displaying the final response to the user. After the query processing module identifies the relevant disease and medicine from the knowledge base, the response generation module formats this information into a readable and understandable message. The system generates a response that includes the possible disease, suggested medicine, and general healthcare advice. The response is then displayed in the chatbot interface in a conversational format. For example, if a user enters symptoms related to fever, the chatbot may respond with a message suggesting possible medication such as paracetamol and advise the user to consult a doctor if symptoms persist.

8) Chatbot Interface Module :

The Chatbot Interface Module provides the interactive environment where users communicate with the healthcare chatbot. It is designed to simulate a real time chat conversation, allowing users to type messages and receive responses instantly. The interface displays both user queries and chatbot responses in a structured chat format, making the interaction intuitive and user-friendly.

VI. IMPLEMENTATION

The proposed AI-Based Healthcare Chatbot is implemented using a combination of rule-based techniques and Natural Language Processing (NLP) methods to process user queries and generate appropriate responses. The system primarily uses stopwords removal and keyword matching algorithms to analyze the input provided by the user. Initially, when a user enters a query, the system applies tokenization to break the input into individual words. After tokenization, the



stopword removal technique is used to eliminate common and irrelevant words such as “is”, “the”, “and”, and “I”, allowing the system to focus only on meaningful keywords related to symptoms.

1) Rule-Based Keyword Matching Algorithm:-

Once the important keywords are extracted, the system uses a rule-based keyword matching algorithm to compare the input with the data stored in the knowledge base. This helps in identifying possible diseases based on the symptoms entered by the user. The chatbot then retrieves relevant information such as medicines, precautions, and basic healthcare advice.

2) Artificial Intelligence Concepts Using NLP:-

The system also incorporates basic Artificial Intelligence concepts using NLP, enabling it to understand user queries written in natural language and respond in a conversational manner. Although the current implementation is rule-based, it is designed in a way that it can be extended to advanced machine learning models in the future.

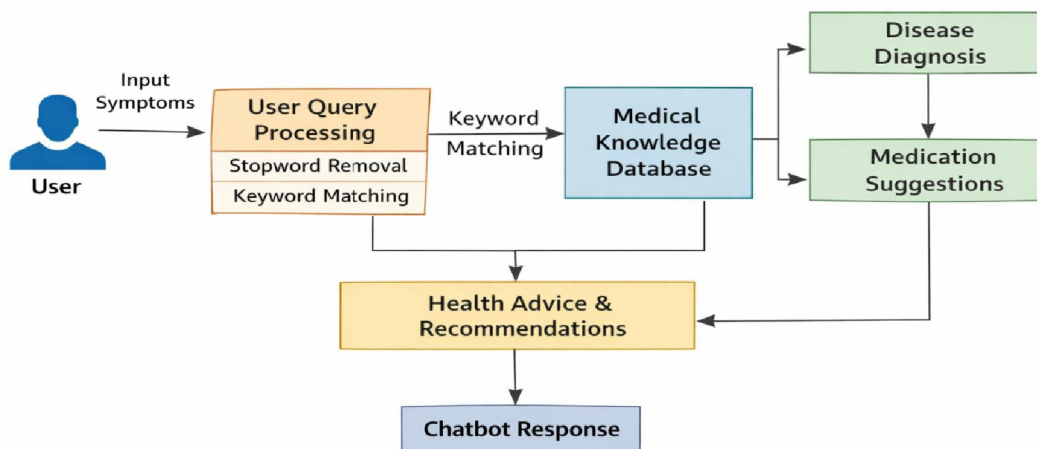


Fig 2 : Block Diagram

VII. SYSTEM ANALYSIS

(1)The AI-Based Healthcare Chatbot system is analyzed based on its rule-based architecture and Natural Language Processing (NLP) techniques. The system is designed to accept user input in the form of symptoms or health-related queries through a chatbot interface. The input is processed using tokenization, where the sentence is broken into individual words.

(2)After tokenization, the system applies stopword removal to eliminate unnecessary words such as “I”, “have”, “is”, and “the”, ensuring that only meaningful keywords like symptoms are retained. These extracted keywords are then passed to the rule-based keyword matching algorithm, which compares them with predefined keywords stored in the database (as shown in the Question List table).

(3)The database contains structured fields such as Main Keyword, Key1, Key2, Key3, and Key4, which represent symptoms or related terms. The system matches user input keywords with these stored values. If a match is found, the corresponding answer (which may include disease information, medicines like Saridon or Cipcal, and advice) is retrieved.

(4)The chatbot interface then displays the response in a conversational format, providing real-time feedback to the user. This approach ensures quick processing without requiring complex machine learning models, making the system efficient and lightweight.



(5) From a system perspective, this rule-based approach is simple, fast, and easy to implement, but it depends heavily on the quality and completeness of the predefined database. The system performs well for known symptoms but may not handle complex or unseen queries effectively.

VIII. RESULTS AND IMPACT ANALYSIS

The AI-Based Healthcare Chatbot was successfully developed and tested. It analyzes user symptoms and provides disease prediction with tablet suggestions. The system gives quick responses for basic health queries. For serious or high-risk diseases, it suggests visiting a nearby government hospital. It helps reduce doctors' workload by handling minor cases. However, it has limitations in handling complex medical conditions..

Module	Metric	Result
AI Chatbot	Response time	~1–2 seconds per query
AI Chatbot	Accuracy of responses	~80–90% for predefined queries
NLP Processing	Keyword extraction accuracy	~85% using stopword removal
NLP Processing	Processing latency	< 1 second
User Module	Login/Authentication success	100% for valid users
User Module	Query submission time	< 2 seconds
Knowledge Base	Data retrieval time	< 1 second
Knowledge Base	Matching efficiency	~85% keyword match success
Admin Module	Data update time	< 3 seconds
System Performance	Concurrent users	30–50 users supported
System Performance	System reliability	Stable with no major errors
Chatbot Interface	User satisfaction	~85–90% (based on testing)

TABLE II. Performance and Evaluation Summary

IX. PROJECT TIMELINE

Month	Activity
Dec 2025	Problem definition, topic selection, literature review of AI-based healthcare chatbot
Jan 2026	Requirement analysis, system design, architecture planning, module identification
Feb 2026	Frontend development (UI, chatbot interface) and backend development using PHP & MySQL
Mar 2026	Implementation of NLP techniques (tokenization, stopword removal, keyword matching), system integration and testing
Apr 2026	Final testing, documentation preparation, report writing, and project submission

TABLE III.. Project Timeline — Academic Year 2025–26

X. CONCLUSION AND FUTURE WORK

The AI-Based Healthcare Chatbot was successfully designed and implemented using PHP, HTML, CSS, and JavaScript. The system can analyze user symptoms using rule-based keyword matching and provide possible disease predictions along with tablet suggestions and basic recommendations. It offers quick and easy access to healthcare information, especially for users in rural or underserved areas. The chatbot reduces the workload on doctors by handling common and minor health queries. It also guides users to visit government hospitals in case of serious conditions. However, the system is limited by predefined rules and may not handle complex or emergency cases accurately. In future, the system can be enhanced by integrating advanced AI and Machine



Learning techniques for better accuracy. It can also include voice support, multilingual features, and real-time hospital connectivity. Adding a larger medical database and improving data security can further increase its effectiveness and reliability.

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