



# Review of Healthcare Chatbot Systems using AI

<sup>1</sup> AKANKSHA P/ BAWANKURE, <sup>2</sup> NIVEDI V. WANKHADE, <sup>3</sup> POONAM D. RAUT, <sup>4</sup> VAISHNAVI S. HIRULKAR, <sup>5</sup> DIPALI P. GOMKALE,

<sup>6</sup> SHRAVANI P. YEOKAR, <sup>7</sup> PROF. HARSHADA M. RAGHUWANSHI

<sup>1,2,3,4,5,6</sup> U.G. Students, Department of Computer Science & Engineering, DRGITR, Amravati,

<sup>7</sup> Assistant Professor, Department of Computer Science & Engineering, DRGITR, Amravati,

**Abstract:** This paper presents the analysis and comparison of existing literature relevant to various chatbots that act as virtual medical assistance and the mechanisms associated with it. Though, the literature consists of a lot many research contributions, but, here, we have critically and exhaustively analysed recent research and review papers that are pertinent to AI based health care chatbots. Based on the basic concepts used in their mechanisms, the existing approaches are categorized. The emphasis is on the concept used by the concerned authors, the methodology used for experimentations and the performance evaluation parameters. The claims of the researchers are also highlighted. Our findings from the exhaustive literature review are mentioned along with the identified problems. This paper is very important for the comparative study of various healthcare chatbots approaches which is prerequisite for solving remote health issues. In the end, we've proposed our own chatbot pertaining to the health care system. We have blended AI with NLP and ML. We have implemented the idea wherein one can easily and readily diagnose the disease or illness and the details can be provided remotely before consulting a medical practitioner or visiting a doctor. This chatbot can inherently reduce the healthcare expenses and can be easily accessible at any time and place. Also, our proposed approach looks consistent and accurate.

**Index Terms** – Artificial Intelligence, Chatbots, Health Care Systems, Machine Learning, Natural Language Programming

## I. Introduction

All industries are developing and incorporating the newest trends. A chatbot that aids in recognising client issues and remote troubleshooting are two of the approaches currently being used. In the end, this lowers communication barriers and enhances the client experience [1]. A chatbot is a piece of intelligent software that can interact with users in a way that is similar to how a human might. The chatbots are used for customer service, social media marketing, and instant messaging on a variety of platforms and websites. Artificial intelligence and Natural Language Programming have long been an element of chatbot technology. have programmes that analyse and recognise spoken speech [2].

The medical industry is no different. Healthcare systems are one of the many areas in which chatbots may be employed. An interactive medical chatbot engages the user in a one-on-one discussion and questionnaire about their health issues. NLP and AI are used by these chatbots [3]. The system is given all the data about illnesses and their symptoms, and with the aid of NLP, it will be able to comprehend the user inquiry and produce the appropriate response. It is necessary to either construct or supply a database with all the information on medical conditions and disorders. Data from a medical database are retrieved by the chatbot [4]. By posing numerous questions, the chatbot mimics the interaction between a doctor and patient. These inquiries are based on the patient's prior information and pre-filled conditions, and a potential diagnosis is formed based on the answers [5]. These bots interact with potential patients who are browsing the website, assisting them in finding experts, scheduling appointments, and gaining access to the proper care. The nicest part about a healthcare chatbot is that these types of chatbots can be accessible from anywhere, even in the most distant place, and they offer patients 24/7 online healthcare help. It aids in the generation of health data and instantly transmits report information to medical management [6].

The overview of the current methodologies is the primary topic of this study. Though there are many review articles on healthcare chatbot systems that have been published in the literature, we have critically analysed and systematically summarised the most current, significant papers. Additionally, this research offers a potential remedy for healthcare chatbot systems. The structure of this essay is as follows. The systematic presentation of the literature review is done in Section 2, which includes a synopsis of the relevant work as well as the main points of the connected methods. The reason for the formulation of the problem and the discovered problem is provided in Section 3. The operation of the suggested technique is thoroughly explained in Section 4. The conclusion is contained in Section 5.

## I. LITERATURE REVIEW

The available literature that is pertinent to healthcare chatbot systems and the mechanics underlying them is critically analysed in this section. Although there are many research contributions in the literature, we have only examined the most recent, significant, and useful study and review publications here. Based on the fundamental ideas used in the mechanisms, the existing techniques are

divided into several categories. The authors' concepts, the platform they employed for their experiments, and the effectiveness of their systems are all highlighted. Additionally, their claims are emphasised. Finally, a summary of the conclusions relating to the research articles that were read and examined is provided. The section's conclusion includes the cause of the detected problem.

Bushra Kidwai and Nadesh RK created a diagnostic chatbot in 2020 utilising the most recent machine learning methods. A decision tree technique is applied for symptom mapping and diagnosis [1]. The system is given all the data about illnesses and their symptoms, and with the aid of NLP, it will be able to comprehend the user inquiry and produce the appropriate response. The information is retrieved from a medical database that contains information on 150 disorders. By posing numerous questions, the chatbot mimics the interaction between a doctor and patient. These inquiries are based on the patient's prior information and pre-filled conditions, and a potential diagnosis is formed depending on the patient's responses. The system can be interactive, according to the creators. Round-Trip Time is the performance assessment parameter that is employed.

A healthcare chatbot that uses NLP was proposed by Papiya Mahajan et al. for 2020. The chatbot system may offer voice or text support [2]. According to user symptoms, the created chatbot is said to deliver ailment details. The N-gram algorithm, TF-IDF algorithm, and Cosine similarity algorithm are the three algorithms employed in this technique to create a health care chatbot system. The system also gives information on the doctor. People will therefore be aware of their health and be properly protected. The authors assert that their chatbot offers individualised diagnoses based on symptoms. However, no performance evaluation metric is offered to support the assertion.

Harsh Mendapara and colleagues created a healthcare chatbot system based on AI and NLP in 2021. Before seeing a doctor, a person may use the chatbot to self-diagnose their sickness and learn more about their particular disease [3]. The authors utilised chatterbot library to train a chatbot using AI. Additionally, they have taught the chatbot to recognise particular words and phrases so that the user's purpose may be understood. The system is then provided the information that has been gathered. Personal information provided by the user will be kept in the database. The chatbot will use NLP to enquire about symptoms. It will list potential diseases and make medication recommendations for those with known illnesses. A clinic appointment can also be made via the system. The resulting findings, according to the authors, are precise and quick.

Mr. Niraj A. Wanjari and colleagues created a chatbot based on AI and NLP in 2022. The authors assert that their chatbot improves accessibility and lowers total healthcare costs[4]. The illness is identified by text-to-text communication between the chatbot system and the patients. Additionally, the right course of action is advised. We discovered that the bot architecture is in its infancy and is not fully formed. The paper is more of an assertion than a practical application. To support the authors' assertions, no performance assessment criteria is offered. However, this project has a lot of room for expansion. It is possible to create a mobile assistant that many people can utilise. This can be exact and will eventually somewhat shorten the time.

M.V. Patil, et al. created an AI-based healthcare conversation bot system in 2021[5]. The suggested medical chatbot deals with giving medical advice while making decisions in accordance with the patient's request and using dialogues to draw analogies. For this, a database is constructed. If a certain piece of information isn't in the database, a search engine will be used to find it and present it to the user. Three separate outputs from experiments are utilised to demonstrate how well the suggested system recognises illnesses and other common symptoms. To support the authors' assertions, no performance assessment criteria is offered, though.

Before contacting a doctor, Lekha Athota et al. created a chatbot in 2020 that can identify the illness and offer details[6]. N-gram, TFIDF, and cosine similarity are used in the ranking and text similarity computation performance assessment parameters. The information is kept in a database, and the queries are handled by a third party. The keywords are given so that the right response to the query may be found. Users also have access to a web interface. The authors assert that by protecting user privacy, character integrity, and accessing pertinent information in response to queries, their chatbot application has been improved in terms of security and efficacy. To support the authors' assertions, no performance assessment criteria is offered, though.

## II. MOTIVATION

Using artificial intelligence chatbots, it is now feasible to have natural language conversations with robots. We learned from the literature that chatbots often perform the same duties as a standard search engine. The essential process flow remains the same even if the chatbot only provided one output rather than several outputs or results—each time an input is entered, a fresh search is conducted. Nothing to do with the earlier output. The goal of this study is to develop chatbots into search engines that can process subsequent searches in relation to the results of prior searches.

## III. AIM & OBJECTIVE

- Chatbot is a smart enough to response a particular suggestion from database stored in it.
- To make user friendly GUI based system which is easy to use by user and whenever user enter a text or ask a question.
- To recognize the requirement of user using NLP technology of text.
- CNN algorithm digitization work fast processes the finding answers from data sets on keyboards written in the text.

## IV. PROPOSED METHODOLOGY

This approach starts with taking the text input from the user in the android app. We promote user to enter the question for the chatbot and then we read the entered value in the edit text. Then send the value to the interface of our hosted Program – O. Get the reply from the Server, Server gives reply in the JSON format. We need to parse it to get the bots response. If bots response is null then set the response to the error string and show it to the user. Repeat the same task for the continuous chatting with the chatbot.

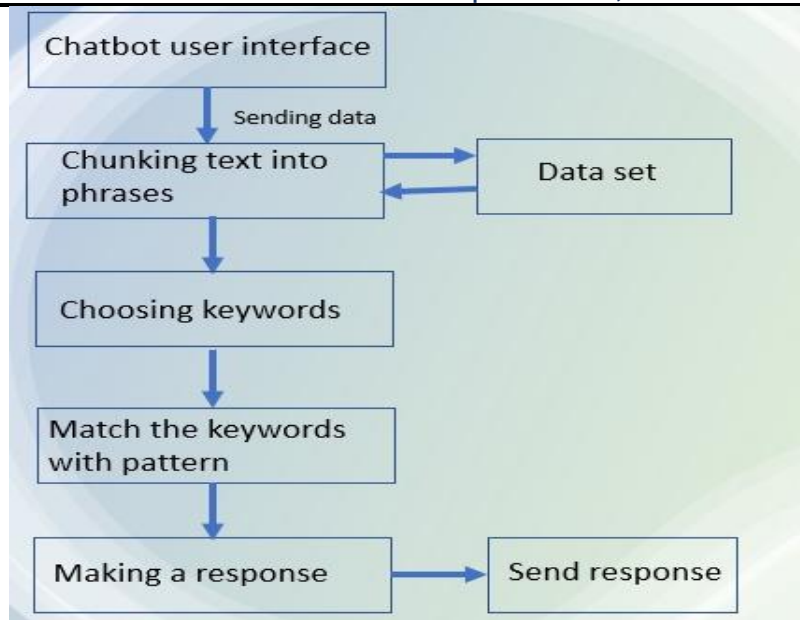


Fig. 2: Flowchart of work

The following steps explain the implementation details to accomplish the above-mentioned tasks:

1. Read the user input on the Click event of the send button.
2. Send the user input to the program – o hosted server using the HttpURLConnection. Here we are dealing with the internet stuff so we need to call this method in the AsyncTask of the android system. AsyncTask runs in the background of the app.
3. Wait till getting the reply from the server. onPostExecute method of the AsyncTask will get the JSON formatted reply. Then send it to JSON parser to extract the bot's response.
4. After extracting the bot's response, we need to display it to the user. So, append the response to text view.
5. Then repeat the process for the next user input.

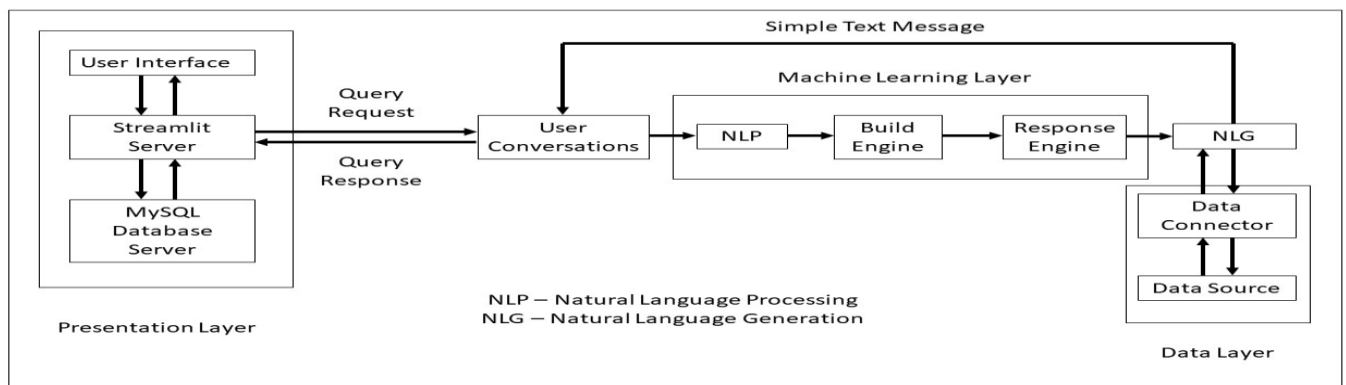


Fig. 3: Flowchart of Proposed Approach

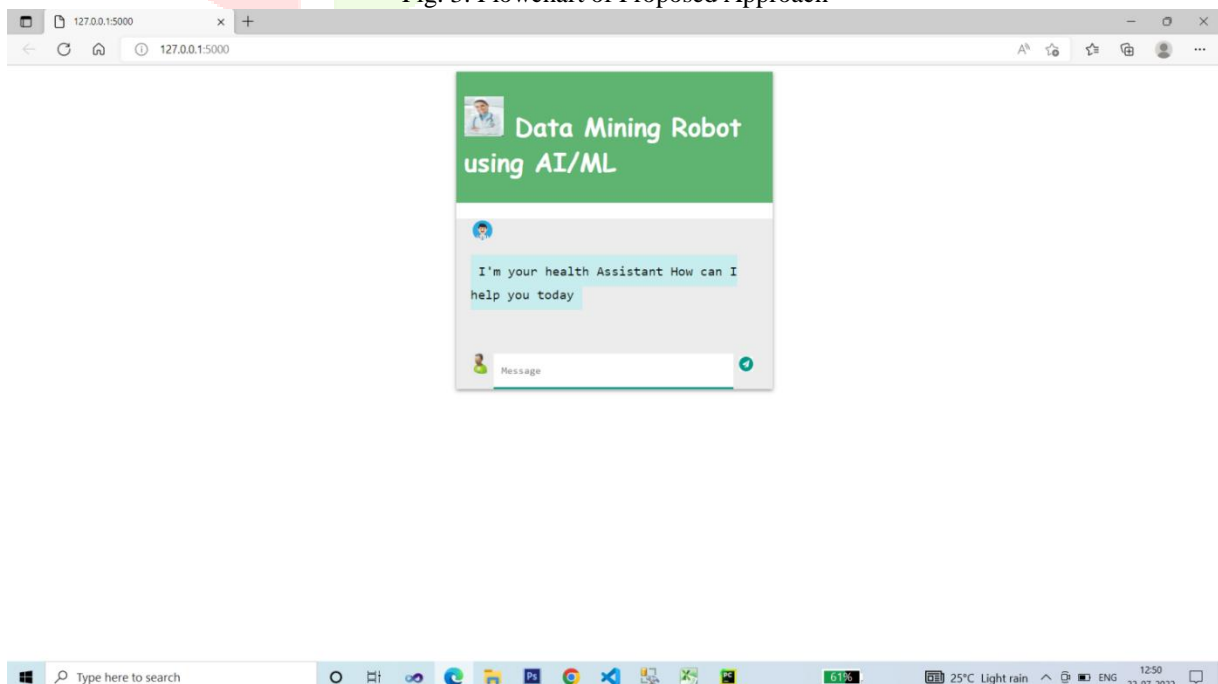


Fig. 4: User Interface

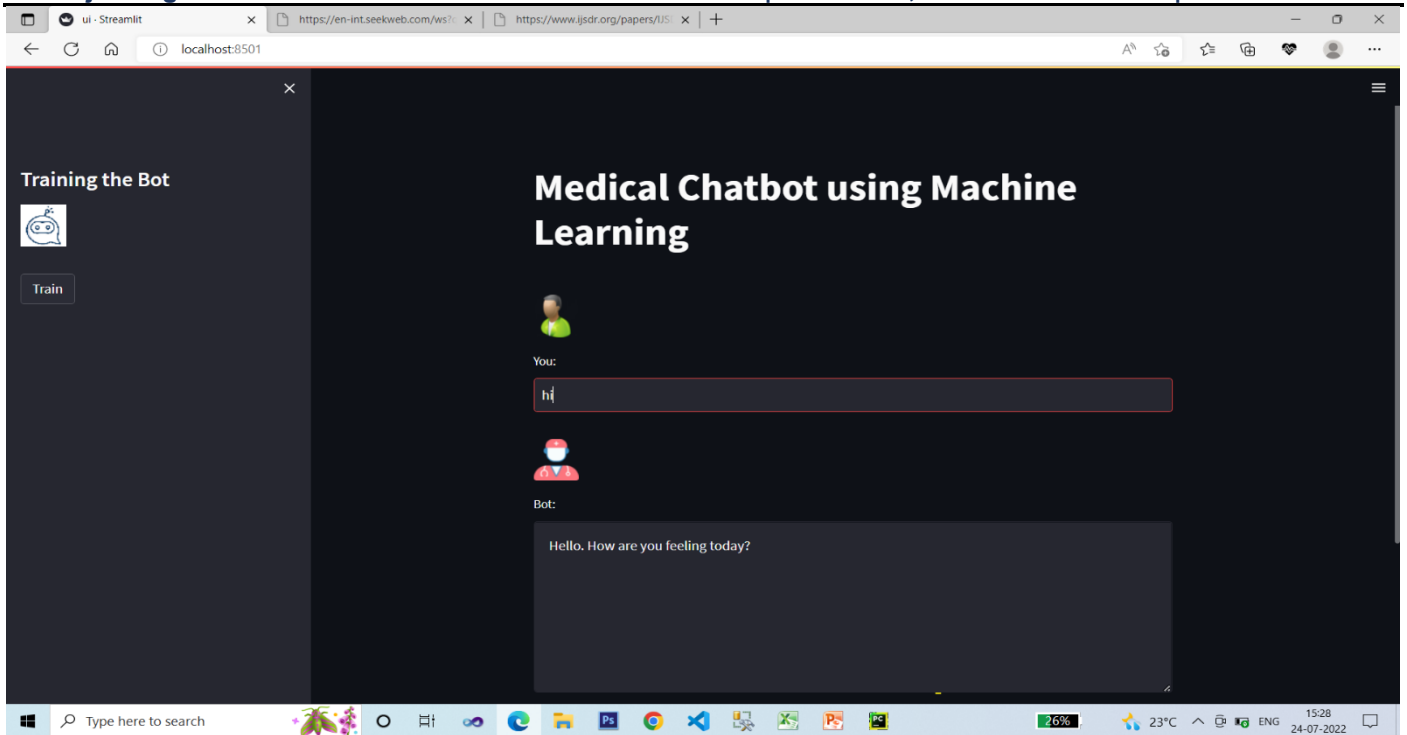


Fig. 5: Medical Chatbot

**V. COMPARISON WITH EXISTING METHOD**

Table1: Comparison with Existing Methods

EXISTING METHODS	PROPOSED APPROACH
UI [Framework] is modarant	Advance feature i.e. easy to handle
In this we have to train the data	If there is problem in database management system data against UI
Database is deleted and new database is created	Old database is replaced by new database
Text to speech was not there	Text to speech
In this conversation was not save	Conversation are save
Book an appointment	Call system

**VI. ADVANTAGES**

- 24 Hours Availability
- Instant Answers
- Endless Patience
- Programmability
- Personalization

**VII. CONCLUSION**

Smart solutions are important for the success of any business. From providing 24/7 customer service, improving current marketing activities, saving time spent on engaging with users to improving internal processes, chatbots can yield the much-needed competitive advantage. If you are looking to develop a chatbot, the best thing to do is to approach a company that will understand your business needs to develop a chatbot that helps you achieve your business goals.

**REFERENCES**

[1] Bushra Kidwai, Nadesh RK, "Design and Development of Diagnostic Chabot for supporting Primary Health Care Systems", International Conference on Computational Intelligence and Data Science (ICCIDIS 2019)

[2] Papiya Mahajan, Rinku Wankhade, Anup Jawade, Pragati Dange, Aishwarya Bhoge, "Healthcare Chatbot using Natural Language Processing", International Research Journal of Engineering and Technology (IRJET), Volume 07, Issue 11, Nov 2020

[3] Harsh Mendapara, Suhas Digole, Manthan Thakur, Anas Dange, "AI Based Healthcare Chatbot System by Using Natural Language Processing", International Journal of Scientific Research and Engineering Development, Volume 4, Issue 2, Mar- Apr 2021

[4] Mr. Niraj A. Wanjari, et.al., "AI Healthcare Chatbot Using Natural Language Processing", International Research Journal of Modernization in Engineering Technology and Science, Volume 04, Issue 05, May-2022

[5] M.V. Patil, Subhawna, Priya Shree, Puneet Singh, "AI based healthcare chat bot system", International Journal of Scientific & Engineering Research, Volume 12, Issue 7, July-2021

[6] Lekha Athota, Vinod Kumar Shukla, Vinod Kumar Shukla, Ajay Rana, "Chatbot for Healthcare System Using Artificial Intelligence", 2020 8th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO) Amity University, Noida, India. June 4-5, 2020