



# CHATBOT FOR HOSPITAL MANAGEMENT USING ARTIFICIAL INTELLIGENCE TECHNOLOGY

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**ABSTRACT-**In today's fast paced life people often don't take proper care of their health. People try to avoid going to doctor for diagnosis either because they don't like it or they don't get time. To lead a good life healthcare is very much important. But it is very difficult to obtain the consultation with the doctor in case of any health issues. The proposed idea is to create a medical chatbot using Artificial Intelligence that can diagnose the disease and provide basic details about the disease before consulting a doctor. To reduce the healthcare costs and improve accessibility to medical knowledge the medical chatbot is built. Certain chatbots acts as a medical reference book, which helps the patient know more about their disease and helps to improve their health. The user can achieve the real benefit of a chatbot only when it can diagnose all kind of disease and provide necessary information. Chatbots are programs that mimic human conversation using Machine Learning algorithms. It is designed to be the ultimate virtual assistant helping one to complete tasks ranging from answering questions in health care domain. Chatbots are currently the one of the best trending technologies available. It is certainly one of the most advanced and time saving technology also. But yet to accomplish many tasks there is a need to make chatbots efficient in medical field as well. To address this problem this project provides a platform where human can interact with a chatbot which are highly trained on datasets using Machine Learning algorithms. Machine Learning algorithms take a more natural approach for computation rather than taking a logical approach. The output is depended on the dataset they are trained on. We can implement in real time medical system and convert the text results in voice format.

**KEYWORDS:** Machine learning, Natural language processing, Chatbots, Artificial intelligence, Medical system

## 1. INTRODUCTION

Chatbot's are such kind of computer programs that interact with users using natural languages. For all kind of chatbots the flow is same, though each chatbot is specific in its own area knowledge that is one input from human is matched against the knowledge base of chatbot. Chatbot's work basically on Artificial intelligence, so using this capability we have decided to add some contribution to the Health Informatics. The high cost of our healthcare system can often be attributed to the lack of patient engagement after they leave clinics or hospitals. Various surveys in this area have proved that that chatbot can provide healthcare in low costs and improved treatment if the doctors and the patient keep in touch after their consultation. To answer the questions of the user

chatbot is used. There is very a smaller number of chatbots in medical field. The main purpose of the scheme is to build the language gap between the user and health providers by giving immediate replies to the Questions asked by the user. Today's people are more likely addicted to internet but they are not concern about their personal health. They avoid to go in hospital for small problem which may become a major disease in future. Establishing question answer forums is becoming a simple way to answer those queries rather than browsing through the list of potentially relevant document from the web. Many of the existing systems have some limitation such as There is no instant response given to the patients, they have to wait for experts acknowledgement for a long time. Some of the processes may charge amount to perform live chat or telephony communication with doctors online. This system allows computer to communication between human to computer by using natural language processing (NLP). There are three analyses which understand natural language i.e. identification of main linguistic relations is completed to parse subject into object of the sentences. Chatbot is an Entity which imitates human discussion in its particular accepted set-up together with a text or vocal language with techniques such as Natural Language Processing (NLP). The aim of this system is to replicate a person's discussion. The development of chatbot application can be done with making a user interface to send input and receive response. It is a system that interacts with user by keeping the track of the state of

interaction and recollecting the preceding commands to give functionality.

## 2. RELATED WORK

Mamta Mittal, et.al,...[1] explained the importance of medical chat bots and present our developed medical chatbot, developed on internet technologies. Our chatbot also assists user queries regarding hospital information, including specialists' availability, OPD timings, room registration, number of beds, emergency information, and doctor availability, among others. This is the first real time developed medical chatbot for query queue management in hospitals based on the literature survey. Additionally, it improves users' satisfaction by providing answers to all their health and personal assistance related queries. The proposed chatbot virtually assists users like real reception staff of a hospital. It provides users with total medical assistance 24\*7. However, these existing systems failed to save the chat history and were not fully customised to understand the user's ultimate message. Thus, these bots did not fully understand what the user said and provided responses from the knowledge stored in the bot brain. Therefore, we developed a special chatbot that includes collecting local hospital information responses by integrating web-based techniques. Present medical chat bots are integrated with speech recognition such that users can communicate through either voice or text messages. To implement a chatbot, several techniques and optimisation algorithms are available. Gradient Descent (GD) is an optimisation algorithm used to evaluate the coefficients of function (f) that minimise the cost function. It is a primary optimisation algorithm to assess the minimum cost function.

Byeong Jin Ye, et.al,...[2] implemented a rule-based or artificial intelligence-based communication software that uses a mobile device to provide answers and relevant information in response to questions posed through text or voice conversations. This technology is increasingly used for applications in credit scoring and marketing strategies due to the universalization of smart devices and mobile (online) communication and the expanding influence of messenger apps. Recently, chatbots have been increasingly used as a tool for digital healthcare. For example, the chatbot program "Kohby" at Kangbuk Samsung Hospital provides information on health check-ups and

administrative services such as appointments or payments. In addition, the chatbot also provides appropriate answers to questions about symptoms and diseases, and connects the patient with an appropriate doctor through “HealthTap” and “Babylon Healthcare”. The chatbot additionally provides information regarding treatment and management for cancer patients or interventions for stress or mental health problems. Furthermore, chatbot also plays a role in motivating and sustaining lifestyle changes, for example, quitting smoking. Because chat bots are optimised for mobile devices and can therefore obtain the necessary information without the need to install a separate app, the number of users and the service area are becoming increasing significantly. However, no chatbot program has yet been developed that explains the results of the general health examination explicitly and provides methods for follow-up management, that are easily understood by the general public.

A Kumaresan Angappan, et.al,...[3] facilitated the job of a healthcare provider and helps to improve their performance by interacting with users in a human-like way. Chatbot in health care may have the potential to provide patients with access to immediate

medical information, recommend diagnoses at the first sign of illness, or connect patients with suitable health care providers (HCPs) across their community. Healthcare chat bots are the future of medical field as it aids in reducing the amount of physical contact between patient and the doctor in the day to day growing population. Our chatbot (Dr.bot) uses natural language processing to interact with the user. Dr.bot uses pattern matching to recognise the user input and provide a suitable response from the provided dataset. The proposed system will include a brief summary of herbal medicines, their uses and suitable home remedies that can be used to treat and cure most of the common diseases. In this pandemic we could decrease the physical contact by the usage of medical chat bots which will provide herbal methods to cure the disease in home itself. By using a healthcare chatbot people can avoid unnecessary visit to clinics and hospitals. Especially in remote areas, it is becoming more difficult to consult a medical specialist when there is an emergency situation.

Karthik Saligrama, et.al,...[4] facing unprecedented pressure because of changing

demographics, administrative requirements, workforce shortages and increasing morbidity as well as changes in information technology demand and expectations. As of late, there has been significant advancement in man-made consciousness (AI) and its application in social insurance. In the coming years, these methods are anticipated to assume control over a portion of the exercises presently being conveyed by clinicians and medicinal services directors. There has additionally been an extraordinary measure of expansion about the capacities of AI and even now and again guarantees that AI will supplant human clinicians through and through. These points of view do not seem to reflect current restrictions of AI frameworks. Currently, there is little discussion in scientific literature or public policies as to how AI techniques can be incorporated in healthcare delivery. Most medicinal services associations, these days, have a detached relationship to their customers with regards to correspondence. The customer looks through the site to discover data and it is even difficult to explore to arrive at the exact data they need. Most associations, including emergency clinics and clinical practices, have done little to propel their customer interchanges frameworks. Regularly this incorporates an inquiry and answer page on a site. In recent years, there has been enormous advancement in man-made consciousness (AI) with the improvement of profound neural systems, common language handling, PC vision and mechanical autonomy. These methods are presently effectively being applied in social insurance with a significant number of the wellbeing administration exercises at present being conveyed by clinicians and directors anticipated to be taken over by AI in the coming years.

Umar Jameel, et.al,...[5] developed the system the patient can tell the problem to the chatbot and the chatbot will use its algorithm to solve the patient problem by recommending a particular doctor to him. Like a patient telling his problem to a chatbot, chatbot then starts processing algorithms to find the perfect solution for the patient then recommends a doctor as a result. The chatbot will use the answer question box to communicate with patients. Patient tells his/her problem to the chatbot using text, then the chatbot will respond to the problem using a query. The healthcare chatbot is a great tool for communication between patient and bot. With the help of chatbot doctors can save their time for

minor problems and it also helps patients to solve their issues. A patient can have a conversation with a bot using text and the chatbot will respond instantly without any delay. The trends of chatbots are increasing day by day with the passage of time because of the load of patients in hospitals. With the help of artificial intelligence, the proposed system will be developed using natural language processing that means the chatbot first diagnoses the patient's problem then recommends a doctor for consultation. During the COVID pandemic, the trends of virtual assistance increased, and people are interacting with robots and virtual assistants. In many countries, there are robots in hospital receptionists to solve problems of people and work like humans.

J. Jinu Sophia, et.al,...[6] easiest way is to use a pre-existing software model which would be almost ready to use. The other way is code everything entirely from scratch. With the likes the tools like Natural Language Processing, building a chat-bot from scratch has become slightly easier process. We can use Natural Language Processing by importing one of the python modules - Natural Language Toolkit (NLTK). We can even create chat-bots using some machine learning algorithms for more human like interactions. All the above disadvantages can be overcome if we have the particular domain expertise. From the review of various journals, it is concluded that, the usage of Chatbot is user friendly and can be used by any person who knows how to type in their own language in mobile app or desktop version. A medical chatbot provides personalized diagnoses based on symptoms.

Farah Shaik, et.al,...[7] primarily focused on aiding India who since April has crossed over a 100,000 cases per day and currently over 300,000 a day. Evidence presents that the variant found in India spread faster and is more harmful than others. In just a short period of time it has taken over and become dominant in major Indian cities making it harder to control the situation. As students, we were motivated to propose a server-less chatbot named 'Covisstance' that addresses this issue and helps in providing users with real time information of availability of hospital beds and oxygen ventilators in the hospitals in their area. For testing purposes, we have implemented this for the state New Delhi but at a production level, this

service can be extended to serve all states and hospitals can be connected to a common secure database. In the literature, several researchers attempted to design medical chat bots providing support and information to patients. For example. A Chatbot used to virtually assist patients and provide information and advice to eradicate physical visit. This chatbot is based on Thailand and has 7 features some of which are contact information, guidelines, and lists of hospitals. However, to the best of our knowledge there is no solution specifically designed to find available bed spaces and ventilators for critical and non-critical patients during the COVID-19 pandemic. The Covisstance server less chatbot addresses a critical issue of providing aid to locate hospitals and oxygen ventilators which enables high accessibility and ease of use. It is implemented by integrating several powerful services such as Microsoft Power Virtual Agents, Microsoft Power Automate Flow, Microsoft Lists and Microsoft Language Understanding AI service (LUIS).

Yuvadee Jitgosol, et.al,...[8] presently, tourism and service industries have incurred a major role in further developing the economy of Thailand. Thus, supporting the staff with good personnel administration is not an option but indeed necessary. Human resource departments should consider offering supportive welfare or benefits, rewarding good or outstanding work, providing motivation, and retaining or regularizing personnel as are the factors to develop the business effectively. Overall, the database can be updated anytime and can be used for searching for information 24\*7. With a user friendly interface design, it is also programmed in a way that helps recognize the behaviour of employees, such as in using social security services, requesting personal leave or days off each year.

Soufyane Ayanouz, et.al,...[9] understand the user input and provide a meaningful response, the chatbot uses artificial intelligence and deep learning methods. Moreover, they interact with humans, using natural language, different applications of Chatbots such as medical chat bots, call centres, etc. A chatbot could help doctors, nurses, patients or their families. Better organization of patient information, medication management, helping in emergencies or with first aid, offering a solution for superficial medical issues: these are all

possible situations for chat bots to step in and reduce the burden on medical professionals. In this paper, we performed a detailed survey on recent literature. We examined many publications from the last five years, which are related to chat bots. Then we presented different related works to our subject, and the AI concepts needed to build an intelligent conversational agent based on deep learning models. Finally, we presented a functional architecture that we propose to build an intelligent chatbot for healthcare assistance.

Shreekar Kolanu, et.al,...[10] can educate and bring in an awareness to the people and follow a healthy lifestyle with the help of our bot named "DiaBot" which is integrated into the web based platform to help and show people whether they are diabetic prone and help them lead a good healthy life. "Diabot" which will help manage diet plans, suggesting plans and calorie intakes. We'll allow patients to book appointments, find nearby clinics and hospitals. The bot will include an UI for a proper user experience. Integrated into it are details on diets, Map and a detailed review system. Diabetes can be dangerous and fatal, if not treated and taken care of. The body either doesn't make enough insulin or can't effectively use the insulin it does make. Our bot will act as the earlier solution to patients with mild symptoms. Identifying the type of diabetes makes it easier for patients to figure out the treatment necessity in the future. Enhance the user with ease of information so that the user is educated about the basic problems he is going thru in the initial stages. Also, to identify whether the patient has already been affected or in the starting stage. Being aware of the symptoms and getting a regular check-up is the motive behind this project. The proposed system is that the bot will ask the details of patients and according to the info given by the patient it will suggest the patient to maintain healthy balanced diet, by suggesting nutrition foods, less calorie foods and other parameters etc.

### 3. BACKGROUND OF THE WORK

In existing system, implement Question Answering (QA) systems which can be identified as information accessing systems which try to answer to natural language queries by giving answers suitable answers making a use of attribute available in natural language techniques. The system takes a plain text as input and answering all type of questions output by

qualified user is the output. Synchronous written conversations (or "chats") are becoming increasingly popular as Web-based mental health interventions. This review is based on an evaluation of individual synchronous Web-based chat technologies. Through the current evidence of the application of this technology, the tentative support for mode of intervention is seen. Interventions utilizing text-based synchronous communication showed better outcomes compared with Waitlist conditions and overall equivalent outcomes compared with Treatment As usual, and were at least as good as the comparison interventions. However, the issue of whether these technologies are cost effective in clinical practice remains a consideration for future research studies. Medical search has several unique requirements that distinguish itself from traditional Web search. A common scenario in which a person performs medical search is that he feels uncomfortable but is uncertain about his exact medical problems. In this case, the searcher usually prefers to learn all kinds of knowledge that is related to his situation. However, existing medical Web search engines are optimized for precision and concentrate their search results on a few topics. This lack-of-diversity problem is aggravated by the nature of medical Web pages. When discussing a medical topic, many medical Web sites use similar, but not identical, descriptions by paraphrasing contents in medical textbooks and research papers.

### 4. PROPOSED METHODOLOGIES

In the proposed system the user dialogue is a linear design that proceeds from symptom extraction, to symptom mapping, where it identifies the corresponding symptom, then diagnosis the patient whether it's a major or minor disease and if it's a major one an appropriate doctor will be referred to the patient, the doctor details will be extracted from the database, the user will be identified by the login details which is stored in the database. In order to achieve an accurate diagnosis, the logic for state transitions are made, natural language generation templates were used, and system initiative to the user and get responses from the user. This system helps users to submit their complaints and queries regarding the health. Customer satisfactions the major concern for developing this system. . The actual welfare of the chatbot is to facilitate the people by giving proper guidance

regarding the good and healthy living. For the

reason that many of the people do not have fundamental awareness of physical condition. So we proposed the medical chat-bots functioning depends on Natural language processing that helps users to submit their problem about the health. The User can ask any personal query related to health care through the chat-Bot without physically available to the hospital. By Using Google API for text voice conversion at the time of answer retrieval in medical chat bot. Query is sent to ChatBot and gets related answer and display answer on android app. The System's major concern behind developing this web based platform is analyzing customer's sentiments.

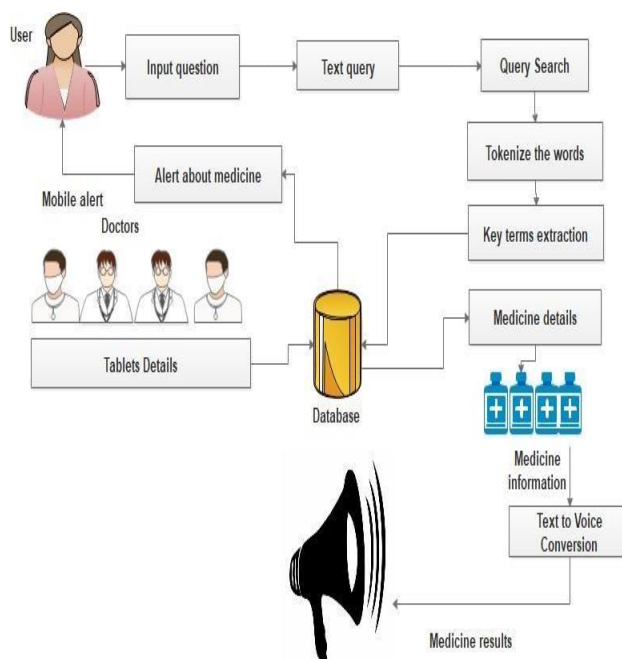


Fig 1: Proposed architecture

Fig 1 specifies, user provide input question and extract the keyword from query based on text mining algorithm. Then provide the results in the form of medicine details.

#### 4.1 INTERFACE CREATION

Chatbot's are such kind of computer programs that interact with users using natural languages. For all kind of chatbots the flow is same, though each chatbot is specific in its own area knowledge that is one input from human is matched against the knowledge base of chatbot. Chatbot's work basically on Artificial intelligence, so using this capability we have decided to add some contribution to the Health Informatics. The high cost of our healthcare system can often be attributed to the

lack of patient engagement after they leave clinics or hospitals. Various surveys in this area have proved that that chatbot can provide healthcare in low costs and improved treatment if the doctors and the patient keep in touch after their consultation. To answer the questions of the user chatbot is used. There is very less number of chatbots in medical field. In this module, we can design the framework for health care domain to patients to get the answers without any human assistance. Admin can train keywords with answers for future processing.

#### 4.2 POST QUESTIONS

The user can chat as if chatting with a human. The bot then ask the user a series of questions about their symptoms to diagnose the disease. It gives suggestions about the different symptoms to clarify the disease. In this module, patient can be registering their details and login to the system. After that the post the questions related to health issues. The question can be in the form of text.

#### 4.3 KEYWORD EXTRACTION

In the first step, questions are collected and perform preprocessing steps to remove the noisy words. The basic steps are

##### Tokenization

The given document is considered as a string and identifying single word in document i.e. the given document string is divided into one unit or token

##### Removal of Stop Word

In this step the removal of usual words like a, an, but, and, of, the etc. is done.

##### Stemming

A stem is a natural group of words with equal (or very similar) meaning. This method describes the base of particular word. Inflectional and derivational stemming are two types of method. One of the popular algorithms for stemming is porter's algorithm. After that extract the keywords and forward to next module

#### 4.4 TOP K RESULTS

In this module, keywords are forward to server page. If the user wants any medical diagnosis of the disease based on the symptoms provided, then the chatbot uses the machine learning algorithm to provide tablets details.

## 4.5 TEXT TO VOICE CONVERSION

Text-To-Speech is a process in which input text is first analyzed, then processed and understood, and then the text is converted to digital audio and then spoken. This technique synthesizes sound by concatenating short samples of sound called units. It is used in speech synthesis to generate user specific sequence of sound from a database built from the recording of other sequences. The answers are converted to voice and hear by microphones using speech synthesis.

## 6. CONCLUSION

In this system we build up a system which is useful for medical institute or hospitals to help the users to freely ask medical dosage related queries by voice. System gets output for medicine API and speaks out and displays all medicine names. We are using NLP because we want to a computer to communicate with users in their terms. Large amount of data which is too diverse and complex to be evaluated by traditional methods are being generated by the health care transactions. The application of data mining on medical data can focus on new, useful and potentially lifesaving knowledge. The extraction or mining process of knowledge from the large amount of data is said to be data mining. It is considered as an innovation which tends to help the physicians who deal with large amount of data. A medical chatbot provides personalized diagnoses based on symptoms.

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