



Developing A Medical Chatbot Using AI

¹ D. Geethanjali, ² Dr. S. Sujatha

¹Student, Department of Computer Applications, University College of Engineering BIT Campus, Trichy, India

²Professor, Department of Computer Applications, University College of Engineering BIT Campus, Trichy, India

ABSTRACT

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 healthcare costs and improve accessibility to medical knowledge the medical Chatbot is built. Certain Chatbots act 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 kinds of diseases and provide the 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 the health care domain. Chatbots are currently one of the best trending technologies available. But yet to accomplish many tasks there is a need to make Chatbots efficient in the medical field as well. To address the problem this project provides a platform where humans can interact with a Chatbot that is highly trained on datasets using Machine Learning algorithms. Machine Learning algorithms take a more natural approach to computation rather than taking a logical approach. The output is dependent on the dataset they are trained on. We can implement the real-time medical system and convert the text results into voice format.

Keywords: NLP, Text Mining Algorithm, Support Vector Machine algorithm, Text to Voice Format, Chatbot, ML,

1. INTRODUCTION

AI is the simulation of human intelligence processes by machines, especially computer systems. These processes include learning (the acquisition of information and rules for using the information), reasoning (using rules to reach approximate or definite conclusions), and self-correction. Particular applications of AI include expert systems speech recognition and machine vision. AI can be categorized in any number of ways, but here are two examples. The first classifies AI systems as either weak AI or strong AI. Weak AI, also known as narrow AI, is an AI system that is designed and trained for a particular task. Virtual personal assistants, such as Apple's Siri, are a form of weak AI. Strong AI, also known as artificial general intelligence, is an AI system with generalized human cognitive abilities so that when presented with an unfamiliar task, it has enough intelligence to find a solution. The Turing Test, developed by mathematician Alan Turing in 1950, is a method used to determine if a computer can actually think like a human, although the method is controversial.

1.2 TECHNOLOGIES IN AI

- **AUTOMATION:**

What makes a system or process function automatically? For example, robotic process automation (RPA) can be programmed to perform high-volume, repeatable tasks that humans normally performed. RPA is different from IT automation in that it can adapt to changing circumstances.

- **MACHINE LEARNING:**

The science of getting a computer to act without programming. Deep is a subset of machine learning that, in very simple terms, can be thought of as the automation of predictive analytics.

There are three types of machine learning algorithms:

- Supervised learning: Data sets are labeled so that patterns can be detected and used to label new data sets
- Unsupervised learning: Data sets aren't labeled and are sorted according to similarities or differences
- Reinforcement learning: Data sets aren't labeled but, after performing an action or several actions, the AI system is given feedback

MACHINE VISION:

The science of allowing computers to see this technology captures and analyzes visual information using a camera, analog-to-digital conversion and digital signal processing. It is often compared to human eyesight, but machine vision isn't bound by biology and can be programmed to see through walls, for example. It is used in a range of applications from signature identification to medical image analysis. Computer vision, which is focused on machine-based image processing, is often conflated with machine vision.

- **NATURAL LANGUAGE PROCESSING:**

The processing of human and not computer language by a computer program. One of the older and best-known examples of NLP is spam detection, which looks at the subject line and the text of an email and decides if it's junk. Current approaches to NLP are based on machine learning. NLP tasks include text translation, sentiment analysis, and speech recognition.

II LITERATURE SURVEY**[1] TITLE: WEB-BASED CHATBOT FOR FREQUENTLY ASKED QUERIES (FAQ) IN HOSPITALS**

AUTHOR: Mamta Mittal, Ph.D

The major objective of this work is to explain the importance of medical chatbots 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, the 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 the 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 customized 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 chatbot brain. Therefore, we developed a special Chatbot that includes collecting local hospital information responses by integrating web-based techniques. Present medical chatbots are integrated with speech recognition such that users can communicate through either voice or text messages. To implement a Chatbot, several techniques and optimization algorithms are available. Gradient Descent (GD) is an optimization algorithm used to evaluate the coefficients of function (f) that minimize the cost function. It is a primary optimization algorithm to assess the minimum cost function.

TECHNIQUES:

- Gradient descent (GD) Algorithm.

[2] TITLE: DEVELOPMENT OF A CHATBOT PROGRAM FOR FOLLOW-UP MANAGEMENT OF WORKERS' GENERAL HEALTH EXAMINATIONS IN KOREA: A PILOT STUDY

AUTHOR: Byeong Jin Ye

Chatbot, a type of digital healthcare tool, is the 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, the chatbot also plays a role in motivating and sustaining lifestyle changes, for example, quitting smoking. Because chatbots are optimized 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.

TECHNIQUES:

- Workers' general health examination (WGHE) system.

[3] TITLE: AI BASED HEALTHCARE CHATBOT SYSTEM

AUTHOR: A KumaresanAngappan

Interactive chatbot applications are the latest inventions of the modern era. The healthcare sector is closely associated with human interaction, and it seems that conversational AI applications like chatbots are more prevalent. A chatbot should respond in a way that the user should feel like they are conversing with a real person. The chatbot responds according to the clear dataset and sustainable backend logic for the outcome generation. A medical

chatbot facilitates the job of a healthcare provider and helps to improve their performance by interacting with users in a human-like way. Chatbots 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 chatbots are the future of the 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 recognize 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 the most common diseases. In this pandemic, we could decrease physical contact by the usage of medical chatbots which will provide herbal methods to cure the disease in the home itself. By using a healthcare chatbot people can avoid unnecessary visits to clinics and hospitals. Especially in remote areas, it is becoming more difficult to consult a medical specialist when there is an emergency situation.

TECHNIQUES:

- AIML (Artificial Intelligence Mark-up Language) code.

III. EXISTING SYSTEM

In the existing system implement a Question Answering System which can be identified as an information accessing system that tries to answer natural language queries by giving answers suitable answers making use of attributes available in natural techniques. The system takes plain text as input and answering all types of questions output by the qualified user is the output

DISADVANTAGES

- Difficult to extract knowledge from the medical crowd-sourced Q&A websites
- Irrelevant question-answer pairs may be extracted
- The questions asked by patients can be noisy and ambiguous

IV PROPOSED SYSTEM

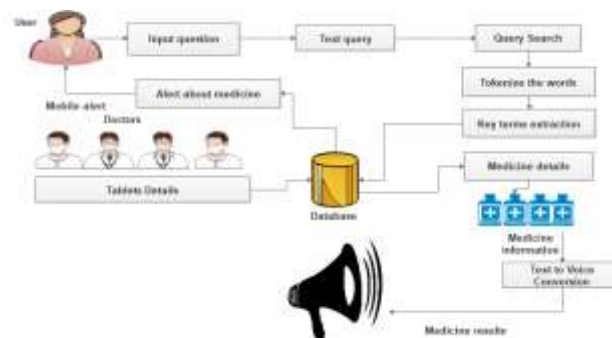
Proposed the medical Chatbot functioning depends on Natural Language processing that helps users to submit their problems about their health. The User can ask any personal query related to health care through the Chatbot without being physically available to the hospital. By using the Hidden Markov Model for text voice conversion at the time of answer retrieval in the medical chatbot. The query is sent to the chatbot and gets a related answer and display the answer on the application

ADVANTAGES

- Extracting medical knowledge from user-typed questions
- The proposed method provides a cost-efficient and effective way to mine knowledge from crowd-sourced question-answering websites
- Recommending expected results from trained datasets
- Also result in voice format

V. SYSTEM ARCHITECTURE

System architecture is the conceptual model that defines the structure, behavior, and views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system. In this architecture, the user provides input question and extract the keyword from the query based on a text mining algorithm. Then provide the results in the form of medical details.



SYSTEM ARCHITECTURE

VI. MODULES

INTERFACE CREATION

Chatbot's are such kind of computer programs that interact with users using natural languages. For all kinds of chatbots, the flow is the same, though each chatbot is specific in its own area of knowledge that one input from humans is matched against the knowledge base of the Chatbot. Chatbots work basically on Artificial intelligence, so using this capability we have decided to add some contribution to 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 Chatbot can provide healthcare at 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 a very less number of chatbots in the medical field. In this module, we can design the framework for the health care domain for patients to get the answers without any human assistance. Admin can train keywords with answers for future processing.

POST QUESTIONS

The user can chat as if chatting with a human. The bot then asks 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, the patient can be registering their details and log in to the system. After that, they post the questions related to health issues. The question can be in the form of text.

KEYWORD EXTRACTION

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

- **TOKENIZATION**

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

- **REMOVAL OF STOP WORDS**

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) meanings. This method describes the base of a particular word.

Inflectional and derivational stemming are two types of methods. One of the popular algorithms for stemming is porter's algorithm. After that extract the keywords and forward them to the next module

TOP RESULTS

In this module, keywords are forwarded to the 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 tablet details.

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 sequences of sound from a database built from the recording of other sequences. The answers are converted to voice and heard by microphones using speech synthesis

VII. CONCLUSION

In this system, we build up a system that is useful for medical institutes or hospitals to help the users freely ask medical dosage-related queries by voice. The system gets output for medicine API and speaks out and displays all medicine names. We are using NLP because we want a computer to communicate with users on their terms. A large amount of data that 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 a large amount of data is said to be data mining. It is considered an innovation that tends to help physicians who deal with large amounts of data. A medical chatbot provides personalized diagnoses based on symptoms.

References

[1] L. C. De, "Bio-diversity and conservation of medicinal and aromatic plants," Adv. Plants Agricult. Res., vol. 5, no. 4, p. 00186, Dec. 2016.

-
- [2] M. M. Ghazi, B. Yanikoglu, and E. Aptoula, "Plant identification using deep neural networks via optimization of transfer learning parameters," *Neurocomputing*, vol. 235, pp. 228–235, Apr. 2017.
- [3] J. W. Lee and Y. C. Yoon, "Fine-grained plant identification using wide and deep learning model 1," in *Proc. Int. Conf. Platform Technol. Service (PlatCon)*, Jan. 2019, pp. 1–5.
- [4] A. Kaya, A. S. Keceli, C. Catal, H. Y. Yalic, H. Temucin, and B. Tekinerdogan, "Analysis of transfer learning for deep neural network based plant classification models," *Comput. Electron. Agricult.*, vol. 158, pp. 20–29, Mar. 2019.
- [5] V. Bodhwani, D. P. Acharjya, and U. Bodhwani, "Deep residual networks for plant identification," *Proc. Comput. Sci.*, vol. 152, pp. 186–194, Jan. 2019