

Machine Learning Enabled Health Care Chat Bot

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Abstract - Leading good and healthy lifestyle is very important. It is very difficult to do get medical advice in case you have any health problems. The proposed idea to do a medical discussion using machine learning that will be able to diagnose the disease and provide basic information about disease before consulting a doctor, reducing the cost of health care and development access to medical information.. Few conversations work as reference books, which help the patient find out about the illness and help improve their well-being. The user is only able to make significant chat benefits diagnosing all diseases and providing the necessary information. Therefore, people will have an idea of their own health and well-being protection.

Key Words: healthcare, chat bot, machine learning, symptoms, diagnostic, diseases.

1. INTRODUCTION

Chat bots allow users to connect via text or speech and get responses from artificial intelligence (AI) through a text or voice interface. In most cases, a chat bot will converse with a human being. Applications where chat bots are employed include e-commerce customer support, contact centres, and online gaming. Chat bots are computer programmes designed to respond automatically to messages they receive over a web interface. It is possible to build chat bots such that they answer in the same way every time, but they can also respond differently depending on the keywords used in the message. Hospitals, nursing homes, and even private organisations are increasingly turning to chat bots for human services on their websites. Bots engage with potential patients who visit the site, helping them find experts, scheduling appointments, and ensuring they receive proper care. These bots connect with patients.

An ML model must be built in which we may provide any text input and it must assess the symptoms based on the training data. To train the model with data sets comprising diverse illness CSV files, a Supervised Logistic Regression machine learning technique can be used. The objective is to evaluate the outputs of several models and choose the optimal model for symptoms in real-world data. The data set includes a CSV file that compiles all illnesses. In ML, the logistic regression method helps us to handle data efficiently. The objective here is to model the underlying structure or

distribution of the data so that the training set may be used to learn more.

Regardless, the use of artificial intelligence in a field where people's lives are at stake still raises questions in the minds of some. It raises the question of whether human personnel should be allocated to the aforementioned duty. This healthcare chat bot system will assist hospitals in providing online healthcare support 24 hours a day, seven days a week. It responds to complex queries as well as simple ones. As a result, it aids in the generation of new business and sends lead data directly to sales. With sequence of inquiries, it assists patients by directing what exactly he or she is seeking for

2. LITERATURE SURVEY

A chatbot is a form of a computer system that allows humans to communicate with computers using natural human language. DeepProbe, Alime, SuperAgent, MILABOT and RubyStar are some examples of modern chatbot systems. [1] The main idea of creating this chatbot is to replicate a person's discussion [6].

Professor Joseph Weizenbaum at the Massachusetts Institute of Technology created ELIZA, one of the first chatbots in 1966[3]. ELIZA uses pattern matching and substitution methodology to simulate conversation. "ELIZA is well known artificial therapist. The bot attempts to rephrase the questions of the client and responds on certain keywords. If no keyword is found ELIZA replies with fixed phrases to keep the conversation going" [2].

PARRY was constructed by American psychiatrist Kenneth Colby in 1972. The programme imitated a schizophrenic patient. It makes an attempt to imitate the sickness. It's a natural language programme that mimics human thought patterns. [4]

A.L.I.C.E is a universal language processing chatbot that conducts talks via heuristic pattern matching. Richard Wallace was the first to build ALICE in 1995. The AIML (Artificial Intelligence Markup Language) XML schema is used by the application to establish dialogue rules. The software was rewritten in Java in 1998, and Wallace published an AIML specification in 2001. Other developers then created free and open ALICE sources in a range of programming languages and foreign languages.[4]

In this paper, the chatbot will function as a virtual doctor, allowing patients to engage with the doctor. This chatbot was created using natural language processing and a pattern matching algorithm. It is written in the Python programming language. According to the results of the survey, the chatbot provides 80 percent correct answers and 20 percent wrong or unclear responses. From this survey of chatbot and analysis of result suggested that this software can be used for teaching and as a virtual doctor for awareness and primary care.[2]

Chat-bots, for example, can provide immediate responses to patients' health-related inquiries while searching for specific patterns of symptoms in predicting disease, as demonstrated by the internet-based Doc-Bot delivered via mobile phone or a Messenger-based chat-bot for outpatient and translational medicine.[5]

This system offers a text-to-text conversational agent that inquires about the user's health concern. The user can converse as if he or she were messaging with a human. To diagnose the ailment, the bot next asks the user a series of questions regarding their symptoms. It makes recommendations based on the various symptoms in order to define the ailment. The precise disease is discovered based on the user's response, and it indicates the doctor who should be consulted in the event of a significant disease.[10]

While this technology is still in its early stage, health chatbots have the potential to improve access to healthcare, improve doctor-patient and clinic-patient communication, and assist in the management of the growing demand for health services such as remote testing, medication adherence monitoring, and teleconsultations. [7-9]

The chat bot implements pattern comparison, in which the sentence order is identified and a response pattern is saved. The author talks about the chatbot's operating system, software, programming language, dialog box, database, and how input and output results are stored in this article. The inbuilt set Background () function is used to set the required background colour. The Text() function is used to extract the input, and the trim() function is used to remove any punctuation marks. All the texts or strings used in input and output are added to the text area in the dialog box using AddText(). The random() function is then used to select a response from the database. InArray() is used as a pattern matching function. The chatbot serves as a source of entertainment.[11]

3. SYSTEM DESIGN

Systems design is the process of defining the architecture, components, modules, interfaces, and data for a given system to satisfy specified requirements. Systems design could be the application of various systems theories to product development. There is some overlap with the disciplines of systems analysis, systems architecture, and

designing. The chatbot here is used to simulate a conversation with users using patterns. It's an online assistant that offers different services through chatting over the internet. This program uses a number of python modules to work namely tkinter, numpy, pandas and matplotlib.

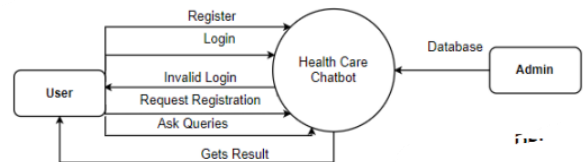


Fig. 1 DFD Diagram

The first step of the chatbot system is the user login, the user enters the credentials. Then it's verified if it is found in the database, else the user has to sign up (to create a new account). In the chat interface, the user his queries about a disease. Chatbot APIs are implemented for an immediate response concerning the queries asked by the user. Medicine Enquiries will be given to the user if the Symptoms are matched with the Medicine API. The chatbot then gives information to consult a doctor with the specified hospital address.

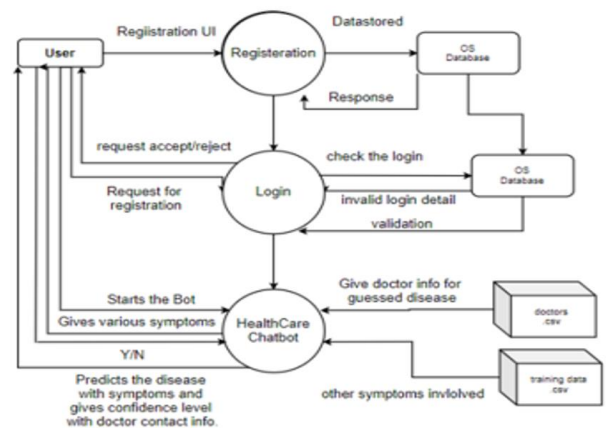


Fig. 2 DFD Diagram

This figure explains the user interaction. The user inquires are first taken care. The user input is then processed and compared with the strings present in the database of the chatbot. When the database finds a corresponding match with user input the output is returned. Based on patient demands we need to alter different elements, but the basic communication flow is similar. If the message is unrecognizable by the chatbot it hits the human fall back, else it continues the interaction between the bot and its user. Once the query pattern is matched, the template of the category that contains the response is sent back to the user.

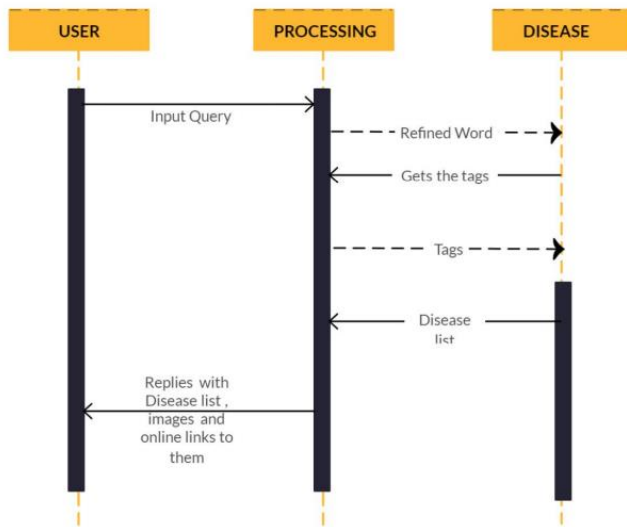
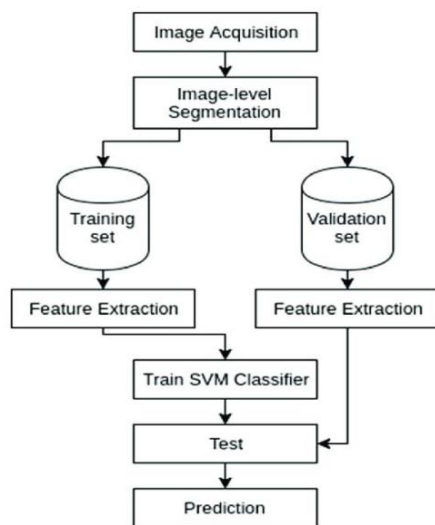


Fig. 3 Sequence Diagram

4. WORKING MODALITY

The Chat Bot System Health-Care is compiled using Python, GUI connections and a basic network API that you may use.



Implementation:

Algorithms: Supporting vector machines (SVMs, support vector networks too) are supervised models with related learning algorithms that evaluate data used to assess classification and regression. In view of a collection of instances of training, each of which is marked one or the other of two categories, the SVM training algorithm creates a model that assigns fresh examples to each of the categories, making it a non-probabilistic binary linear classifier. An SVM model shows the instances as spatial points, mapped so as to split the examples of the different categories into a distinct break that is as broad as feasible. New instances will subsequently be mapped to the same space and will belong to a class depending on their side of the gap.

Besides the linear classification, SVMs may conduct an effective non-linear classification utilising what is known as the kernel technique to map their inputs to high dimension function spaces.

Software Requirement: In a software-based solution running on a Linux or window system with a 2.4-GHz dual core CPU is presented

Purpose: The major objective of the system is to construct a linguistic gap between the user and healthcare professionals by providing fast answers to the user's questions. People nowadays are more likely to be addicted to the internet, yet they are unconcerned about their own health. They avoid coming to the hospital for minor issues that might develop into a serious sickness in the future. Creating question-and-answer forums is becoming an easy approach to answer those inquiries rather than sifting through a list of possibly relevant online pages. Many present systems have drawbacks, such as the fact that patients do not receive an immediate answer; instead, they must wait for specialists to recognise their request, which might take a lengthy time. Some processes may demand a fee for online live chat or telephonic connection with doctors. The goal of this technology is to duplicate a person's conversation

5. RESULTS & DISCUSSIONS

Healthcare chat bots have not yet reached maturity yet. They are in the early stages. However, it seems certain that their use will soon become commonplace. The main requirement they need is a straightforward workplace or mobile with proper internet. The production of chat bot can be improved by adding more word combinations and increasing the use of the database so that the clinical Chabot can deal with all types of diseases. Indeed, even a voice chat can be included with a framework to make it easier to use everything.

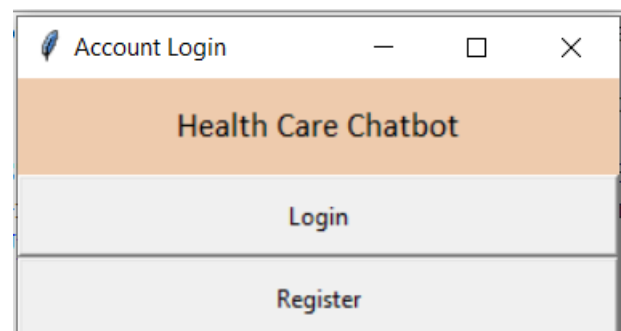


Fig. 1 Login & Register

This is the Login & Register window, where the user can register and login to the chat bot.

7. FUTURE SCOPE

Chat bots are a phenomenon of the future that has yet to realise its full potential, but with their growing popularity and enthusiasm among businesses, they are certain to stay for a long time. Machine learning has altered the way businesses communicate with their consumers. With the introduction of new platforms for building various sorts of chat bots, it is exciting to see the emergence of a new domain in technology while exceeding the previous barrier.

REFERENCES

- [1] Lokman, A.S.; Ameen, M.A. Modern Chatbot Systems: A Technical Review. In Proceedings of the Future Technologies Conference (FTC) 2018; Arai, K., Bhatia, R., Kapoor, S., Eds.; Springer International Publishing: Cham, Switzerland, 2019; pp. 1012–1023.
- [2] Saurav Kumar Mishra, DharendraBharti, Nidhi Mishra, "Dr.Vdoc: A Medical Chatbot that Acts as a Virtual Doctor", Journal of Medical Science and Technology, Volume: 6, Issue 3,2017.
- [3] Siddique, Sarkar & Chow, James. (2021). Machine Learning in Healthcare Communication. Encyclopedia. 1. 220-239. 10.3390/encyclopedia1010021.
- [4] <https://onlim.com/en/the-history-of-chatbots/>
- [5] A. K. Tripathy, R. Carvalho, K. Pawaskar, S. Yadav and V. Yadav, "Mobile based healthcare management using artificial intelligence," 2015 International Conference on Technologies for Sustainable Development (ICTSD), 2015, pp. 1-6, doi: 10.1109/ICTSD.2015.7095895.
- [6] Dharwadkar, R., Deshpande, N.A.: A medical chatbot. Int. J. Comput. Trends Technol. (IJCTT) 60, 41–45 (2018)
- [7] Hoermann S, McCabe KL, Milne DN, et al. Application of synchronous text-based dialogue systems in mental health interventions: Systematic review. J Med Internet Res 2017; 19(8): e267. [PMC free article][PubMed] [Google Scholar]
- [8] Fadhil A, Gabrielli S. Addressing challenges in promoting healthy lifestyles: the ai-chatbot approach. In: Proceedings of the 11th EAI International Conference on Pervasive Computing Technologies for Healthcare, ACM, 2017, pp.261–265.
- [9] Comendador BEV, Francisco BMB, Medenilla JS, et al. Pharmabot: A pediatric generic medicine consultant chatbot. J Automat Control Eng 2015; 3(2): 137--140. [Google Scholar]
- [10] Divya Madhu, Neeraj Jain C. J, ElmySebastain, ShinoyShaji, AnandhuAjayakumar, "A Novel Approach for Medical Assistance Using Trained Chatbot", International Conference on Inventive Communication and Computational Technologies (ICICCT 2017)
- [11] Dahiya, Menal. (2017). A Tool of Conversation: Chatbot. INTERNATIONAL JOURNAL OF COMPUTER SCIENCES AND ENGINEERING. 5. 158-161.2017