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AI Based Healthcare Chatbot System

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ABSTRACT:

Medical field has changed a lot in the past decade. Research says 60% of patients visit doctor for common health issues and 80% of the diseases could be cured using homemade remedies. In this pandemic we could decrease the physical contact by the usage of medical chatbots 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. Thus, an effectively designed and deployed chatbot can help patients who are living in remote areas by providing preventive measures and home remedies.

Keywords:

Artificial Intelligence Mark-up Language (AIML), Herbal, Healthcare-chatbot, Interactive agent, Natural Language Processing (NLP), Pattern Matching.

1.Introduction:

The rise of web and mobile applications have paved way for many interventions in the field of medicine and healthcare. Chatbots, also known as conversational agents, interactive agents, virtual agents, virtual humans, or virtual assistants, are artificial intelligence programs designed to simulate human conversation via text or speech. [5,6]

Interactive chatbot applications are the latest inventions of 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 response 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.[3]

Chatbots do not get tired, fatigued, or sick, and they do not need to sleep; they are cost-effective to operate and can run 24 hours a day, which is especially useful for patients

who may have medical concerns outside of their doctor's operating hours.

2.Related Works:

The criteria for creating chatbot for medical applications should be efficient. Gopi Battineni, et al. [13] designed complex AI medical discussions for users, especially in times of unknown illnesses such as nCOV-19. It is, therefore, clear that if well-designed and well-used conversation can help patients living in remote areas by promoting immune systems, regenerating viruses, and reducing the psychological damage caused by isolation and fear. This study reveals the complexity of artificial intelligence (AI) discussion for the

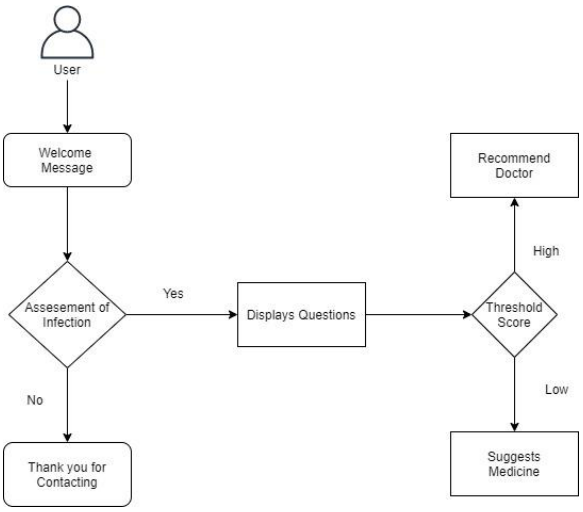


Fig 1: Working Flowchart

purpose of diagnosing and recommending immediate action when patients are exposed to nCOV-19. In addition, introducing a real assistant can also measure the severity of the infection and contact a registered physician when the symptoms worsen. With AIML integration in our chatbot, it can detect patterns from user messages and provide direct and logical responses. Once it has all the necessary information, it detects the acute percentage of the virus that the user encounters and acts appropriately, by contacting health professionals or providing information about immediate preventive measures. The main purpose of this chatbot is to make the most of that disease - Covid 19.

Ghare Shifa et al. [12] developed a dialogue based on Artificial Intelligence to reduce the need for a physician and reduce medical costs. Artificial Intelligence (AI) as the building block of learning a new complex life and working for an ongoing circle. The user will have a text chat with the healthcare chatbot and then get to identify the primary disease and the user can also access their chat records within their features collected in the database. They have used 3.7 python version in jupyter notebook. NLP is used to detect and analyse human language. BLU is a subset of the larger NLP image. It processes raw data which is considered a chatbot brain, which cleans it and provides appropriate actions. The proposed system is used only to detect disease but does not provide any remedies.

Aishwarya Kedar et al. [4] aimed to make a chatbot system with the help of artificial intelligence and machine learning, our system is based on hospital management. Each user must log in to the system to use it, we provide a chatbot of hospitals that will serve as appointment bookings, details of surgeons, presence of doctors etc. we make a smart plan that will make the user get general hospital information with finger tips. These bots interact with potential patients who visit the site, help them find specialists, book their appointments, and get them the right treatment. By asking a series of questions it helps patients to direct what they want. The resulting chatbot focuses on operating only in the hospital area.

Dinesh Kalla and Fnu Samaah [9] developed an application that uses Artificial

Intelligence and can help diagnose a variety of diseases and provide the necessary information about a patient's illness. It uses techniques from Natural Language Processing, which works in human language to provide feedback. This app answers the same questions that medical professionals may have answered, their purpose in answering objectives is to take input from the patient or user, process it using specific methods and provide results to the user according to their symptoms. In the first stage they process the input text by translating the whole sentence into lowercase letters so that the algorithm does not contain the same type of words from uppercase letters differing from the same word, from Chatbot for Medical Treatment using NLTK Lib. Since the output has a very low cosine similarity, and the response may or may not be exactly the same.

Ashwini Shangrapawar [3] et al designed a chatbot is to give service to the people who are suffering from body problem or disease by suggesting them medicines regarding their problems. To give them 24x7 availability, we use our hardware boot as a server for client using programming. This medical chatbot provides medical assistance to the patients for some of the general diseases like fever, cold, typhoid, malaria, jaundice etc. Here they applied input speech signal through the mic and it compared with the database stored in the raspberry pi and answer from the database. If problem statement or disease and medicine related information is not available in the database then, it will answer from the Google server. The drawback of this proposed system is that it is a hardware-based system which should be carried from place to place.

3.Proposed Work:

The proposed chatbot program aids the work of the health care provider and helps to improve their performance by communicating with users in a human-like interaction rather than the system manner. The human-like chatbot mainly works based on AIML (Artificial Intelligence Mark-up Language) code. AIML is an XML (Extensible mark-up language) based mark-up language meant to create artificial intelligent applications. AIML makes it possible to create human interfaces while keeping the implementation simple to program, easy to understand and highly maintainable.

The Spring Tool Suite is used to run the AIML file, which is a JAVA based platform highly useful for developing web applications. In this chatbot, the user types the question in the chat box, the chatbot compares the question pattern with the AIML code. Then the process of pattern matching is carried out to make the chatbot respond to respective questions. Pattern matching is the process of checking whether a particular sequence of letters / data is present in a given data. The main feature of this chatbot is the user gets an idea about herbal remedies which are more effective, healthy and safe way of treating illnesses. Generally, the main objective of any Chatbot system is that it should behave in a human like way. That is, the user must feel like they are actually chatting with a healthcare provider.

Hence, we also aim to make this Chatbot more user friendly.

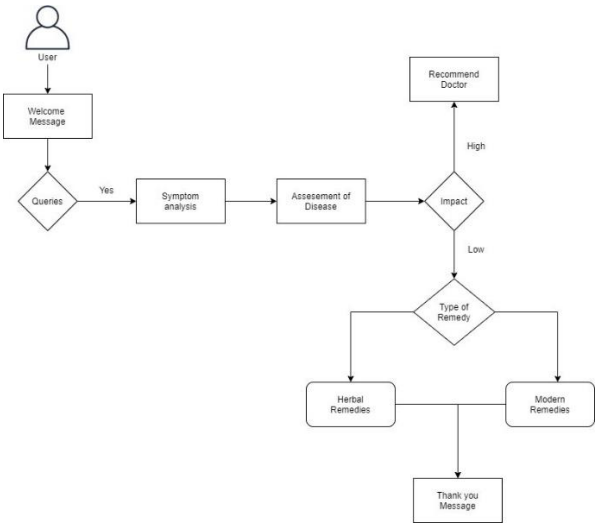


Fig 2: System Process

4.Simulation and Analysis:

1.Datasets: The dataset is based on the CSV files. A CSV is a comma separated values file which allows data to be saved in a table like format. It can be saved in n excel sheet with a .csv extension. This dataset contains the details of all the common disease that are already analyzed and shortlisted, also their corresponding herbal remedies and methods for those particular disease and its related symptoms has been pre-saved in the CSV file.

2.Pattern Matching: It is the process of checking whether a sequence of data/keywords are present in the given dataset. Pattern Matching reads through text in dataset. The name of the disease and symptoms are represented as keywords are already stored within the pattern tag <*pattern*> of the AIML. By using AIML tags Pattern-matching is simple and more accurate.

Symptoms are presented as keywords and are stored within the pattern tag <*pattern*>of the AIML. By using AIML tags Pattern-Matching is simple and more accurate. Various types of AIML tags are used in the process of creating the chatbot. Some of the important tags used in the AIML are Pattern tag, Template tag and category tag. The <*pattern*> is used to match the users input text with the pre-stored data. The <*template*> is used to store the data for which the bot will respond according to the user's input. The <*category*> is used to define the unit of knowledge in our AIML bot.

4.1. Algorithm:

Input: Natural Language Query from user

Output: Requested data from CSV file or AIML tags based on input in form of Natural Language.

Pseudocode: User Interaction.

1.**While** user has a question.

2.User enters the query.

3.detected and extracted words.

4.**for** each keyword k in query.

5. Lookup k in CSV data fields.

6. Lookup k in <*pattern*> of AIML.

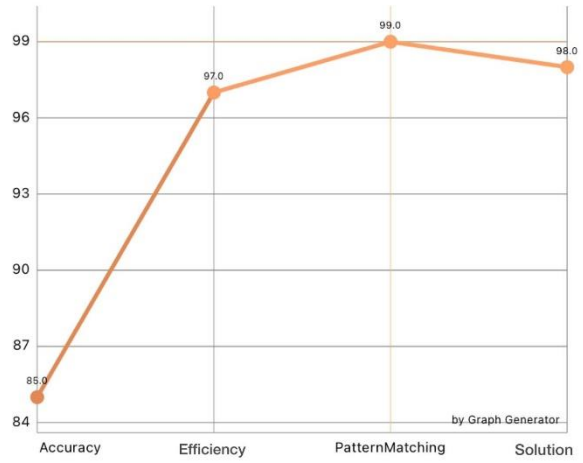
7. return the CSV data value v.

8. end **for.**

9. concatenate v with predefined reply sting.

10. end **while**.

4.2. Model Accuracy Graph:



-Dr. Bot

Fig 3: Model Accuracy Graph

The above graph represents the Model accuracy. It is a graphical representation of factors such as Accuracy, efficiency of the proposed system. The pattern Matching ability and the solutions given by the system is also shown in the graph.

-Dr. Bot - Other Chatbots

Fig.4: comparison graph

The above graph is a comparison of our proposed system along with similar other chatbots. The blue line represents the abilities of other chatbots. The orange line represents the abilities of our proposed system. The above graph shows the various characteristics of a chatbot system such as Accuracy, Efficiency, Pattern matching and the solutions given by the chatbots. Therefore, by analysing the abilities of the chatbots, the graphs are drawn.

4.3. Sample output:

The sample output of our proposed system shows the conversation between the user and the chatbot system.

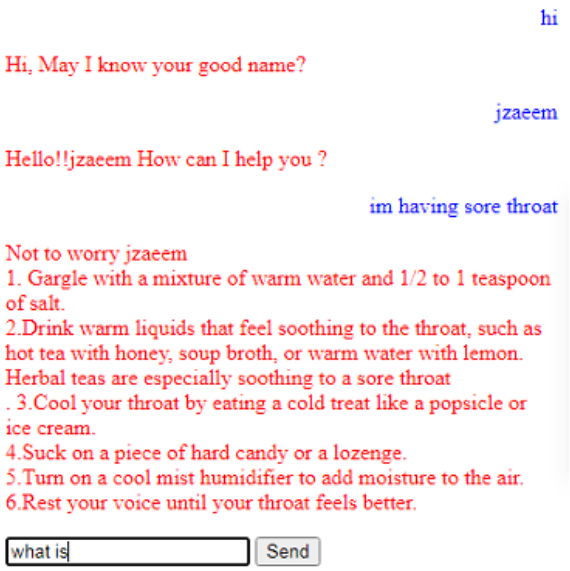


Fig.5: sample output

5.Conclusion and Future work:

Healthcare chatbots 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.

6.References:

[1] Adam Palanica, "Physicians Perceptions of Chatbots in Health Care: Cross-Sectional Web-Based-Survey",*JMIR Publications:Published on 05.04.19 in Vol 21, No 4 (2019): April.*

[2] Amato F, Marrone S, Moscato V, Piantadosi G, Picariello A, Sansone C. CEUR Workshop Proceedings. 2017. Chatbots Meet eHealth: Automatizing Healthcare *URL: http://ceur-ws.org/Vol-1982/paper6.pdf [accessed 2019-02-26] [Web Cite]*

[3] Ashwini Shangrapawar, Ankita Ravekar," Artificial Intelligence based Healthcare Chatbot System", *IRJET Vol:07, Issue-02:Feb-2020.*

[4] Aishwarya Kedar, Jyoti Dahale,Khushboo Patel," Chatbot System for Healthcare using Artificial Intelligence", September 2020 IJSDR | Volume 5 Issue

[5] Brooke S. Chatbots Magazine. How chatbots will shape the future of healthcare *URL: https://chatbotsmagazine. com/how-chatbots-will-shape-the-future-of-healthcare-fa8e30cebb1c?gi=7238e40fd943 [accessed 2019-02-25] [Web Cite]*

[6]Cade J. Medium. No appointment necessary—The rise of bots in healthcare *URL: https://medium.com/gene-global/no-appointment-necessary-the-rise-of-bots-in-healthcare-4d42c5539547[Web Cite]*

[7] Cameron, G., Cameron, D., Megaw, G., Bond, R., Mulvenna, M., Neill, S. O, McTear, M. (2018). Best Practices for Designing Chatbots in Mental Healthcare – *A Case Study on iHelpr. Proceedings of British HCI 2018*

[8] Chin-Yuan Huang, Ming-Chin Yang, Chin-Yu Huang, "A Chatbot-supported Smart Wireless Interactive Healthcare System for Weight Control and Health Promotion", proceeding of the *IEEE, April-2018.*

[9] Dinesh Kalla, Fnu Samaah," Chatbot for Medical Treatment using NLTK Lib" *IOSR Journal of Computer Engineering IOSR-JCE, Volume 22, Issue 1, Feb -2020.*

[10] Divya, Indumathi, Ishwarya, Priyasankari, "A SelfDiagnosis Medical Chatbot Using Artificial Intelligence", proceeding *MAT Journal, October-2017*.

[11] Flora Amato, Stefano Marrone, "Chatbots meet eHealth: automat zing healthcare", proceeding of *diet, May-2018*

[12] Ghare Shifa,Shaikh Sabreen," Self-Diagnosis Medical Chat-Bot Using Artificial Intelligence",*Easychair Preprint No.2736-2020.*

[13] Gopi Battineni, Jadhav, K.P," AI Chatbot Design during an Epidemic like the Novel Coronavirus", *Special Issue:Feature Papers in Artificial Intelligence in Medicine),2020.*