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HealthCare Chatbot

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Abstract - *With changing times due to the Covid-19 pandemic, it is advisable to leave our houses only during emergencies. Despite the fact that hospitals maintain adequate precautions, people still remain fearful of visiting them due to the risk of getting infected. In the safe confines of one's own home, this work can be used to analyze and understand diseases and symptoms. It contains a Medical Test webpage that makes predictions about various illnesses using the concept of machine learning. If the user wants to know the cause for the particular symptom, they can use the chat-bot facility. The chat-bot will ask to state the symptoms which the user is experiencing. The user can state their symptoms one by one and receive the predicted output. It will also provide the probability of the illness occurring based on the symptoms. A set of possible future symptoms are also displayed concerning the probable disease. When an emergency occurs, it helps pinpoint what is wrong and recommends expert doctors based on their Practo profile to schedule an appointment.*

Key Words: Chatbot, Healthcare, Machine learning, Decision Tree, Natural Language Processing, Neural Network

1. INTRODUCTION

Even though we are getting accustomed to the latest changes due to the Covid-19 pandemic, the fear of getting infected is increasing due to new emerging variants. Despite the strict lockdown restrictions, the cases are yet to be recovered, causing a disturbance in our daily life. One of the issues includes applying for a doctor's appointment. The hospitals follow the Covid-19 protocols up to the mark, yet people have a misconception of hospitals being a hotspot for Corona patients. To minimize this fear and to avoid people leaving their houses frequently, we came up with an idea of self-diagnosis at home.

The user can check their health reports for crucial concerns regarding Cancer, Diabetes, Heart, Liver, Kidney, Malaria, Pneumonia, which are prime health issues faced in India. This process is carried out through a Medical Web page using Flask, where the users can input their health report details and get a diagnosis for the same. This web page is developed using machine learning and web development methods. Other queries related to health are answered through the chatbot service. The chatbot will ask the user to state the symptoms, for example, the user types "I'm feeling cold", "There are skin rashes", "Vomiting", "Fatigue" etcetera, and the model will then predict that the user has "Dengue." Further, it will list out more symptoms that may occur and calculate the probability of the illness supposedly happening, based on the symptoms selected. It helps to figure out what is wrong and how urgent the situation is and recommends expert doctors with their Practo profile to book an appointment in the case of an emergency.

The main benefit of this research is that the users will be able to evaluate the severity of their illnesses and take the appropriate action as a result. In that way, they can determine if a hospital visit or clinic consultation is necessary or if self-diagnosis and telephonic consultation would suffice. Rather than spending hours waiting and making multiple trips to the hospital, you can save time through this work.

2. LITERATURE REVIEW

In [1], the authors developed an intelligent virtual assistant able to talk with patients to understand their symptomatology, counsel doctors, and monitor treatments and health parameters. By utilizing a natural language-based interaction, the system permits the user to form their health profile, describe their symptoms, search for doctors, or remember a treatment to attend. As a future scope, they want to boost the performance of the Symptom Checker module by adding information on the rarity of the diseases; automatic suggestions of food and physical activity to perform based on the user's health conditions. An exploratory study on using conversational interfaces (CIs) was done in [2] to support physicians conducting occupational health consultations. The CI was developed with the help of a web-based information dashboard along with a chatbot assistant, which provides real-time recommendations. Two system designs were implemented in this paper. The first design was by using a proactive chatbot, and the other was by using an on-demand interaction. The limitation was that it was conducted using simulated medical cases, with limited participants, based on only one round of experiments. Hence, the results might not have been sufficient to demonstrate the effects of CIs in long-term routine in real occupational health consults.

Analysis of two characteristics; language, and persona; and their effect on outcomes such as effectiveness, usability, and trust in a chatbot was carried out in [3]. Its disadvantage was the use of informal language for online counseling, a lack of trust in the information, or the chatbot being perceived as not having the correct information. The chatbot in [4] stores the information in the database to identify the keywords from the sentences and make a decision for the query and answer the question. A score is calculated for each sentence, and more similar sentences are obtained for the given query, from

the input sequence. A third party or an expert system is recommended, when the chatbot isn't able to comprehend the query.

An edge computing chatbot-based web interface that controls a given COVID-19 dataset that uses two recommender system modules is discussed in [5]. The two modules include evidence-based filtering and social filtering. Evidence-based filtering is used to observe domain-specific topics whereas; social filtering authorizes diverse experts to unite via a "social plane" to collaboratively find answers to crucial clinical questions to fight the pandemic. The authors want to create mechanisms such as open datasets, model-driven tools, and task-specific social collaboration features. The proposed idea in [6] 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. The main objective was to reduce healthcare costs and improve accessibility to medical knowledge with the help of a medical chatbot. The authors added that in the future, the bot's symptom recognition and diagnosis performance could be greatly improved by adding support for more medical features, such as location, duration, and intensity of symptoms, and more detailed symptom descriptions.

3. PROPOSED METHODOLOGY

3.1 Dataset

Datasets for various illnesses are obtained from Kaggle. Snippets of a few such as Liver and Malaria can be seen in Fig-1 and Fig-2. Various other datasets such as datasets for Diabetes, Pneumonia, Cancer, Dengue, Cold, and so on are also incorporated with the model.

	A	B	C	D	E	F	G	H	I	J	K
1	Age	Gender	Total_Bilirı	Direct_Bil	Alkaline_I	Alamine_/	Aspartate	Total_Pro	Albumin	Albumin_	Dataset
2	65	Female	0.7	0.1	187	16	18	6.8	3.3	0.9	1
3	62	Male	10.9	5.5	699	64	100	7.5	3.2	0.74	1
4	62	Male	7.3	4.1	490	60	68	7	3.3	0.89	1
5	58	Male	1	0.4	182	14	20	6.8	3.4	1	1

Fig-1: Dataset for Liver patients

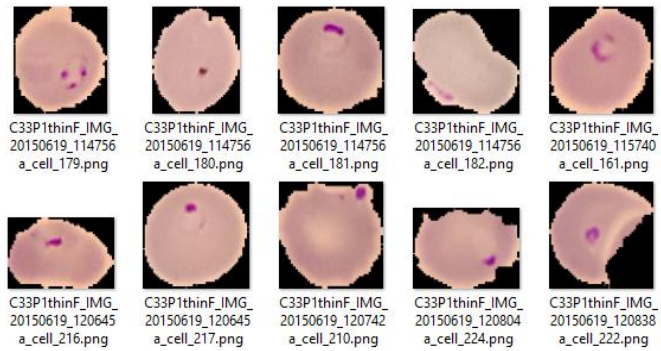

Fig-2: Dataset for Malaria patients

The doctor's dataset which is used for recommending their Practo profile is seen in Fig-3.

	A	B	C	D
1	Dr. Amarpreet Singh Riar	https://www.practo.com/delhi/doctor/amarpreet-sing		
2	Dr. (Maj.)Sharad Shrivastava	https://www.practo.com/delhi/doctor/dr-54-general-p		
3	Dr. Anirban Biswas	https://www.practo.com/delhi/doctor/anirban-biswas		
4	Dr. Aman Vij	https://www.practo.com/delhi/doctor/dr-aman-vij-ge		
5	Dr. Mansi Arya	https://www.practo.com/delhi/doctor/dr-mansi-arya-		

Fig-3: Dataset of Doctor's profile

3.2 Block Diagram

Fig-4 shows how the attributes will function using a diagrammatic representation.

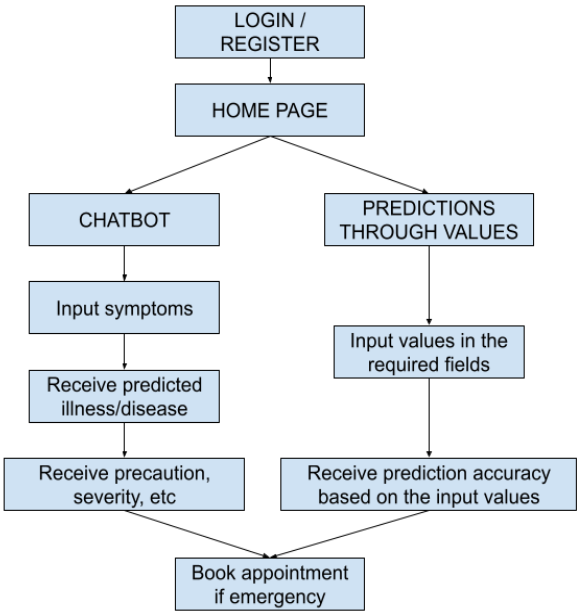

Fig-4: Block diagram

3.3 Machine Learning Techniques

Decision Trees:

A Decision Tree algorithm is a tree-structured classifier that can be implemented for Classification and Regression. It consists of root nodes and leaf nodes, where the root nodes define the features of the given dataset, and leaf nodes define the output. A decision tree algorithm was preferred for this work since it simulates the human-thinking capability to make a decision and is also easy to understand.

The prediction starts from the root node of the decision tree and compares the values or weights of the root attribute. According to the comparison, it continues down the branch and onto the next node. The algorithm continues the comparison of the attribute values with other sub-nodes and proceeds down the tree. This process goes on until the last

node, that is, the leaf node is reached. The algorithm can be summarized as:

- **Step-1:** Start the tree with the root node containing the entire dataset.
- **Step-2:** Determine which attribute will be the best fit in the dataset using the Attribute Selection Measure (ASM**).**
- **Step-3:** Create subsets for the root node that contain the best values for the attributes.
- **Step-4:** Create the decision tree node containing the best attribute.
- **Step-5:** Make new decision trees recursively using the subsets of the dataset created in step -3. Continually repeat this process until you reach the point where you cannot further classify the nodes, that is, when you reach the leaf node.

The simple representation of the Decision tree for Dengue is shown in Fig-5.

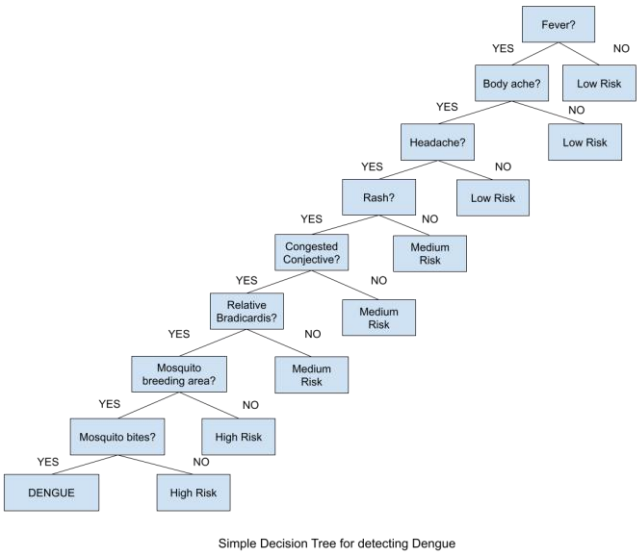

Fig-5: Block Diagram for Decision Tree

Logistic Regression:

The method of modeling the probability of a discrete result of a given input variable is known as logistic regression. The Binary Logistic regression models have a binary outcome, which might be true or false, yes or no, and so forth. Logistic regression is a handy analysis tool for determining if a new sample fits best into a category in classification tasks.

Natural Language Processing:

Natural language processing (NLP) is a field that focuses on making computer algorithms understand natural human language. Natural Language Toolkit (NLTK) is a Python package that can be used for NLP. The Natural language toolkit (NLTK) is a collection of Python packages built specifically for detecting and tagging components of speech in natural language text such as English.

Neural Networks:

A neural network is an artificial intelligence strategy for teaching computers to analyze data in a manner inspired by the human brain. It is a form of deep learning that employs interconnected nodes or neurons in a layered structure that bear a resemblance to our brain. It generates an adaptive system that computers can utilize to learn from their mistakes and continuously improve.

3. CONCLUSIONS

As new variants of the Covid-19 virus are emerging, dread is rising in people for the safety of their lives. Even though there are various norms and regulations implemented, the severity of the situation should not be neglected. Though proper precautions are maintained, people still have a fear of going to hospitals, risking their chances of getting infected. This work will help create a healthy and safe environment without going through the fear and risk of getting infected. People who are finding it difficult to afford the hospital bills can also be benefitted from this project.

Our model has been designed to work smoothly based on mentioned features such as functioning of the webpage, prediction through inputs, and implementation of chatbot. The accuracy reached for the chatbot model is about 95.52%. For future scope, we want to improve our chatbot facility by adding features such as translation so that people who aren't comfortable in English language can also use the chatbot with ease. We would also like to add a chtbot for mental health care.

REFERENCES

[1] M. Polignano, F. Narducci, A. Iovine, C. Musto, M. De Gemmis and G. Semeraro, 'HealthAssistantBot: A Personal Health Assistant for the Italian Language' in IEEE Access, vol. 8, pp. 107479-107497, 2020, doi: 10.1109/ACCESS.2020.3000815.

[2] M. Young, The Technical Writer's Handbook. Mill Valley, CA: University Science, 1989. X. Ren, G. Spina, S. De Vries, A. Bijkerk, B. Faber and A. Geraedts, 'Understanding Physician's Experience With Conversational Interfaces During Occupational Health Consultation' in IEEE Access, vol. 8, pp. 119158-119169, 2020, doi: 10.1109/ACCESS.2020.3005733.

[3] R. Oruche et al. 'Evidence-Based Recommender System for a COVID-19 Publication Analytics Service' in IEEE Access, vol. 9, pp. 79400-79415, 2021, doi: 10.1109/ACCESS.2021.3083583.

[4] Kavitha, B. R., and Chethana R. Murthy.'Chatbot for healthcare system using Artificial Intelligence' Int J Adv Res Ideas Innov Technol 5 (2019): 1304-1307.

[5] Linder, Courtney. The Effects of a Healthcare Chatbots; Language and Persona on User Trust, Satisfaction, and Chatbot Effectiveness. Diss. Clemson University, 2020.

[6] Divya, S., Indumathi, V., Ishwarya, S., Priyasankari, M. and Devi, S.K., 2018. A self-diagnosis medical chatbot using artificial intelligence. Journal of Web Development and Web Designing, 3(1), pp.1-7.