IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

Docbot: Your Personal Medical Chatbot

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***Abstract*— Such a chatbot would act as a sophisticated tool, providing direction and support to patients and medical staff, ultimately resulting in improved healthcare outcomes and the averting of preventable deaths.** **virtual assistants can help patients medical professionals and others with a number of tasks connected to medicine in order to assist people chatbots are computer programs that may interact with them via text messages apps or live chat the bot can recognize the symptoms and provide a diagnosis in line with that particular symptom additionally based on the diagnosis it could create a faster medical advice in addition to the other fields in which they have already been widely utilized to support speed up and improve operations we are now able to use chatbots in health service care today chatbots are used in every business to assist users according to their needs.**

Keywords*— *Intelligent chatbot, Virtual assistants, Diagnosis, health service.

I. INTRODUCTION

Today, chatbots are used in every business to assist users according to their needs. They may be found at banks, IRCTC under the nameDisha Chatbot, as well as several online travel agencies like Make My Trip. Their demand in the market is always rising day by day aswe move towards digitalization. The primary driver of the need for medical chatbots in the medical business is India's growing population and the scarcity of physicians to meet the needs of that population. Even sometimes, doctors may misjudge the source of a patient's symptoms, endangering the patient's life. For instance, Mohammed Benaziza, widely known as the "Giant Killer," was one of the top bodybuilders in the bodybuilding profession throughout the 1990s. His high potassium level, called hypokalemia, caused him to expire away. His body was experiencing cramps because of the excessive potassium level. The physicians couldn't figure out precisely what was going on, but they eventually concluded that Mohammed's lack of potassium was to blame for their bodily cramps.

Doctors then gave him another potassium injection, which caused the spasm to extend to his heart and eventually cause his death. Even physicians have made blunders in a great deal more instances. Therefore, a medical chatbot that can instruct doctors on what to do in such urgent cases is required to prevent such a situation from occurring.

Its usage is not just restricted to medical professionals; it can also be made use of by regular people in an emergency to advise them on the initial courses of action that the patient should follow. Additionally, if the person has a specific disease, the chatbot can determine what kind of disease they have by only receiving their responses to a few of its questions. Following that, a person can ask the chatbot for information if they want to know what safeguards and treatments they should take.

II. LITERATURE SURVEY

[1]E-Health refers to the practise of providing medical treatment assisted by electronic means of communication and processes.

Every individual today talks about e-health services but few have provided an in-depth description of this relatively fresh term. This term was rarely ever used before to 1999, but it has since become frequently utilized as a "buzzword" that refers to almost everything related to computers and medicine, including "Internet medicine". Instead of its typical academic roots, the term "e-health" was created by corporate executives and marketing specialists. Their goal was to bring e-business, e-solutions, and e-commerce's success and enthusiasm to the field of healthcare. They aimed to reveal the innovative prospects appearing in the healthcare sector by fusing the ideas, goals, and even the hoopla connected with the digital revolution. According to Intel, e-health is "a collaborative initiative spearheaded by visionaries from both the healthcare and high-tech domains, aimed at fully harnessing the transformative potential that arises from the convergence of the Internet and healthcare". It felt reasonable to establish a new phrase to describe these issues because the Internet confronted the old healthcare IT business with fresh possibilities and challenges.

[2] It demonstrates how new technology is reshaping healthcare.

Formerly new concepts, care models and biases, and innovative treatments have become common healthcare technology. Healthcare organizations are rapidly developing and implementing instant emerging technologies (ETs). Nurses, nurse informaticists, and nurse preceptors should understand how emerging technology could enhance clinical practice in the healthcare sector. To modernize older healthcare business practices as well as offer new goods, services, and frameworks that serve the Quadruple Helix, innovation and creators are crucial. Aim higher. Nurses can be title holders, early adopters, and enforcers of ETs and responsible innovation through various partnerships and invention centres in healthcare organizations, which helps improve safety.

[3] More and more individuals are relying on customized and nearby medicine, linked health devices, and health-tracking equipment.

Improved connectivity is facilitated through IoT technology, enabling patients and hospital employees to stay connected via remote monitoring and virtual visits. IoT medical equipment simplifies the treatment of chronic conditions and automates patient care workflows. It efficiently filters, analyzes, and disseminates data to ensure everyone is well-informed. Additionally, IoT technology reduces waste, mitigates errors, and optimizes pharmaceutical production processes, potentially leading to more cost-effective medication options.Whilst sensitive objects are beingtransported, it ensures quality control; By simplifying the entire process, it can even reduce the cost of healthcare.

[4] The use of online chatbots for medical services is becoming more prevalent among hospitals, nursing homes, and private centers on their websites. These chatbots engage in simulated conversations with fictitious cases and are programmed to automatically respond to user messages.

Chatbots allow for text or voice communication, and the responses they provide are powered by artificial intelligence. Typically, a chatbot will converse with a real person. Chatbots have uses in contact centres, customer service for online retailers, and online gaming. Chatbots are computer programmes that are created to automatically reply to messages that are delivered to them. In order to respond to messages, chatbots can be programmed to do so in a number of ways or consistently in the same way. using specific terminology and even modifying their responses dependent on the situation using machine learning. An emerging trend in the healthcare industry involves the growing utilization of online chatbots to provide human-like assistance on websites. These computer programs interact with potential patients visiting the site, aiding them in finding suitable specialists, scheduling appointments, and obtaining necessary treatments. However, despite the potential benefits, concerns persist regarding the application of artificial intelligence in a field where people's lives are potentially at stake.

[5] As hospitals, nursing homes, and private centres upgrade their websites, they are increasingly integrating online chatbots for human services. The use of chatbot technology as part of this innovative strategy enables these businesses to provide visitors with personalised and engaging experiences.

Hospitals, nursing homes, and private centers are increasingly adopting online chatbots on their websites to offer medical services. These chatbots simulate conversations with fictional cases and are programmed to automatically respond to user messages. Essentially, chatbots are computer programs designed to facilitate interactive communication.. They can be set up to reply regularly or else in reply to messages containing specific expressions as well as to use machine literacy to customise their replies in accordance with the environment. It begs the question of whether hiring human workers for the aforementioned task is appropriate. Hospitals are now able to give online healthcare help twenty-four hours a day because to this healthcare chatbot technology, which offers both detailed and general responses. Additionally, it helps with lead generation and immediately alerts sales to fresh leads. By asking the questions in order, it helps patients by directing them towards what they are especially looking for.

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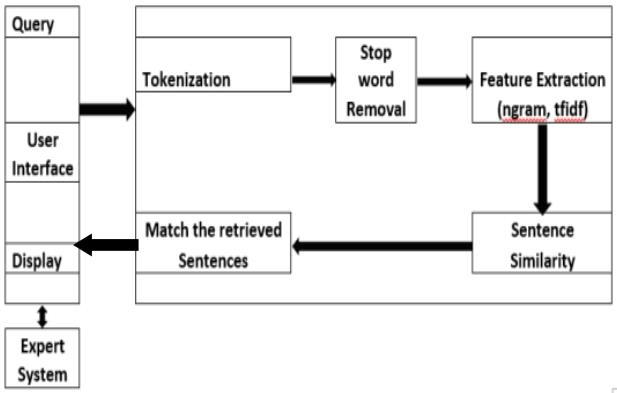
III. PROPOSED SYSTEM

Chatbots, a subset of virtual assistants, may have thoughtful exchanges with people. For the purpose of understanding natural language, these chatbots make use of artificial intelligence, notably machine learning. Giving readers important health information is the paper's major goal. Users frequently have to register in order to access a website and start a chat with a chatbot. The system utilises an expert system to construct a response when the database does not already have a pre-existing response to a query.

Domain experts must register by giving various pieces of information. Data from the chatbot is stored in the database as pattern templates.

IV. SYSTEM ARCHITECTURE



1. The user engages with the healthcare chatbot application by inputting their queries through the textual user interface.

2. Tokenization: Whenever the system encounters a specified character list, it breaks down the text into individual words. Punctuation is then deleted, and the words are taken from the sentences.

3. Stop words removal: The sentences are carefully processed to extract important keywords by eliminating stop words. This essential step involves filtering out commonly used words and those without specific meanings, such as "an," "a," or "the," which are not relevant for analysis or understanding**.**

4. N-gram TF-IDF-based Feature Extraction: Feature extraction is a crucial step in document processing, where attributes are ranked based on their relevance to the document. By employing N-gram TF-IDF, this process is optimized, improving both the speed and effectiveness of document analysis.

5. TF-IDF Weighting: The weight of each phrase in a sentence is determined using the metrics of term frequency (TF) and inverse document frequency (IDF).TF measures the frequencyof a term within a sentence, while IDF evaluates the rarity ofwords across the entire document collection. This combination helps determine the importance of terms in a sentence.

6. N-gram for Text Compression: In order to efficiently store data and extract relevant keywords from the database, the application employs N-gram analysis. This technique helps reduce the data space occupied by documents and facilitates the extraction of meaningful keywords, resulting in text compression and efficient storage.

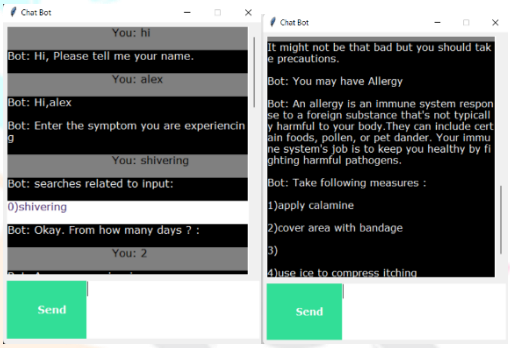
7. Sentence Similarity: By employing cosine similarity, the system assesses the likeness between two sentences based on the weights assigned to the query. The degree of similarity is directly proportional to these weights. The resulting similarity score, which ranges from 0 to 1, captures the level of resemblance. As term frequency does not possess negative values, the similarity score is confined within this range. This technique enables the evaluation of sentence similarity and aids in determining the relevance of the query.

8. Retrieval of Matched Sentences: The answers for the query, obtained through the aforementioned processes, are retrieved and displayed in the user interface, facilitating easy access to relevant information.

V. RESULTS

The user must provide their name in the application because it uses a question and response format. The chatbot then prompts users to submit their symptoms. The chatbot then asks questions pertaining to symptoms. The chatbot shows the disease name and any precautions that need to be taken based on the user's response and the database's availability of the answer or similar answers to the inquiry. Bigram and trigram are used by the application along with n-gram text compression to speed up query processing. Users receive the responses from the N-gram, TF-IDF, and cosine similarity.

DISEASE	SYMPTOMS			
Allergy	Continuous_sneezing	shivering	chills	Watering_from_eyes
Hypertension	Headache	Chest_pain	dizziness	Lack_of_concentration
Gastroenteritis	vomiting	Sunken_eyes	Dehydration	diarrhea
Acne	Skin_rash	Pus_filled_pimples	blackheads	Scurring



VI. Challenges/issues faced

We have faced so many challenges and issues while working on it. They are Data availability and quality: One of the biggest challenges is the availability and quality of data. It is a big task to collect perfect information and precautions for every disease. It is difficult to collect sufficient and representative data. Additionally, the quality of the data may be poor, with missing values, measurement errors, or inconsistencies. We need to fix every error to get perfect data. Feature selection and extraction: Another challenge is selecting the most relevant features or variables for predicting the exact disease in patients. This requires domain expertise and careful feature selection and extraction techniques that can capture the complex interactions between different features.

Model selection and optimization: Hybrid models involve multiple machine learning algorithms and techniques, and selecting the optimal combination of these methods can be challenging. Moreover, optimizing the hyperparameters of each model and ensuring that they are compatible with each other can be a complex task.

Generalizability: Ensuring that the hybrid model can generalize well to unseen data and different patient populations is another challenge. This requires carefully selecting the training and testing data, cross-validation, and regularizing the model to prevent false predictions.

Ethical considerations: Finally, there are ethical considerations related to the use of machine learning to predict exact diseases in patients. For example, ensuring that the predictions are accurate and do not lead to false positives or false negatives, and protecting patient privacy and confidentiality.

VII. DISCUSSION

The results were obtained using machine learning models like Naive Bayes, and KNN SVM on the various disease datasets. Performance on these datasets shows that our suggested special data-driven hybrid model performs better than conventional feature extraction methods. The main advantage of machine learning algorithms is their capacity for excellent generalization to the learning of accurate data representation. It should be noted that the datasets used in our research contain unusually high levels of false symptoms and invariance to elements that may contribute to false diseases, which may result in subpar performance from the suggested deep learning classifiers. However, using a combination of time-frequency and careful consideration of a mechanism that can more effectively detect a disease, our approach can obtain the current invariance. For instance, alter the symptoms.

The absence of datasets with reliable gold standard labels poses a notable challenge in leveraging machine learning techniques. In this study, a benchmark dataset with clinical annotations was utilized, although it still presents a complex array of symptoms. Notably, the preliminary experimental results showcased the superior performance of machine learning models compared to traditional classifiers, offering a compelling impetus for further exploration of machine learning in disease detection. To augment the precision of disease prediction, future work will center on innovative approaches such as ensemble classification of machine learning and deep learning classifiers. This study stands out for its pioneering focus on disease prediction, illuminating the underexplored potential of machine learning in this domain.

VIII. CONCLUSION

The potential of chatbots for the future is yet to be fully realized, but their increasing popularity and demand in various industries, including healthcare, make them a promising innovation that is here to stay. As different types of chatbots are being introduced, it is exciting to witness the technological advancements that surpass previous thresholds. To address the healthcare needs of our country's growing population, our team is developing a chatbot system that can provide medical assistance to patients when doctors are not available. Although such systems are already available in foreign countries, they are not widely implemented in our region. The scarcity of doctors to serve the rising patient demands is evident in the government hospitals in our city. Hence, the implementation of a medical chatbot can potentially enhance the well organized and performance of the medical industry, while also reducing the mortality rate.

IX. Acknowledgment

The authors express their gratitude to REVA University, School of Computer Science and Engineering, Bengaluru, for allowing them to conduct advanced research work on the university premises.

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