International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 10 Issue: 04 | Apr 2023 www.irjet.net p-ISSN: 2395-0072

VOICE RECOGNITION BASED MEDI ASSISTANT

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Abstract - *The "VOICE RECOGNITION BASED MEDI ASSISTANT" promises to improve healthcare through a paradigm for hands-free and eye-free interaction. However, little is known about the problems encountered during development of system especially for the elderly health-related work. To solve this let's look at maintenance delivery method and QoL improvement for the elderly. finally, identified key design challenges and opportunities can occur when integrating voice-based interactions virtual assistant (IVA) in the life of the elderly. our findings will help practitioners conducting research and research. development of intelligent devices utilizing his full-fledged IVA provide better care and support a better quality of life because of the aging population.*

Key Words: Interactive Virtual Assistant(IVA), Medi assistant, Chatbot,

1.INTRODUCTION

The aging of the population was seen as a global problem in the 21st century approach for improving healthcare and life routine management resulting in an improvement in quality of life QoL however obtaining and utilising such breakthrough technologies is frequently difficult for ageing folks who are frequently left behind while numerous systems such as Electronic Health Record (HER) and Patient Portals (PPS) have been widely used to improve health data management and patient provider communications it is difficult for ageing populations with multiple comorbidities to adopt learn and interact with such tools which can only be accessed through graphical user interfaces guis on desktops and mobile devices. the concept of this simple but efficient project emerged out of the need to overcome this fear of the driver and other road users if they are properly implemented overall this simple device could help reduce the 40-0 at some point in the future.

Intelligent Virtual Assistants (IVAs) based on voice allow users to naturally engage with digital systems while remaining hands-free and eye-free. As a result, they are the next game changer for future healthcare, particularly among the elderly. With the rising acceptance of IVAs, research have examined how older persons use existing IVA features in smart speakers to enhance their daily routines, as well as potential impediments preventing their adoption.

While these findings mostly focused on older adults' experiences with existing IVA features on a single type of smart-home device, practical demands, challenges, and design strategies for incorporating these devices into older persons' daily lives remain unexplored. Furthermore, while the quality of healthcare delivery and QoL enhancement are controlled by both care providers and patients, previous research solely focused on the patient experience, leaving a huge gap between provider expectations and quality of care delivery.

1.1 Objective Of Research

The goal of research for a voice and machine learning-based medical assistant is to create a reliable system that can help medical professionals diagnose and treat patients, give patients personalized health advice, automate administrative tasks, enhance medical transcription and documentation, and improve the patient experience overall.

2. LITERATURE REVIEW

[1] Angel-Echo: A Personalized Health Care Application. Mengxuan Ma, Karen Ai, and Jordan Hubbard are the authors :

Technology is continually breaking new ground in health care by providing new avenues for medical personnel to care for their patients. Health data can now be collected remotely without limiting patients' independence, thanks to the development of wearable sensors and upgraded types of wireless communication such as Bluetooth low energy (BLE) connectivity. Interactive speech interfaces, such as the Amazon Echo, make it simple for those with less technological skills to access a range of data by utilising voice requests, making communicating with technology easier. Wearable sensors, such as the Angel Sensor, in conjunction with voice interactive devices, such as the Amazon Echo, have enabled the creation of applications that allow for simple user involvement. We propose a smart application that monitors health status by integrating the Angel sensor's data collection capabilities and the Amazon Echo's voice interface capabilities. We also give Amazon Echo voice recognition test results for various populations.

[2] Implementation of interactive healthcare advisor model using chatbot and visualization. Tae-Ho Hwang, JuHui Lee, Se-Min Hyun, and KangYoon Lee are the authors:

Using the influx of various information has major affects on human lives in the fourth industrial revolution era. The application of artificial intelligence data in the medical industry, in particular, has the potential to influence and affect society. The components required for establishing the interactive healthcare advisor model (IHAM) and chatbot-based IHAM are described in this paper. The biological information of the target users used in the study, such as body temperature, oxygen saturation (SpO2), pulse, electrocardiogram (ECG), and so on, was measured and analysed using biological sensors based on the oneM2M platform, as well as an interactive chatbot to analyse everyday biophysical conditions. Furthermore, the accumulated biological information in the chatbot and biological sensors are sent to users via the chatbot, and the chatbot also provides medical advice to boost the user's overall health.

[3] Chatbot for Healthcare System Using Artificial Intelligence. Lekha Athota, Vinod Kumar Shukla, Nitin Pandey, and Ajay Rana are the authors:

Health care is critical to a happy life. However, it is quite difficult to get a doctor's consultation to every health-related condition. The idea is to use Artificial Intelligence to build a medical chatbot that can diagnose diseases and provide basic information about them before contacting a doctor. This will help to minimise healthcare expenditures while also improving access to medical knowledge via a medical chatbot. Chatbots are computer programmes that engage with users through natural language. The chatbot saves the data in the database in order to recognise the sentence keywords, make a query decision, and respond to the question. The n-gram, TFIDF, and cosine similarity are used to calculate ranking and sentence similarity. Each sentence from the given input sentence will be scored, and more similar sentences will be found for the query. The expert programme, a third party, tackles the question supplied to the bot that is not understood or is not in the database.

[4] IntelliDoctor – AI based Medical Assistant. Dr. Meera Gandhi, Vishal Kumar Singh, and Vivek Kumar are the authors:

IntelliDoctor is a personal medical assistant powered by Artificial Intelligence (AI). This interactive programme analyses symptoms to diagnose, anticipate medical disorders, and offers remedies and ideas depending on the user's inputs in an effort to deliver smart healthcare and make it more accessible. Furthermore, the software tracks users' health activities such as step counts, sleep tracking, heart rate sensing, and other information, and provides users' periodic health reports. It takes into account numerous exercise activities tracked as well as other criteria such as their age, gender, location, previous medical data, and calorie intake to provide a more accurate analysis.accurate analysis. It provides accurate comprehensive diagnosis and also functions as a pre-screening instrument for doctors.

[5] verview of the Speech Recognition Technology. Jianliang Meng, Junwei Zhang, and Haoquan Zhao are the authors:

Speech recognition is a cross-disciplinary field that uses the voice as the research object. Speech recognition enables the machine to convert a speech signal into text or commands via an identification and understanding process, as well as to perform natural voice communication.

2. PROPOSED WORK

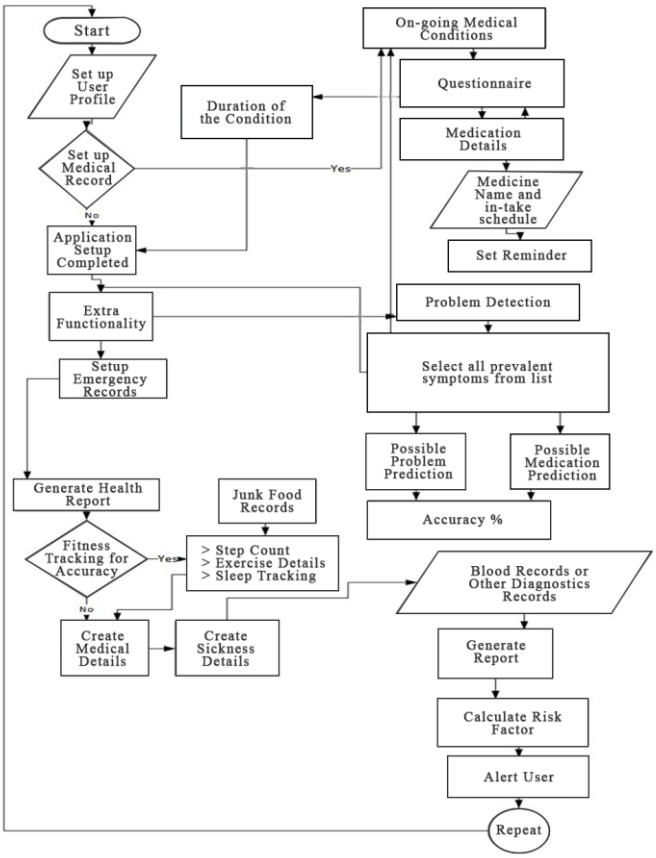

Fig -1: System Flowchart

Conversational virtual assistants, or voice assistants, automate user interactions. Artificial intelligence is used to fuel chatbots, which uses machine learning to comprehend natural language. The paper's primary goal is to assist readers with basic health information. When a person initially accesses the website, they must register before they can ask the bot questions. If the answer is not found in the database, the system uses an expert system to respond to the requests. Domain experts are also required to register by

providing certain details. The chatbot's data is saved in the database as pattern-template data. The database queries in this case are handled by a NoSQL database.

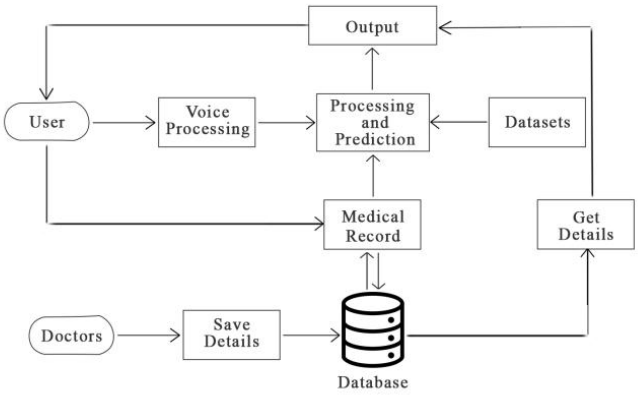

Fig -2: System Architecture

Fig- 2 Shows System architecture. The inquiry is entered by the client into the UI as speech. The user interface receives the user's inquiry and then delivers it to the chatbot programme. The pre-processing stages for literary experiences in the chatbot application include tokenization, in which the words are tokenized, the stop words are then eliminated, and feature extraction is based on N-gram, TF-IDF, and cosine likeness. The knowledge database stores the answers to questions so that they can be recovered and retrieved.

Tokenization: The word-by-word separation of sentences or words for easier processing. Every time it encounters one of the rundowns of the selected character, it divides text into words. Sentences are broken up into individual words, and all punctuation is removed. This suggests what comes next.

Stop words removal:Stop words are eliminated from sentences in order to extract significant keywords. It is mostly used to eliminate extraneous elements from sentences, such as words that occur far too frequently. Additionally, it is utilised to remove terms like an, a, and the that are unnecessary or have ambiguous meanings. This action is taken to lessen computational complexity or processing time.

N-gram TFIDF-based feature extraction: The method of feature extraction, which ranks the qualities in accordance with the document, is one of characteristic diminution. This phase improves the document's efficiency and suitability. It is employed to extract the list of keywords and their frequency within the text.

TF-IDF: The weight of each phrase in the sentence is determined using phrase Frequency and Inverse Document Frequency. To determine how frequently a word or phrase appears in a sentence, use the term frequency.

N-gram: The goal of N-gram is to expand N-gram models through the use of variable length arrangements. A grouping of words, a word class, a grammatical feature, or any other succession of items that the modeller believes to have important language structure data might be considered a sequence. N-grams are employed in this system to extract the pertinent keywords from the database, compress the text, or decrease the amount of data in the document.

Sentence similarity: To determine how similar two sentences are, cosine similarity is utilised. The number of query weights directly relates to how similar the query and the document are. Since the word frequency cannot be negative, the similarity calculation result for the two papers falls between 0 and 1.

Find the matching phrase: The user interface retrieves and displays the answers to the query that were discovered through the aforementioned process.

Results and Analysis: The application uses a question-and-answer protocol, and it consists of a login page where users must provide their information to register for the application if they are new users, a page that displays similar answers to the user's query if one is already in the database, and a page where experts respond to questions directly from users. To speed up query execution, the application leverages bigram and trigram in addition to n-gram text compression. To communicate the responses to the users, N-gram, TF-IDF, and cosine similarity were used.

Web technology in use: React is a UI development library based on JavaScript. It is controlled by Facebook and an open-source development community. React is a popular library in web development even though it isn't a language. The library made its debut in May 2013 and is currently one of the frontend libraries for web development that is most frequently used. The application will use Express.js for server side development together with MongoDB as its primary database.

3. RESULTS

Systems that engage with patients, respond to their questions about medicine, and offer them medical advice are known as voice recognition-based medical assistants. These technologies are intended to be more effective than more conventional forms of communication, such phone calls or emails, and they can give patients advice that is more individualised and precise. Utilising machine learning algorithms to analyse medical data and find patterns that can be used to forecast a patient's likelihood of contracting a specific disease is known as machine learning-based disease prediction. Large datasets of medical records, genetic information, and other pertinent data can be used to train these algorithms to increase their accuracy and dependability.

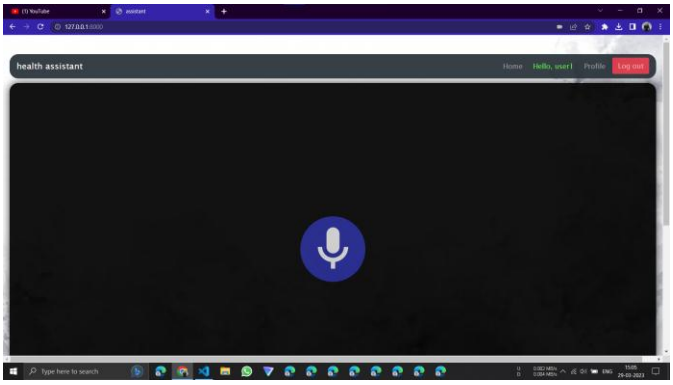

Fig -3: Voice Chatbot

Fig -3 shows Voice chatbot which is created with javascript, html and CSS as templetes and runs on the Django server. The chatbot uses web speech recognition API to provide chatbot functionality.

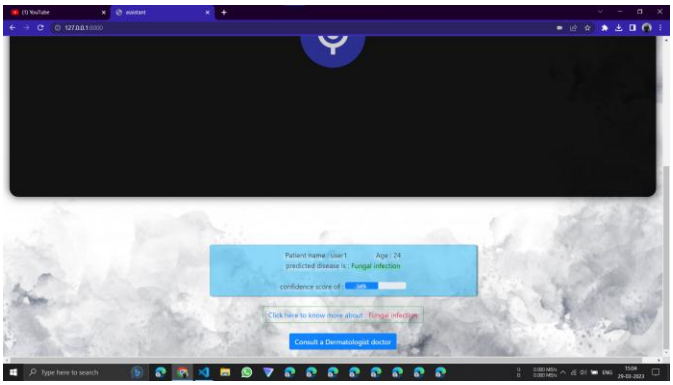

Fig -4: Results After Diagnosing the Symptoms from User

Fig-4 shows that the chatbot will accept user input and deliver it to the backend ML algorithm, which will forecast the results. When the results are computed, the chatbot will pronounce the output and display the results along with the required data.

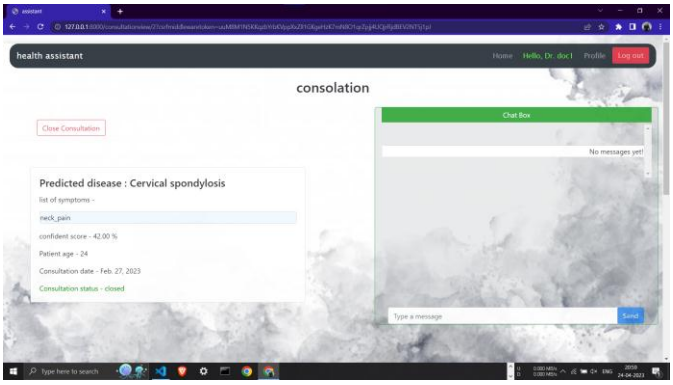

Fig -5 Menu for Doctor-Patient Consultations

Fig -5 shows the doctor and patient being able to talk about the disease, and the doctor having complete information about the disease projected.

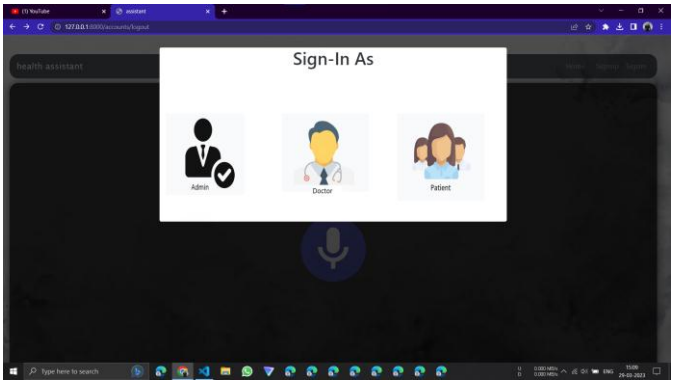

Fig -6 Doctor, User and Admin Login Menus

Fig -6 shows, a user, administrator, or doctor can connect into the system using this menu, where he or she will be able to re-login automatically during the following visit. From the perspective of the logged in user, the API requests will be secure.

5. ADVANTAGES

There are several advantages to using physician assistants based on speech recognition and disease prediction using machine learning in health care. Some of these advantages include:

Improved accuracy and speed of diagnoses: Machine learning algorithms are able to analyze large amounts of medical data to identify trends and predict disease risk, leading to earlier accuracy in dignoses.

Enhanced patient experience: Voice-activated medical assistants provide patients with instant access to medical advice and information, enabling them to manage their health more effectively.

Increased efficiency: Routine chores can be automated using voice recognition-based medical assistants, saving medical practitioners time and allowing them to focus on more sophisticated patient care.

Personalized medicine: Individual patient data can be analysed by machine learning algorithms to produce personalised treatment plans based on characteristics such as heredity and lifestyle, resulting in more successful therapies.

Reduced healthcare costs: Voice recognition-based medical assistants and disease prediction using machine learning can help cut healthcare expenses by enabling earlier disease detection and more effective treatments.

Improved healthcare outcomes:Voice recognition-based medical assistants and illness prediction using machine learning can enhance overall healthcare outcomes by offering patients with more efficient, accurate, and personalised medical treatment.

Improved healthcare outcomes:Voice recognition-based medical assistants and illness prediction based on machine learning can enhance overall healthcare outcomes by offering patients with more efficient, accurate, and personalised medical treatment.

Overall, voice recognition-based medical assistants and illness prediction based on machine learning have the potential to transform healthcare by offering more efficient, accurate, and personalised medical treatment while lowering healthcare costs and increasing patient outcomes.

6 DISADVANTAGES

Along with the benefits, there are some possible drawbacks to employing voice recognition-based medical assistants and machine learning to forecast disease in healthcare. Here are some of the major drawbacks:

Privacy and security concerns: Patient data collection and storage may pose privacy and security concerns, especially if the data is not properly secured or comes into the wrong hands.

Algorithmic bias: ML algorithms can be biased if the training data is biased, potentially leading to inaccurate predictions or diagnoses and perpetuating healthcare disparities.

Limited access: Some patients may not have access to the technology required to employ voice recognition-based medical assistants, thus leaving them behind.

Technical difficulties: Technical issues, such as voice recognition mistakes or software faults, could result in inaccurate diagnosis or recommendations.

Legal and ethical issues: The employment of voice recognition-based medical assistants and machine learning-based disease prediction poses legal and ethical concerns, such as accountability and obligation in the event of an inaccurate diagnosis or advise.

Dependency on technology: The increased reliance on technology may result in less human interaction and empathy, thus compromising patient satisfaction and trust.

Overall, while voice recognition-based medical assistants and illness prediction using machine learning have the potential to transform healthcare, it is critical to address these possible drawbacks to ensure that they are utilised responsibly and ethically.

7. CONCLUSIONS

Finally, by giving patients more effective, individualised, and precise medical advice and diagnoses, voice recognition-based medical assistants and disease prediction using machine learning have the potential to revolutionise healthcare. These technologies do, however, also give rise to privacy and data security issues, as well as the risk of algorithmic discrimination and bias. Strong privacy and security protocols, unbiased and trustworthy disease prediction algorithms, and the incorporation of ethical considerations into the development and use of these systems are all necessary for addressing these concerns in order to ensure the success of these technologies.

Overall, the integration of these technologies offers hope for the future of healthcare, but it is crucial to approach their development and deployment with care and prudence to guarantee that they are successful.

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