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MEDICAL CHATBOT USING NATURAL LANGUAGE PROCESSING

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Abstract-Medical chatbots using AI and ML are emerging as a promising solution for improving healthcare delivery. These chatbots use natural language processing (NLP) algorithms to understand and respond to patients' queries in real-time. The chatbots can also provide personalized health advice, recommend suitable treatments, and even make appointments with doctors.

AI and ML-based chatbots can analyze vast amounts of medical data, including patients' medical history, symptoms, and treatment outcomes, to provide more accurate diagnoses and treatment options. The chatbots can also detect potential health risks and alert patients to take preventive measures.

One of the key benefits of medical chatbots is their ability to provide 24/7 access to healthcare advice and support. This can be especially valuable for people living in remote areas or those with mobility issues. Chatbots can also reduce the burden on healthcare professionals by providing triage and basic care information to patients.

Overall, medical chatbots using AI and ML have the potential to transform the healthcare industry by improving patient outcomes, reducing costs, and increasing access to care. However, it is important to ensure that these chatbots are developed with a focus on patient privacy, security, and ethical considerations.

Keywords: Natural Language Processing, Artificial Intelligence ,Machine Learning Flutter, Python, Google Firebase, Cloud formation.

I INTRODUCTION

In recent years, the healthcare industry has witnessed a rapid rise in the use of artificial intelligence (AI) and machine learning (ML) technologies to improve patient care and clinical outcomes. One of the most promising applications of AI and ML in healthcare is the development of medical chatbots.

Medical chatbots are software applications that use natural language processing (NLP) algorithms to simulate human conversation and interact with patients in real-time. These chatbots can help patients get quick and accurate answers to their healthcare queries, provide personalized health advice, recommend treatments, and even make appointments with doctors.

AI and ML-based chatbots can analyze large amounts of medical data, including patients' medical history, symptoms, and treatment outcomes, to provide more accurate diagnoses and treatment options. They can also detect potential health risks and alert patients to take preventive measures.

The use of medical chatbots is particularly beneficial for people living in remote areas or those with mobility issues who may find it difficult to access traditional healthcare services. Additionally, chatbots can help reduce the burden on healthcare professionals by providing triage and basic care information to patients.
However, the development of medical chatbots using AI and ML also raises important ethical, privacy, and security considerations. As such, it is essential to ensure that these chatbots are developed in a way that prioritizes patient safety, security, and privacy.

Overall, medical chatbots using AI and ML have the potential to revolutionize the healthcare industry by improving patient outcomes, increasing access to care, and reducing healthcare costs.

II LITERATURE REVIEW

Many medical Chatbot designs have been proposed in the past few years which aim to provide the user with medicine recommendation after extracting the illness information from the user messages. A similar paper "Pharma Bot: A Pediatric Generic Medicine Consultant Chatbot" proposed by Benilda Eleonor V. Comendador, Bien Michael B. Francisco, Jefferson S. Medenilla, Sharleen Mae T. Nacion, and Timothy Bryle E. Serac provides a design for a | P a g e standalone medical Chatbot that is implemented using MS Access and Visual C# [2]. For using the proposed design, the user has to navigate using the four options provided by the application. This design aims to work by converting the user input to SQL queries and execute it on MS Access to retrieve the solution to the illness [2]. Also, a research paper "Med Chatbot: An UMLS based Chatbot for Medical Students" proposed by Hameedullah Kazi, B.S. Chowdhry and Zeesha Memon focuses on a design for an AIML based Medical Chatbot. This Chatbot design is implemented using a JAVA based AIML interpreter called Chatter bean [3]. To use the proposed design, the user has to type a message that should contain the illness name and it detects the illness names using AIML patterns. Once the illness is detected, the Chatbot provides the user about the necessary information about the problem [3]. However, the previous proposed designs in the past did not focus in understanding the intensity of the illness that the user is suffering through. Our proposed design aims to ask more questions to the user until it gets confident about the probable illness that the user is suffering through. Also, our Chatbot design has the concept of threshold level that helps it to detect the intensity of the problem and connects the user directly to the doctor if it feels that the problem is too serious .

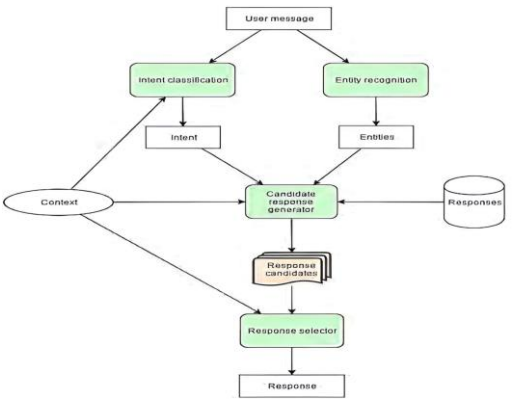
cloud technology to provide a highly available and scalable service. The use of CloudFormation code in the project demonstrates the importance of infrastructure management and automation in chatbot development and highlights the potential of cloud technology to transform the field of conversational AI.

III METHODOLOGIES

The method utilized to create this Chat Bot system is summarized as follows:

BOW (Bag of Words) is a technique of text modelling in NLP, it works on numbers. BOW is used to preprocess the text by converting it into a Bag of Words, which keeps a count of total occurrences of the most frequently used words. Pre-processing of the data is required to removenoise and irrelevant data from the dataset.

The system focuses on the messages that the user provides while initiating the conversation. The idea behind this is to detect the preliminary symptoms and the problems that the user may be experiencing. After the Chatbot has collected enough keywords from the initial messages, it now starts leading the conversation by asking questions to the user and trying to shortlist few diseases that the user may be suffering through. After the Chatbot has shortlisted the possible diseases that the user may have, now it gives a rank to the possible diseases that the user may be suffering .
Speech recognition, also called speech-to-text, is the task of reliably converting voice data into text data. Speech recognition is required for any application that follows voice commands or answers spoken questions. What makes speech recognition especially challenging is the way people talk—quickly, slurring words together, with varying emphasis and intonation, in different accents, and often using incorrect grammarFinally, we can deploy the chatbot on a webserver and test it with sample user queries toevaluate its performance. Overall, using these techniques can result in anintelligent and efficient chatbot that can understand and respond to user queries effectively.



Figure[2]: Dialog flow sample data flow diagram

IV ARCHITECTURE DIAGRAM

The architecture design of the proposed Chabot is given bellows:

System Architecture When a patient provides a text or sentence by providing their patient id. The Tokenizers splits the patient's text into lines of sentences or words that match the dictionary. After, it analyses the patient's sentence and checks in the JSON file or dictionary for the related sentence and shows the related text or sentence to the patient. I will refer to the components in the above diagram, as we go through the flow. First, let's see what all things do we need to determine an appropriate response at any given moment of the conversational flow?

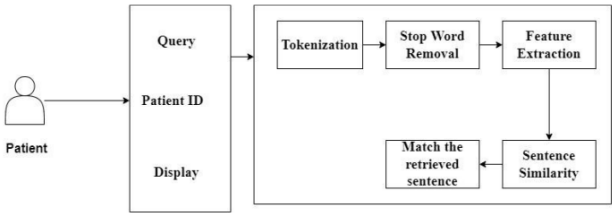


Figure [3]: Architecture design of chatbot

V TECHNOLOGY USED

To build a Cloud mind, Chabot provides infrastructure code templates for Cloud Formation, several technologies are used, including Flask, NLTK, Keras, Python, and AWS services. Here is an overview of the technologies and steps involved in building the Chabot:

1. Natural Language Processing (NLP) is the study of letting computers understand. Without NLP, human language sentences are just a series of meaningless symbols to computers. Computers don't recognize the words and don't understand the grammar. NLP can be regarded as a "translator", who will translate human languages to computer understandable information.
2. speech-to-text, is the task of reliably converting voice data into text data. Speech recognition is required for any application that follows voice commands or answers spoken questions. What makes speech recognition especially challenging is the way people talk—quickly, slurring words together, with varying emphasis and intonation, in different accents, and often using incorrect grammar.
3. grammatical tagging, is the process of determining the part of speech of a particular word or piece of text based on its use and context. Part of the speech identifies 'make' as a verb in 'I can make a paper plane,' and as a noun in 'What make of car do you own?' Define Cloud Formation templates: Cloud Formation templates are defined in YAML or JSON format and stored in a central location such as an S3 bucket.
4. multiple meanings through a process of semantic analysis that determine the word that makes the most sense in the given context. For example, word sense disambiguation helps distinguish the meaning of the verb 'make' in 'make the grade' (achieve) vs. 'make a bet' (place). Test the chatbot: Once development is complete, it can betested to ensure it functions as expected.

VI RESULT

Overall, the chatbot based on cloud technologyand using NLP can have a significant impact on businessesand organizations, improving customer experience, increasing productivity, scalability and cost-effectiveness, personalization, and 24/7 availability

The bot will be able to answer accurately and somehow it can also replace humans in live support that will save a lot of infrastructure and resource cost. User analytics can havea way to track where the bot did not help and analyze over time

• Co-reference resolution is the task of identifying if and when two words refer to the same entity. The most common example is determining the person or object to which a certain pronoun refers (e.g., 'she' = 'Mary'), but it can also involve identifying a metaphor or an idiom in the text (e.g., an instance in which 'bear' isn't an animal but a large hairy person).

Natural language generation is sometimes described as the opposite of speech recognition or speech-totext; it's the task of putting structured information into human language.

VII CONCLUSION

Our Medical Chatbot will have a great impact on the life of its users. It would provide them the advantage of carrying a virtual Doctor in their pockets. It would also give them the freedom to consult a doctor 24/7 and can get a real doctor's advice if needed. This can be a most popular tool for people with busy schedule as they won't have to hamper their schedule to consult a doctor for minor health queries. This would also be a tool with high utility among elderly and physically disabled people as this can help them get solutions to all their health-related issue at their fingertips. We would bring Doctors and Medical Professionals to our platform to feed the medical data into our records and also to chat with our users when required. Having lots of medical data would make our Chatbot function more efficiently and accurately. Our Chatbot is in a design phase right now. We would be implementing the whole design into code very soon and we plan to launch it in the next few months. We are implementing the Chatbot engine in Python and using Spyder as the AIML platform. We also plan to design and make a device that people could wear and let it collect their important body readings and health data. We would make the device using raspberry pi and would make it compatible with our Chatbot and many other services as well using APIs. The idea behind comparing our Chatbot with Health Tap was not to show that our Chatbot was better than Health Tap in anyways, but to show that it was different from any Medical Chatbot present till date. While voice interface may be optional, chatbots have been in the enterprise long enough for developers and experts to begin identifying what elements of chatbots are mainstay requirements.

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