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Artificial Intelligence HealthCare Chabot System

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Abstract:

Through chat bots one can communicate with text or voice interface and get reply through artificial intelligence. Typically, a chat bot will communicate with a real person. Chat bots are used in applications such as ecommerce customer service, call centers and Internet gaming. Chatbots are programs built to automatically engage with received messages. Chatbots can be programmed to respond the same way each time, to respond differently to messages containing certain keywords and even to use machine learning to adapt their responses to fit the situation. A developing number of hospitals, nursing homes, and even private centers, presently utilize online Chatbots for human services on their sites. These bots connect with potential patients visiting the site, helping them discover specialists, booking their appointments, and getting them access to the correct treatment. In any case, the utilization of artificial intelligence in an industry where individuals' lives could be in question, still starts misgivings in individuals. It brings up issues about whether the task mentioned above ought to be assigned to human staff. This healthcare chatbot system will help hospitals to provide healthcare support online 24 x 7, it answers deep as well as general questions. It also helps to generate leads and automatically delivers the information of leads to sales. By asking the questions in series it helps patients by guiding what exactly he/she is looking for.

Keywords: Artificial Intelligence, Prediction, Pattern matching, Disease, Query processing

Introduction:

Artificial Intelligence, also referred to as Machine Intelligence, is an intricate innovation smoothly gearing up to revolutionize our lives forever. The stimulation of human intelligence using contemporary computers that imitates cognitive functions is changing the ways of problem-solving. And with cutting-edge disciplines such as AI and Chat bots, researchers are leading the way to a great transformation. Apart from all other ways of demonstrating an impact, the role of AI in health. To lead a good life healthcare is very much important. But it is very difficult to obtain the consultation with the doctor in case of any health issues. The proposed idea 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 .To reduce the healthcare costs and improve accessibility to medical knowledge the medical chatbot is built. Certain chat bots acts as a medical reference books, which helps the patient know more about their disease and helps to improve their health. The user can achieve the real benefit of a chatbot only when it can diagnose all kind of disease and provide necessary information. A text-to-text diagnosis bot engages patients in conversation about their medical issues and provides a personalized diagnosis based on their symptoms. Hence, people will have an idea about their health and have the right protection. are industry is particularly ground-breaking.

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CHATBOTS:

Are automated systems which replicate user's behavior on one side of the chatting communication. They are mimic systems which imitate the conversations between two individuals. They provide a simulating platform for effective and smart communications with the user on the other end. They copy marketers, sales person, counsellors and other mediators and work to provide services that the above-mentioned people provide. There are wide ranges of chat bots catering in many domains some of them are as follows: business, market, stock, customer care, healthcare, counseling, recommendation systems, support system, entertainment, brokering, journalism, online food and accessory shopping, travel chat bots, banking chat bots, recipe guides, etc.The most famous chat bots like Alexa or Google assistant are the best examples that can be given for smart communicating chat bots. These are general purpose chat bots that provide services for all domains and are not restricted to a specific domain. There are also domain-specific chat bots which provide functionalities to the above-mentioned domains. Artificial Intelligence:Is based on how any device perceives its Environment and takes actions based on the perceived data to achieve the result successfully. It is the study of intelligent agents. The term "artificial intelligence" is applied when a machine mimics "cognitive" functions that humans associate with other human minds, such as "learning" and "problem solving. Artificial Intelligence gives the supreme power to mimic the human way of thinking and behaving to a computer. A Chabot (also known as a talkbot, chatterbox, Bot, IMbot, interactive agent, or ArtificialConversationalEntity) is a computer program which conducts a conversation via auditory or textual methods. These programs are designed to provide a clone of how a human will chat and thereby it acts as a conversational partner rather than humans. For various practical purposes like customer service or information acquisition, chatbot is being used in the dialog system. Mostly chatbots uses natural language processing for interpreting the user input and generating the corresponding response but certain simpler systems searches for the keyword within the text and then provides a reply based on the matching keywords or certain pattern. Today, chatbots are part of virtual assistants such as Google Assistant, and are accessed via many organizations' apps, websites, and on instant messaging platforms. Non-assistant applications include chatbots used for entertainment purposes, for research, and social bots which promote a particular product, candidate, or issue. Chatbot's are such kind of computer programs that interact with users using natural languages. For all kind of chatbots the flow is same, though each chatbot is specific in its own area knowledge that is one input from human is matched against the knowledge base of chatbot. Chatbot's work basically on Artificial intelligence In recent times, the discussion has moved to a point where AI doctors replacing General Physicians in the future is not startling any more. Even though the switch may not happen in the near future, AI in healthcare industry is definitely going to be assisting General Physicians to make an evolved diagnosis. There will soon be a time when the dependency on the human mind in the healthcare industry will decline from its current percentage. So, it is about time, we recognize and appreciate the benefits of AI Chatbots to the healthcare industry.The super-responsive AI enabled Chatbots are presenting us with an option of a computerized medical professional with human-like conversational skills. It is not just revolutionary; it is a paradigm shift.In the process of understanding the employment of this technology and its implications, we are sketching below a comprehensive study on how AI Chatbots are revolutionizing healthcare. Artificial Intelligence is based on how any device perceives its Environment and takes actions based on the perceived data to achieve the result successfully. It is the study of intelligent agents. The term "artificial intelligence" is applied when a machine mimics "cognitive" functions that humans associate with other human minds, such as "learning" and "problem solving. Artificial Intelligence gives the supreme power to mimic the human way of thinking and behaving to a computer.A chatbot (also known as a talkbot, chatterbot, Bot, IMbot, interactive agent, or ArtificialConversationalEntity) is a computer program which conducts a conversation via auditory or textual methods. These programs are designed to provide a clone of how a human will chat and thereby it acts as a conversational partner rather than humans. For various practical purposes like customer service or information acquisition, chatbot is being used in the dialog system. 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issue.Chatbot's are such kind of computer programs that interact with users using natural languages. For all kind of chatbots the flow is same, though each chatbot is specific in its own area knowledge that is one input from human is matched against the knowledge base of chatbot. Chatbot's work basically on Artificial intelligence A chatbot is a type of web-robotic application powered by AI that helps in running automated commands on the internet. As the name suggests, these internet bots are primarily used as communication tools and facilitate automated conversation by way of audio or textual messaging. Instead of depending on conversing with an individual,provide assistance in communicating between two sides with automated scripts. With low doctor-patient ratios all around the world, particularly in under-developed and developing nations, Chatbots are pitched to play a major role in basic healthcare.

Hardware Requirement:

i3 Processor Based Computer or higher

Memory: 1 G

Hard Drive: 50 GB

Monitor

Internet Connection

Software Requirement:

Windows 7 or higher

WAMP Server

Notepad++

My SQL 5.6

Advantages

Save time and money

Generate new lead

Guide users

It provides support 24 x 7

Limitation

It requires active internet connection.

Not all business can use chatbot.

LITERATURE SURVEY

Simon Hoermann discusses the current evidence for the feasibility and effectiveness of online one-on-one mental health interventions that use text-based synchronous chat. Synchronous written conversations (or "chats") are becoming increasingly popular as Web-based mental health interventions.This review is based on an evaluation of individual synchronous Web-based chat technologies. Through the current evidence of the application of this technology, the tentative support for mode of intervention is seen. Interventions utilizing text-based synchronous communication showed better outcomes compared with Waitlist conditions and overall equivalent outcomes compared with Treatment As usual, and were at least as good as the comparison interventions. However, the issue of whether these technologies are cost effective in clinical practice remains a consideration for future research studies. Saurav Kumar Mishra says that the Chatbot will act as a virtual doctor and makes possible for the patient to interact with virtual doctor. Natural language processing and pattern matching algorithm for the development of this Chabot. It is developed using the python Language. Based on the survey given it is found that the no of correct answer given by the Chabot is 80% and incorrect/ambiguous answer given is 20%.From this survey. Proposed an idea in which the AI can predict the diseases based on the symptoms and give the list of available treatments If a person's body is analyzed periodically, it is possible to predict any possible problem even before they start to cause any damage to the body. Some Challenges are research and implementation costs, and government regulations for the successful implementation of personalized medicine, they are not mentioned in the paper. Hameedullah Kazi, describes the development of a Chabot for medical students, that is based on the open source AIML based Chatterbean.The AIML based Chabot is customized to convert natural language queries into relevant SQL queries. A total of 97 question samples were collected and then those questions were divided into categories depending on the type of question. According to the number of questions in each category the resultant categories were ranked. Questions were based on quires, where 47% are of posed questions. Other categories have less than 7%. The system has not been specially designed for the task of supporting natural dialog in chat bots or, providing responses to student queries.Here the studies are based on to recognizes emotions classification using AI methods. The studies train emotions classification models from a lot of labelled data based on RNN, deep learning, convolutional

neural network. Linguistic interaction is most important in counselling using NLP and NLG to understand dialogues of users. Here the multi-modal approach is used of emotion-recognition. They have collected corpuses to learn semantic information of words and represent as vector using the word vector, synonym knowledge of lexical are collected. In this paper a voice recognition chat-bot is developed, if the questions are not understood asked to the bot is further processed using the third party expert-system. The web-bots are created as text-based web-friends, an entertainer for the user. Here they focused on the improved system if the system is not only text-based but also voice-based trained. Here the voice recognition requires a 2 part process of capturing and analysis of an input signal. Server response recognition data retrieval and information output. The server used here is SOAP based on black box approach. The use of expert system allows unlimited and autonomous intelligence improvements. This chatbot aims to make a conversation between human and machine. Here the system stores the knowledge database to identify the sentence and making a decision to answer the question. The input sentence will get the similarity score of input sentences using bigram. The chatbot knowledge is stored in RDBMS.

Application

This system can be used by the multiple peoples to get the counselling sessions online recent study identified that on an average, a patient spends 60 minutes in reaching to the right doctor after reaching a hospital. And it takes almost 30 minutes in finding out the right hospital or clinic. This is in regards to the treatment of basic healthcare. A well-developed and advanced Chatbot system available to the patient can answer any initial concerns and drastically reduce the treatment time. Clinicians and health services are facing unprecedented pressure because of changing demographics, administrative requirements, workforce shortages and increasing morbidity as well as changes in information technology demand and expectations.1,2 In recent years, there has been major progress in artificial intelligence (AI) and its application in healthcare. In the coming years, these techniques are predicted to take over some of the activities currently being delivered by clinicians and healthcare administrators. However, there has also been an exceptional amount of inflation about the abilities of AI and even sometimes claims that AI will replace human clinicians altogether.

Techniques:

Make the system more communicative in the natural language, proves fruitful for counselling, and can also be modeled for prediction of diseases. By any measure, Artificial Intelligence – the use of intelligent machines to work and react like humans is already part of our daily lives. Facial recognition at passport control and voice recognition on virtual assistants such as Alexa and Siri are already with us. Driverless cars or 'companion' robots that 'care' for the elderly are undergoing trials and most commentators say will be commonplace soon. As with automation after the industrial revolution, it is hard to think of any area of our lives that will not be affected by this nascent data driven technology. Artificial Intelligence is already with us in healthcare too. Google's Deep Mind has taught machines to read retinal scans with at least as much accuracy as an experienced junior doctor. Babylon, the health app start-up, claims its chatbot has the capacity to pass GP exams although this is contested by the Royal College of General Practitioners.And just as some say AI is going to provide instant relief to many of the pressures healthcare systems across the world are facing, others claim AI is little more than snake oil and can never replace human delivered care. It already has a role, but how far can that extend? It is difficult to imagine how the judgments around patient behaviors, reactions and responses and the subtleties of physical examination, particularly observation and can be anything other than human. It will be for our politicians and ultimately the public to decide how far and in what ways AI impacts patient care across the UK.

What is AI.

While AI is one of the newest fields of engineering,the topic has been extensively researched formally since the 1950s.8 John McCarthy, one of the founding fathers of AI, defined it as 'the science and engineering of making intelligent machines Alan Turing stated for a machine to be termed intelligent it would have to demonstrate behavior indistinguishable from that of a human.10 With the advances in AI and its ability to emulate features of human intelligence such as reasoning and decision making, vision and language, knowledge representation, complex task processing and communication, some have suggested that AI is getting closer to passing the Turing test11 and even that AI will be the principal contributor to the fourth industrial revolution.12 In the past, there have been periods where the potential of AI was unable to be

realized because of limitations in data, computing prowess and funding. However, the current period where there is access to enhanced computational power and volume of data coupled with increasing funding presents a more optimistic picture for the application of AI. The potential roles of AI techniques in healthcare delivery and medical research are becoming increasingly Moreover, being mostly a service industry, healthcare business largely depends on customer satisfaction and the quality of services provided. Let's understand how AI in health industry can help businesses improve customer service:Customer Service/Administration of Patient Engagement: Facilitating continuous interaction with patients, Chat bots can drastically increase patient satisfaction and eventually retention. Patients are provided with a tool for constant engagement resolving concerns and building confidence.Research/Treatment: Research and suggestive treatment are the most crucial areas where Chat bots can contribute the most. Some of the specialties current involved in AI-powered Chat bots research include Radiology, health records, imaging, telemedicine, and many more.First level primary care and Emergency first aid: The main concern, above everything else, is the easy access to incorrect or misleading information, which today is just a click away. Moreover, lack of medical understanding can lead to a critical situation. Therefore, carefully developed and widely tested Chat bots serve as a dependable way of providing first primary care and even emergency first aid.Answering the FAQs: Chat bots are good listeners with aptly programmed responses. So, the concern of not addressing any of the patient's questions or even giving a half-baked response is out of the window. Bots can be programmed to address different FAQs related to a different medical condition in a much more responsible way.

Dispensers of drug info:

Any medical professional at time the first-ever computer program that could communicate with humans was, developed by MIT in 1966. Subsequently, with programs passing Turing tests, e-commerce, messaging, healthcare, and other enterprises indicated a deep interest in using chat bots. A chatbot is an artificial intelligence program that can interact, respond, advice, assist, and converse with humans. It can mimic a two-way communication between two individuals. In the initial phases of chatbot implementation, tasks like scheduling an appointment and answering fundamental queries were accomplished. Today, the scope of chat bots is much broader with recommendations, references, diagnosis, and even preliminary treatments. Day, it is possible to embed chat bots on websites, mobile apps, and even third-party apps like Facebook and WhatsApp. There's no need for downloading them explicitly and registration/activation. For instance, Religare, a leading health insurer has its generally, hospitals and other healthcare organizations provide chatbot in-built in their app. Apart from usual support; it also helps to secure your medical records in one place. This record can also be shared with the doctor whenever it is required. There are mental health and therapy chat bots available that provide continuous support to patients with mental illness, depression, or sleeplessness. mental therapy

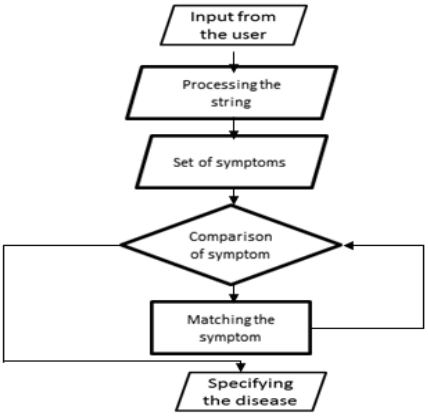

Fig 3: Specifying the disease

Chats For SOS:

During the instances of life-threatening events/symptoms, chat bots can help in raising alarm automatically. For example, if a person who complains about chest pain does not respond to messages within a stipulated time, an emergency call made by the bot to healthcare/family/friends might help in attending the needful.

Customization

Organizations can customize chat bots to decipher different languages, voice accents, and text patterns. With different modes of conversations, chat bots can simplify communications. For instance, for a person with a visual disability, computer vision could be altered. For people with speech problems, with NLP capabilities can be beneficial. Another remarkable development in chat bots that we're going to witness soon is that of Emotion AI. Soon the bots would be

able to understand the user's emotions based on text, voice, or sentence structure. This feature will be a great help for understanding the sentiments of people suffering from depression or any other kind of mental illness. Because of their channel nature, one can easily integrate bots with the web, mobile, or third-party apps, and APIs. They can even work with voice assistants like Alexa and Google Home. With seamless integration, a bot can place a call, advise you on first aid, analyze your medical history and send notifications to your doctor. Efficacy and potential of AI-enabled health applications. These technical developments are now being matched by significant investment in the application of AI in healthcare by governments and technology companies and the United States Food and Drug Administration is actively facilitating introduction of AI-enabled medical devices in the market In our view, four areas where AI-enabled healthcare delivery is likely to have the most influence are: healthcare administration; clinical decision support; patient monitoring; and healthcare interventions

Healthcare administration

The business of delivering healthcare has become complex with healthcare infrastructure in many countries being stretched to their capacity because of administrative burdens and resourcing constraints .Information technology tools have been demonstrated to alleviate this burden on health services and AI and data mining techniques have been identified as among the most promising approaches to support healthcare administration by augmenting clinical care and lessening administrative demands on clinicians.24 By undertaking repetitive and routine tasks like patient data entry and automated review of laboratory data and imaging results, AI can free time for clinicians to provide direct care for patients.

Clinical decision support

Clinical decision support systems are computer programs that draw upon clinical data and knowledge to support decisions made by healthcare professionals. Clinical decision support systems can help to reduce medical errors and increase healthcare consistency and efficiency and efforts to get clinical decision support systems into routine practice are increasing. AI techniques have been used in clinical decision support system research since the early 1970s, as in expert systems. Machine learning algorithms are now being used to predict the development of septic shock and aid diagnosis26 and treatment of chronic obstructive pulmonary disease patients and many other specialist decisions. They also have potential to help personalize treatment decisions for patients drawing upon large-scale data about previous cases that historically would have been difficult to make use of in clinical decision making.

Patient monitoring

The adoption of electronic health records and proliferation of smart phones and fitness monitoring devices has created unprecedented access to digital data and the potential to exploit AI techniques for monitoring patients.26 As a result, we have details on patients' sleep patterns, blood pressure, heart rate and other measures in ways that we never had 2 Journal of the Royal Society of Medicine 0(0)before. In addition to these advancements, we have had increases in other settings as well. For example, waveform pattern learning can improve monitoring and analysis of electrocardiographs, electroencephalographs, electro my graphy and Doppler ultrasounds in hospitals.18 AI-enabled software can be used in intensive care units for cardiovascular and respiratory monitoring through the interpretation of vital signs. After a hospital visit, health services can use natural language processing-enabled virtual assistants to communicate appropriate health and medication information and schedule follow-up visits for patients. The use of such virtual health assistants has been found to increase medication compliance and reliable follow-up.Healthcare interventions Emergence of AI has helped health interventions to be tailored for individuals or sub-groups of populations. Machine learning programs integrated with electronic health records can analyze biometric and other medical data of individual patients and recommend treatment plans based on current clinical guidelines.18AI programs linked to hospital servers and capable of analyzing recorded patient data and posing patient queries can reduce waiting times in stretched emergency departments.AI programs based on Fuzzy logic, a form of many-valued logic, can be used to administer medication. For example, fuzzy controllers have been used to administer vasodilatorsFor postoperative patients. Significant developments in computer vision and robotics in recent years promise speedier and less expensive diagnostic and treatment services.

HEALTHCARE CAHTBOX

It is a digital health platform for on-demand healthcare services. It offers online consultation (text, audio, and video), medicine delivery, follow-ups, and patient record management services.

Wysa: Developed by Touchkin, Wysa is AI-powered stress, depression, and anxiety therapy chatbot. It helps people practice CBT (Cognitive Behavioral Therapy) and DBT (Dialectical behavior therapy) techniques to build resilience. For additional support, it connects people with real human coaches.

Mediktor: It is an accurate AI-based symptoms checker with great NLP (Natural Language Processing) capabilities.

ZINI: It provides every user with a Unique Global Health ID that can be used for managing one's healthcare information all over the world. It also creates an emergency medical profile for the patient for urgent medical requirements.

Your.MD: It provides personalized information, guidance, and healthcare support. With an in-built symptom checker, vast medical database, health plans, and journals, it is a certified application for digital healthcare Based on the reply from the user the accurate disease is found and it suggests the doctor who needs to be consulted in case of major disease. The system remembers past responses and asks progressively more specific questions in order to obtain a good diagnosis. The three primary components of our system are user validation and extraction of symptoms from the conversation with the user, accurate mapping of extracted (and potentially ambiguous) symptoms to documented symptoms and their corresponding codes in our database, and developing a personalized diagnosis as well as referring the patient to an appropriate specialist if necessary. There are certain chat bots in the medical field that already exists they are Your.MD, Babylon, and Florence, but current implementations focus on quickly diagnosing patients by identifying symptoms based on pure system initiative questions like natural conversation. Our system focuses solely on the analysis of natural language to extract symptoms, which could make it easier for elderly, less technical users to communicate their symptoms as well as make it relatively straightforward to support spoken language by adding NLG components.

DIFFERENT PERSPECTIVES

The word "chatbot" comes from «chat»which means informal conversation and «bot», short for "robot". Chat bots are software that simulates a human conversation such as Siri for Apple or Alexa for Amazon. The interaction between people and chatbots can be oral and or textual. To respond appropriately to a user request, the chatbot must be able to understand the meaning of the question, then find the answer and deliver it. While this technology first experienced a strong boom in banking and commerce,the use of chat bots is beginning to emerge in healthcare and can provide many services to both health professionals and patients. There is a wide range of potential applications, including medical information, prevention, outpatient follow-up, and patient support or pre-diagnosis.The work we have already done and our discussions with health professionals suggest that the technology could be put to good use on a routine basis, particularlyin the search for treatment information. As the development of healthcare chat bots has only just begun, there is, to our knowledge, no authoritative book on the subject. We wanted this « 39BIS File »to serve as a white paper on healthcare chat bots, a first sharing of experience on the subject that could be useful to everyone. There are indeed many aspects and requirements that are specific to the development of a healthcare chatbot, and they are described in this white paper.

METHODOLOGY:

This unit is the front end of the system. It is responsible for collecting the user queries from the user which are the input to the system. It is also responsible for displaying the system generated results to the user. Therefore, it can be said that the chat interface is the face of the system through which the entire communication takes place. It is the mediator of conversation between the system and the user. The query that userfires on the chat interface is passed on to the chatting backend which acts as a message delivering system between the Chat interface and the Machine Learning Layer. This interface can be accessed either as a website or as a smart phone app. The type of interface depends on the requirements of the user that are to be satisfied by the system. If the system is accessed from a smartphone, the interface will be in the form of an app and if the system is accessed from a website, then the interface will be in the form of a website.For building apps on the Smartphone, it will require to use android for android phones or Swift for iOS. In

this case, only the interfacing platform will be programmed on android and the complete backend processing of the system will take place on a server on which the system will be deployed. For making a website, either Java or Python web frameworks can be used.Java provides spring and Struts as the most advanced and latest web frameworks. Similarly, Python allows usage of Django andFlask frameworks for building of a website. The criteria for selection of the programming language depends upon the functionalities that the system intents to provide, the requirements of the users that will use the system, the algorithms that are to be used by the system, etc. Selection of an appropriate programming language makes it simpler for developers to develop a system which provides maximum functionality to the user with high accuracy and minimum complexity. Regarding maturity, it is important to bear in mind that chat bots are all about the use of natural language. In my team, we feel strongly about the difference between a chatbot that can replace FAQs in an "intelligent "manner, and a real conversational agent able to participate in multiple interactions to understand a question correctly, determine the context and identify an appropriate answer. On the basis of a "cognitive journey "the pathway towards increasing complexity organized around at least three maturity levels, from "assistant" to "concierge" to the current "advisor" level, most deployed chat bots meet only the implementation requirements of an assistant capable of answering a simple question, and maybe personalizing the answer to suit the context.

Proposed System:

In the proposed system the user dialogue is a linear design that proceeds from symptom extraction, to symptom mapping, where it identifies the corresponding symptom, then diagnosis the patient whether it's a major or minor disease and if it's a major one an appropriate doctor will be referred to the patient, the doctor details will be extracted from the database, the user will be identified by the login details which is stored in the database. The chat bots are conversational virtual assistants which automate interactions with the users. Chat bots are powered by artificial intelligence using machine learning techniques to understand natural language. The main motive of the paper is to help the users regarding minor health information. Initially when the user's visits the website first registers themselves and later can ask the bot, queries. The system uses an expert system to answer the queries if the answer is not present in the database. Here the domain experts also should register themselves by giving various details. The data of the chatbot stored in the database in the form of pattern-template. Here SQL is used for handling the database.

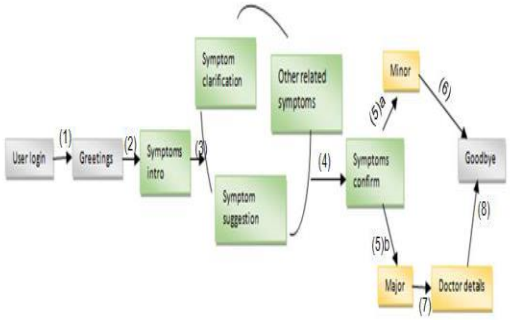

Fig1: Finite state graph

In fig1, Chatbot's dialogue design is represented using finite state graph. In order to achieve an accurate diagnosis, the logic for state transitions are made, natural language generation templates were used, and system initiative to the user and get responses from the user. Besides its greetings and goodbye states, our agent has three main conversational phases: acquisition of basic information, symptom extraction, and diagnosis. Our bot starts off by asking about the user's email and password for login and then enters a loop of symptom extraction states until it acquires sufficient information for a diagnosis. Users have the option of entering the loop again to talk to the doctor about another set of symptoms after receiving their first diagnosis and the another option is that the user can view their history of chats about what they have discussed.

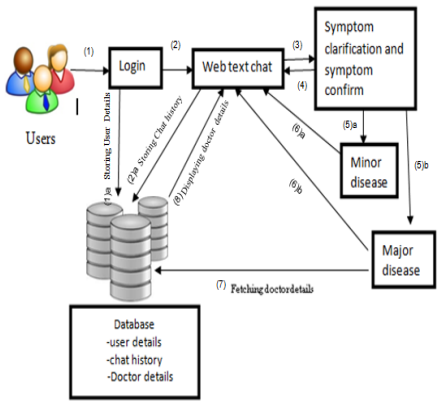

Fig2: Functional Architecture

The above Figure proceeds with the users login where the users' details will be stored in the database. Then the user can start their conversation with the chatbot and it will be stored in the database for future

reference. The chatbot will clarify the users symptoms with serious of questions and the symptom conformation will be done. The disease will be categorized as minor and major disease. Chatbot will reply whether it's a major or minor disease. If it's a major one user will be suggested with the doctor details for further treatment.

SYSTEM ARCHITECTURE

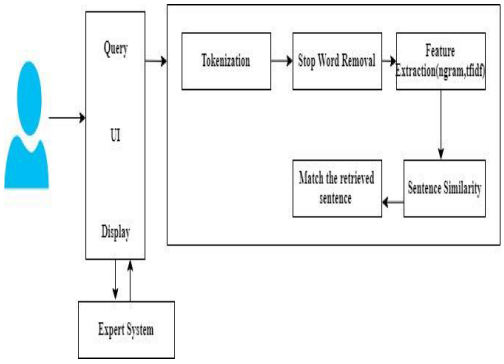

Fig. 1: System architecture

Figure 1 is the system Architecture outline of chatbot healthcare application. The client inputs the question in the UI as the text. The UI gets the user query and after that sends it to the chatbot application. In the chatbot application, the literary experiences pre-processing steps incorporate tokenization where the words are tokenized, at that point the stop words are removed and feature extraction depends on n-gram, TF-IDF, and cosine likeness. The question answers are stored in the knowledge database to recover the retrieve the answer

Tokenization

The words or sentences separated word by word for increased processing. It separates text into words at whatever point it experiences one of the rundowns of indicated character. All the words are separated from sentences and the punctuation are disposed of. This implies the next steps.

Stop words removal

The stop words are removed from the sentences to extract important keyword. It is mainly employed to remove unnecessary things such as words occurring too frequently in sentences. It is also used to delete words that are not important or the words with no specific meanings such as an, a, or the. This step is applied to reduce processing time or computational complexity.

Feature extraction based on N-gram TFIDF

Feature extraction is a characteristic decrease process in the document; it ranks the attributes as per the document. By doing this step it upgrades the speed and adequacy of the document. It is used to extract the set of keywords and frequency of the keywords in the document.

TF-IDF:

Term frequency and Inverse document frequency is used to calculate the weight of each term in the sentence. The term frequency is used to check how many times the term as been occurred in a particular sentence using the formula below.

$$tf = tf_i \quad (1)$$

IDF used to compute the weight of uncommon words over all reports in the document. The words that appear in a while in the document have a high IDF score. It is given by the condition underneath

$$idf = \log \frac{N}{df} \quad (2)$$

The tf and idf are combined to produce the weight of the term or word in the document. The tf and idf values are multiplied to obtain the weight of each term in the document

$$W_i = tf_i * \log \frac{N}{df} \quad (3)$$

4.3.2 N-gram: N-gram is an Endeavour to expand N-gram models with variable length arrangements. A sequence can be a grouping of words, word class, grammatical feature or whatever a succession of something that the modeler thinks bearing significant language structure data. In this system, N-gram is used for text compression or reduces the data space in the document, to extract the relevant keywords from the database.

Sentence similarity

Cosine similarity is been used to check the similarity between two sentences. The similarity between the query and document is directly proportional to the number of query weights. The similarity calculation result of the two documents ranges from 0 to 1 since the term frequency cannot be negative. The formula for calculating cosine similarity is given below:

$$\text{similarity} = \cos(\theta) = \frac{\mathbf{A} \cdot \mathbf{B}}{\|\mathbf{A}\|\|\mathbf{B}\|} = \frac{\sum_{i=1}^{n} A_i B_i}{\sqrt{\sum_{i=1}^{n} A_i^2}\sqrt{\sum_{i=1}^{n} B_i^2}}$$

Retrieve the matched sentence

The answers for the query which are obtained from the above process are retrieved and displayed in the user interface.

USER VALIDATION AND EXTRACTION OF SYMPTOMS

The validation of the user login details occurs here. Then Symptoms are extracted using String Searching Algorithm where substring representing the symptoms is identified in the natural language text input. When users give directly the symptom name such as(e.g. “I have a cough, fever, and nausea”), the system will easily identify it. But however, the system should also be able to handle input like, “When I read, I’m okay at first, but over time, my eyes seem to get tired, and I start to see double.” In this case, the system should extract substrings like “eyes tired” and “see double” (and not substrings like “read” or “okay”).

MAPPING EXTRACTED SYMPTOMS WITH TRAINED DATASETS

Given some extracted substring from the user’s input, we generate a list of suggested closest symptoms .We then ask the user to confirm if they have any of the suggested symptoms. Based on their reply few diseases are being shortlisted. Then further symptom clarification and symptom suggestions are being done by asking the users a series of questions and the mapping of the symptoms to the exact disease is done. the database and each symptom being entered is compared to the symptoms of the common diseases. Next symptom is checked until a matching one is found. The diseases are shortlisted based on the end users input on the question evaluation. The accurate disease is identified and specified to the end user by the chatbot. The chatbot checks whether the identified disease is a major issue or minor issue based on the conditions built in the chatbot. If it is a major issue the chatbot refers a specialist to the end user by sending the doctor details .And if it is a minor issue the chatbot specifies the disease and alerts the end user with a first aid or remedy and asks to visit a doctor shortly.

RESULT AND DISCUSSIONS:

The application uses a question and answers protocol where it consists of login page figure 2, where the user needs to give the details to register in the application if you are a new user, figure 3. Figure 4 shows the answer for the query is available in the database or displays similar answers for the query, figure 5. Figure 6 is the expert answering page where experts answer directly to the user’s question. The application uses n-gram for text compression using bigram and trigram for faster execution of the query. The N-gram, TF-IDF, and cosine similarity to convey the answers to the users. The project result is as follows The user will have text to text communication with the chatbot and get the specific disease and the user can also get their previous chat history through their details which are stored in the database.

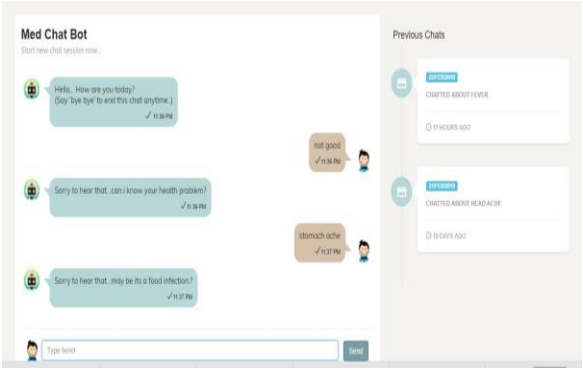

Fig4: Result Prediction

The above figure shows how the user text with the chatbot and the accurate result will be shown to the user at the end of symptom clarification. Then the user can view their previous chat to know what they have discussed earlier.

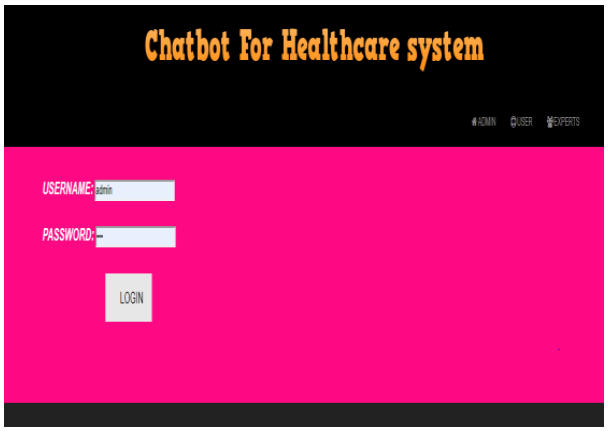

Fig. 2: Login page

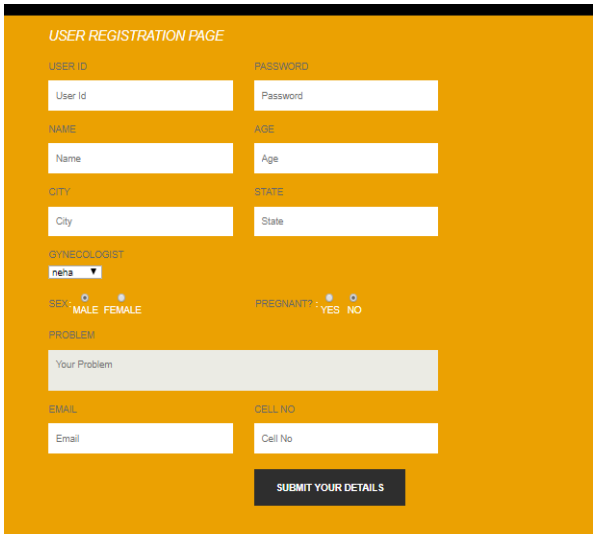

Fig. 3: Registartion page

Fig. 5: Similar answers are displayed

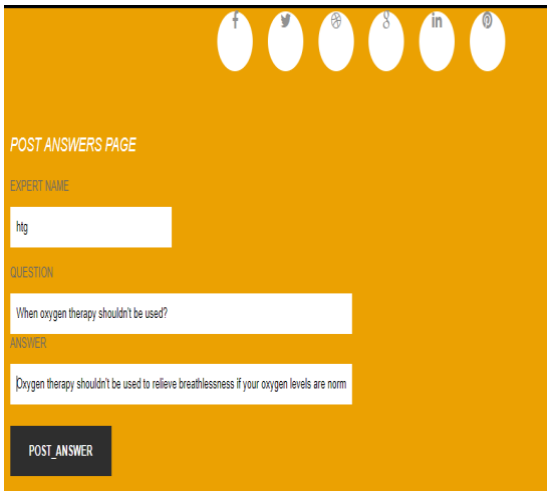

Fig. 6: Expert Answering Page

What are the key success factors for healthcare chat bots?

What seems essential is the medical and scientific validation of a Chabot's answers. How relevant are the answers to the questions asked? Have these answers been validated by the appropriate health authorities or by what is known as evidence-based medicine? In my view, that's the first point. Secondly, for a Chabot to be successful, I think you really need to work on its ease of use.Is the chatbot easy to connect to? How long does it take to get an answer? Is the answer clear, easily understandable and appropriate for the person asking the question? The answer should be different depending on whether it is meant for a patient, a doctor or another healthcare professional. The user experience with the chatbot interface should be as smooth and intuitive as possible. There may be a third point, which concerns the integration of chat bots into the tools that doctors use daily in their consultations with patients. This must be extremely smooth to help doctors save time.

How important is the evaluation of chat bots.

It is not just important. In my opinion, tools that have not been evaluated must not be used. Evaluation should be almost mandatory; that's nonnegotiable. Everything chat bots do must be very carefully assessed so that both practitioners and patients can have confidence in the answers provided by the chat bots. The question of evaluation is therefore key.

Evaluation methods for these tools must be sound and follow an evaluation protocol, and the results must be available for consultation. It would be even better if these assessments were published in scientific journals, soThat there is a frame of reference for the evaluation.Who requests the evaluation? For what purpose.This could be a bit like the validation of medical software, which can be considered to be medical devices. In so far as diagnosis or treatment information is being provided, assessment is almost mandatory. An evaluation could thus be requested by the health authorities, and this would mean the use of chat bots has been validated.

At what stage in its development should a Chabot be evaluated?

For the first evaluation requirement concerning answer reliability, the evaluation should be carried out before the Chabot is commissioned by the person or organization that produced it. Before making such a tool available to doctors or patients, the reliability of answers should be assessed, together with how the answers have been structured and which sources have been used. Without such an evaluation, chat bots should not be allowed to be published on line. In addition, as far as user experience is concerned, once a Chabot has been published on line and its answers have been verified as being reliable, its ease of use and the user experience can clearly be accessed through the doctors and patients using it.

What is the current status concerning the evaluation of healthcare chat bots.

There is very little out there in terms of evaluation. To my knowledge, there are no specific examples of chat bots being used extensively following careful testing and publishing of the results. This is because it is a brand-new area, which is still being shaped. It can be assumed thatEvaluation results and Chabot solutions will begin to appear in specific medical fields in the months to come.

What would you say as a concluding remark?

The key word is “demonstrate” in order to build confidence in the tool. People may be wary of talking to an artificial intelligence device that provides answers to their questions, this is only natural. Therefore, we need to demonstrate, through evaluation, that the results produced can be trusted. This is why evaluation is absolutely key and vital.Manipulation device. However, there is much optimism about developments in the field of ‘autonomous surgery’ and it is not hard to foresee routine and minor surgeries led by robots in the future.

Challenges

While the rapid progress and investment in AI and associated innovations have great promise for health services in alleviating resource and administrative challenges, the hyperbole is considerable and caution is needed. The full maturity of many AI applications is yet to be realized (see Figure I). Aside from the many technical limitations of current AI technologies in comparison with human vision, language processing and context-specific reasoning, other distinctive challenges exist in applying AI techniques in healthcare delivery. First and foremost is the medico-legal context which AI applications will be operated. Even within current medical regulation, lines of responsibilities are not always clear when medical errors occur, and it is even less clear where responsibilities should lie when AI ‘agents’ increasingly support or even autonomously deliver healthcare services. Determination of liability regarding the use of the system, the system and the user need further definition and clarification. This is an area in which regulatory and legal authorities must consult closely with a wide range of stakeholders in the health services as well as clinicians and software developers. Governments across the world have increasingly adopted favorable positions in adoption of AI in various disciplines and activities. While some governments have actively involved themselves in the application of AI in healthcare, others have supported private developers in the development of relevant AI applications.As successes of AI in medicine become more evident, governments and funders may be required to formulate strategies outlining how AI gets applied in healthcare delivery and how this process will be funded.

CONCLUSION AND FUTURE SCOPE

From the review of various journals, it is concluded that, the usage of Chabot is user friendly and can be used by any person who knows how to type in their own language in mobile app or desktop version. A medical Chabot provides personalized diagnoses based on symptoms. In the future, the bots’ 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 description. The implementation of Personalized Medical assistant heavily relies on AI algorithms as well as

the training data. At last, the implementation of personalized medicine would successfully save many lives and create a medical awareness among the people. As said before, the future era is the era of messaging app because people going to spend more time in messaging app than any other apps. Thus medical Chabot has wide and vast future scope. No matter how far people are, they can have this medical conversation. The only requirement they need is a simple desktop or Smartphone with internet connection. The efficient of the Chabot can be improved by adding more combination of words and increasing the use of database so that of the medical Chabot could handle all type of diseases. Even voice conversation can be added in the system to make it more easy to use. Our study of uses shows that healthcare chat bots have not yet reached maturity yet. They are only in the early stages.However, it seems certain that their use will be generalized in the near future.Chatbots are being increasingly integrated into homes, especially via connected speakers that become a daily companion and begin to address healthcare uses.Tomorrow, parents may turn to a vocal Chabot for advice when their child shows minor clinical signs. Patients will carry out a pre-consultation via a questionnaire on a Chabot at the time they make their appointment. Doctors will interview a Chabot to obtain specific information about a drug or pathology.There are three main reasons why chat bots could improve and guarantee access to patients' health information: The use in the Chabot's answers of vocabulary adapted to the user The non-stigmatizing quality of the exchanges for the user The availability of a voice version, for example for visually impaired or illiterate people Chat bots could also help adapt the habitat for home-based healthcare through oral communication Our research was not meant to be exhaustive because we only tested those chat bots that were freely accessible. The inclusion of these chat bots in our white paper is not therefore based on their level of quality. In our study, we identified chat bots that were in the project phase and some that are already being used for everyday purposes. Some of them have resulted in scientific publications describing the use of the technology in healthcare, for a given subject. It is important to note that, despite the emergence of many healthcare chat bots, there are still issues to be resolved about the maturity of the technology and of the uses. Nevertheless, studies have been undertaken and chatbots are being created, thus paving the way for gradual improvement of the technology to meet many needs. Our research was not meant to be exhaustive because we only tested those chatbots that were freely accessible. The inclusion of these chat bots in our white paper is not therefore based on their level of quality. In our study, we identified chat bots that were in the project phase and some that are already being used for everyday purposes. Some of them have resulted in scientific publications describing the use of the technology in healthcare, for a given subject .It is important to note that, despite the emergence of many healthcare chat bots, there are still issues to be resolved about the maturity of the technology and of the uses. Nevertheless, studies have been undertaken and chat bots are being created, thus paving the way for gradual improvement of the technology to meet many needs. We have identified certain trends in potential uses throughout the patient care pathway, as illustrated below: We have identified certain trends in potential uses throughout the patient care pathway, as illustrated below:

• By promoting access to home automation

• By enriching current remote assistance offers with an alert system based on user responses

• By providing a socializing activity

However, all new technologies, including chat bots, could be integrated into uses only on the condition that health ethics are respected. For example, confidentiality is important, as is data security. While many simple or repetitive tasks are and will increasingly be handled by chat bots, robots will never replace humans until technologies are able to understand emotions and unexpressed, implicit information. This is even truer in the health field. A Chabot is a great tool for conversation. Here the application is developed to provide quality of answers in a short period of time. It removes the burden from the answer provider by directly delivering the answer to the user using an expert system. The project is developed for the user to save the user their time in consulting the doctors or experts for the healthcare solution. Here we developed the application using the N-gram, TF-IDF for extracting the keyword from the user query. Each keyword is weighed down to obtain the proper answer for the query. The Web-interface is developed for the users, to the input query. The application is improved with the security and effectiveness upgrades by ensuring user protection and characters and retrieving answers consequently for the question

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