Advanced Healthcare Chat Bot using Python

A Project Work Synopsis

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Submitted by:
RAGHU RAM VADLAMUDI
HARSHA RAJ
DHARMA ARTHI REDDY
RANJITH BANJERJEE

University Roll Number

19BCS4596

19BCS4586

19BCS4593

19BCS4619

Under the Supervision of:

Rajat Tiwari

SUPERVISORS NAME

CHANDIGARH UNIVERSITY
Discover. Learn. Empower.

CHANDIGARH UNIVERSITY, GHARUAN, MOHALI - 140413,

PUNJAB

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ABSTRACT

To start a good life healthcare is very important. But it is very difficult to the consult the doctor if any health issues. The proposed idea is to create a healthcare chatbot using Natural Language Processing technique it is the part of Artificial Intelligence that can diagnose the disease and provide basic. To reduce the healthcare costs and improve accessibility to medical knowledge the Healthcare chatbot is built. Some chatbots 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 benefit of a healthcare chatbot only when it can diagnose all kind of disease and provide necessary information. The system provides text or voice assistance, that means user can use his own convenient language, Bot will provides which type of disease based on the user symptoms, and provides doctor and also provides food suggestion that means which type of food you have to take. Thus, people will have an idea about their health and have the right protection.. Chatbots are programs that work on Machine Learning (ML) as well as Artificial Intelligence (AI)Natural Language Processing (NLP) techniques such as NLTK for Python can be applied to analyses speech, and intelligent responses can be found by designing an engine to provide appropriate human like responses. Key Words: Chatbot, Natural Language Processing (NLP), Natural Language Toolkit (NLTK), Machine Learning (ML), Artificial Intelligence (AI).

INTRODUCTION

1.1Problem Definition

Now a days, health care is extremely necessary in our life. Todays people are busy with their works reception, workplace works and additional addicted to web. They are not involved regarding their health .So they avoid to travel in hospitals for little issues.it may become a significant drawback. So, we will offer a thought is to make a health care chatbot system using AI that may identification the illness and supply basic information regarding the illness before consulting a doctor. Which helps the patients apprehend additional regarding their illness and improves their health. User can do the all reasonably illness information. The system application uses question and answer protocol within the style of chatbot to answer user queries. The response to the question is replied supported the user question. The significant keywords are fetched from the sentence and answer to those sentences. If match is discovered or vital answer are given or similar answers are displayed can identification which sort of illness you have got supported user symptoms and additionally offers doctor details of explicit illness. It may cut back their health problems by victimization this application system. The system is developed to scale back the tending price and time of the users because it isn't potential for the users to go to the doctors or consultants once in real time required.

1.2 Software Specification

Python 3.10.2

Comma-separated values (CSV)

Pandas

Numpy

Tkinter

Matplotlib

2 LITERATURE REVIEW

Chatbot 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 Chatbot 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 Webinterface 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 questions.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 Webinterface 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 questions. synchronous written conversations are getting well-liked as Web-based psychological state interventions. This review is predicated on associate analysis of individual synchronous Web-based chat

technologies. Several of the prevailing systems have live chats through texts and a few limitation like there's no instant response given to the patients they need to attend for consultants acknowledgement for an extended time. A number of the processes could charge quantity to measure chat or telecom communication. However, the difficulty of those technologies are cost effective in clinical practice remains a thought for future analysis studies. 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 chatbot. It is developed using the python Language. Based on the survey given it is found that the no of correct answer given by the chatbot is 80% and incorrect/ambiguous answer given is 20%.From this survey of chatbot and analysis of result suggested that this software can be used for teaching and as a virtual doctor for awareness and primary care. 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.describes the development of a chatbot for medical students, that is based on the open source AIML based Chatterbean. The AIML based chatbot 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 quries, where 47% are of posed questions

2.1 Existing System

Many of the existing systems have live chats through texts and some limitation such as there is no instant response given to the patients they have to wait for experts acknowledgement for a long time. Some of the processes may charge amount to live chat or telephony communication. However, the issue of these technologies are cost effective in clinical practice remains a consideration for future research studies. Here the studies are based on to recognize 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. [1] 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. [2] 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. [3] The chatbot implemented using pattern comparison in which the order of the sentence is recognized and saved response pattern. Here the author describes the implementation of the chatbot Operating system, software, programming language, and database. How results input and output is stored. Here the input is taken using text () function and other punctuation is removed using trim () function and random () function is used to choose a response from the database. The chatbot is used for an entertainment purpose. [4] Here they use n-gram technique for extracting the words from the sentences. Here n-gram is used for comparison and deduction of the input with case data using Moro phonemes and phonemes as the deciding parameter. Probability analysis for the closest match is performed. The final expression is redirected through an expert system. [5] The chatbot developed here for healthcare purposes for the android application. The user sends the text message or voice message using Google API. Here the user gets only related answer from the chatbot. SVM algorithm is used to classify the dataset. Here the Porter algorithm is used to discard unwanted words like suffixes or prefixes. [6] The different documents served in web, the content is checked by tagging the dataset using n-gram based low dimensional demonstration, TF-IDF matrix that generates S, U, and V and finally multiplying the 3 matrices cosine similarity is calculated. [7] Here the chatbot is created for the customer service that functions as public health service. The application uses N- gram, TF-IDF and cosine similarity. The knowledge base is created for storing the question and answer. The application clearly shows extracted the keyword from the question ad by using unigram, bigram, and trigram which helps in fast answering. [8]

Disadvantages in Existing system

- It takes more time to response to the user question
- Pay some charges to perform live chat

2.2 PROPOSED SYSTEM

In our proposed system the user can chat with the bot regarding the query through voice or text. The system uses an expert system to answer the queries. User can also view the available doctors for that particular disease. This system can be used by the multiple users to get the counselling sessions online. The data of the chatbot stored in the database in the form of pattern-template. Bot will provide analgesics and food suggestions that means which food you have to take based on the disease. In earlier times, though computers could read digital texts, they could not understand natural language or follow up with context to the text. They could not process language in the correct way it is supposed to be interpreted. Computers were not equipped to handle written text such as perceived scribbles on paper. Creating a natural flow of the conversation by converting text to speech and speech to text was another task the computer could not understand. Due to many failures, the research for these tasks was put to an end. In the early 1990s, new machine learning (ML) capabilities with rule-based parsing, morphology, and semantics created a whole range of possibilities for computers to understand natural language, which introduced NLP. Deep neural networks and representation learning assist in present-day NLP developments. Today, chatbots are slowly becoming the best alternative for customer queries, so companies spend additional resource investment for routine processes: This gives the company's employees to work on something more productive than doing mundane and tedious daily tasks. To find a chatbot that suits a particular company, one must access all the options available in the market.

4.1 **Advantages in proposed system**

- Reducing health care cost
- Save the user time
- Don't go to hospital for even any small problem

5. **SYSTEM ARCHITECTURE**

The below Figure proceeds with the user can start their conversation with the chatbot like user friendly 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.

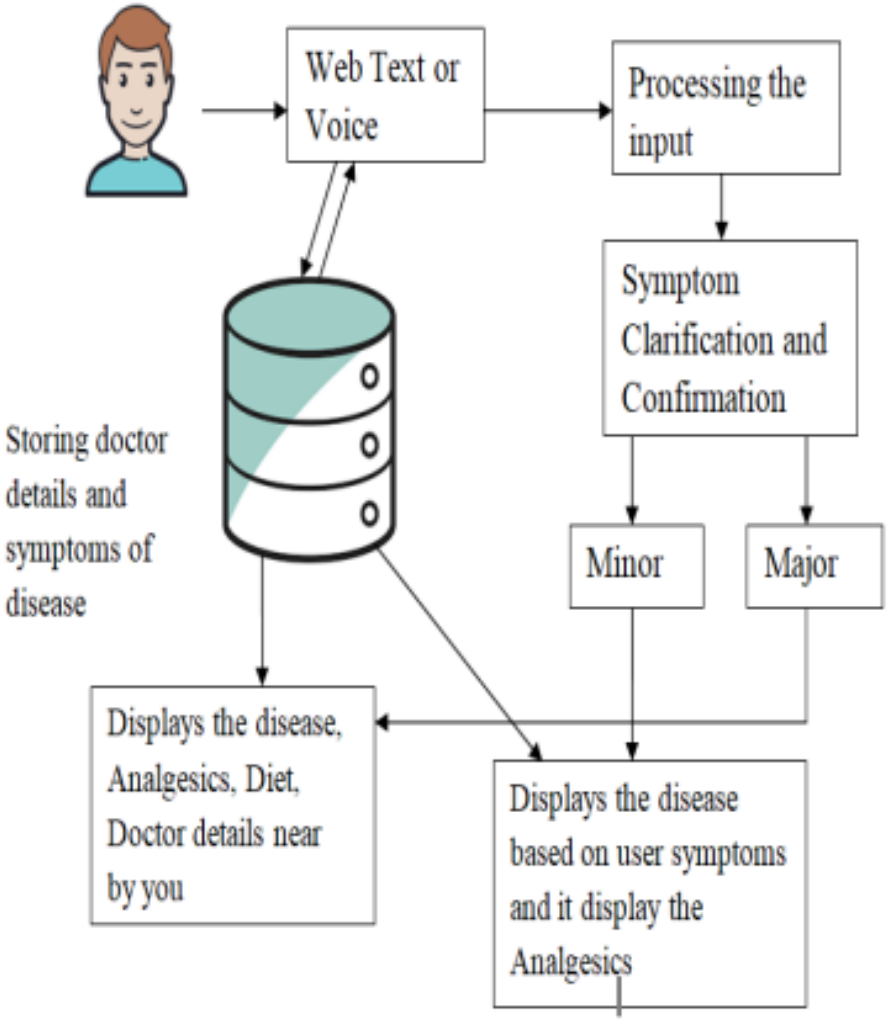

Fig-1: system architecture

If it‘s a major one user will be suggested with the doctor details near by you for further treatment and display the analagesics and also provides food suggestions that means which food you have to take more to recover the disease. The chatbot user interface can chat with like user friendly.by using chatbot don‘t go to hospitals for even small problems.

5.1 **Dataflow Diagram**

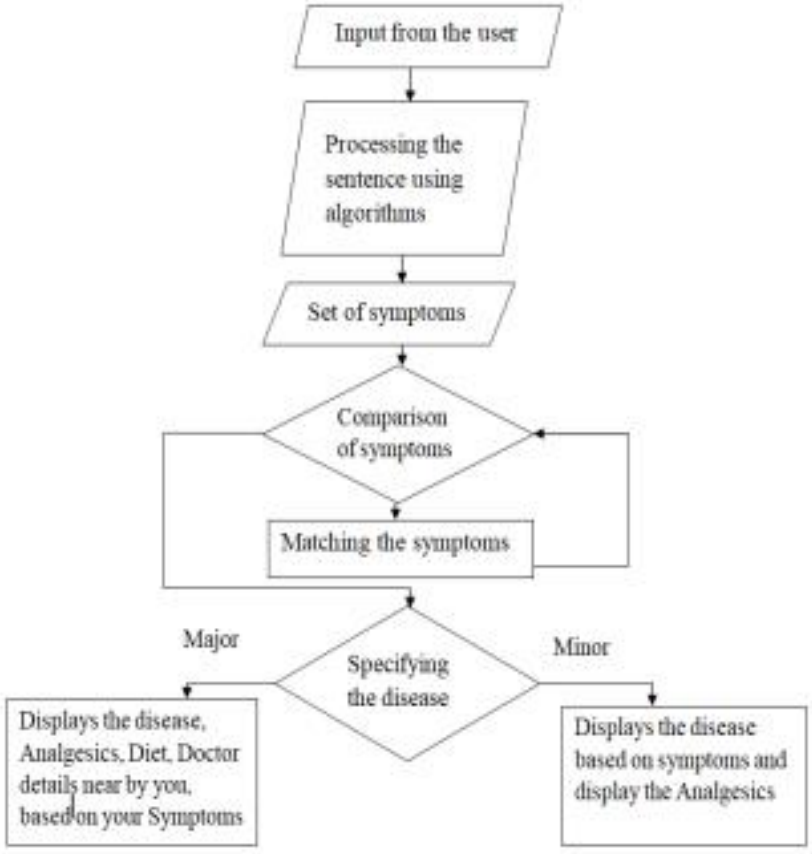

Fig-2: Data flow diagram of chatbot

The chatbot will take the input from the user and then processing the input by using algorithms. Bot will apply the algorithms on whatever the user give the input to the bot.it will understand the input by using algorithms, set of symptoms in the database. 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 near by you for further treatment and display the analagesics and also provides food suggestions that means which food you have to take more to recover the diseas

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PROBLEM FORMULATION

Chatbot is an Entity which imitate human discussion in its particular accepted set-up together with a text or vocal language with techniques such as Natural Language Processing (NLP). The aim of this system is to replicate a person's discussion. The development of chatbot application canbe done with making a user interface to send input and receive response. It is a system that interact with user by keeping the track of the state of interaction and recollecting the preceding commands to give functionality. The medical chat-bots can be developed by using artificial algorithms that scrutinize user's queries and recognize it and give reply to related query. A big disease can start from

small problems such as headache which feels normal but it may beginning of big disease such as brain tumor .most of the disease can be identified by common symptoms so the disease can be predicted if the patient body is analyzed periodically[6].The system give response by use of an efficient Graphical User Interface such that if actual person is

chatting with the user. chatterbot that can be used in various fields like education, healthcare, and route assistance. The central part of the chat-bots includes MySQL. It is an interactive system solve users query regarding medicine. so they can get correct guidance for treatment through android app by using Google API. The system takes a plain text as input and answering all type of questions output by qualified user is the output . The purpose is to provide a generic solution to this problem. this paper helps in recognizing the reality in texts and giving the past content for developing a conversation which is used in middle-school CSCL scenarios. A smart chatbot for customer care by using Software as a Service which analyze message of each application server. It help the user to resolve the issue by providing a human way interactions using LUIS and cognitive services which is implemented on AWS public cloud. Admin feeds input to the machine so that machine can identify the sentences and taking a decision itself as a response to a question. The database used in the project is MySQL. The illustration and execution of SQL in the pattern matching operation is required. The conversation can be done so that it can add some knowledge to the database as it has not been modeled before. If in case the input sentences in the database did not match then it will be remodeled. The evaluation of sentence equivalence is completed with bigram that splits the input sentence in to two parts. The data of chatbot are deposited in the database. The database is appointed as information storage and predictor is used for storing the function and perform pattern matching. This application can be developed by using programming language of Pascal and Java.Paper uses artificial intelligence for predict the diseases based on the symptoms and give the list of available treatments. It can facilitate us to figure out the problem and to validate the solution.

Author gives chatterbot which is based on AIML (Artificial Intelligent Markup Language) structure for training the model and uses Microsoft voice synthesizer for identification of the word spoken by the user. Natural language processing used for understanding and Microsoft speech recognition is used in

speech recognition and speech synthesis for speech to text and text to speech so people get along with it easily

4 RESEARCH OBJECTIVES

The main aim of the project AI Based Healthcare chatbot system using Natural Language Processing, which is easy to use and more secure than the current system it will cure the diseases and helps to maintain proper health in the current system. This system reduces the possibility of diseases. The information is processed and store in the database,then it is reverted to the user. Also, it provides an accurate information about the heath Symptoms and medicines to the patients. The government will also keep the track of the medicines supplied to the medicals and hospitals. By using diagnosis software,the results are generated accurate and fast. For end users it became easy to gain access in healthcare website and explore different types of services.After using such web-based applications, the results of healthcare were affected in different countries and rate of mortality was steadily decreased. With the help of this natural language processing the proposed system can help the government organizations and hospitals also help in the development of the country. Thus, we successfully build up a system for hospitals and medical institute so that user can ask their queries with the medical assistant and book the doctor's appointment bygiving text messages Earlier, the artificial intelligence domain was not developed. After the invention of chatbot systems, the problems of users are solved in less time. In the field of healthcare, automated chatbot deployment in web applications is booming all over the world. Patients suffers from different types of diseases and visit to hospital for treatment purpose. Sometimes doctors are not available due to that, time required for nursing takes a lot . To overcome this issue, medical chatbots were developed. These chatbots are trained and tested on live dataset also accuracy of the output is relevant. The AI based chatbot are fast, reliable and precise. User provide the proper details and receive feedback according to their query. If any user makes minor mistake, the chatbot provides validation and autocorrection features. Nowadays, in every clinics and hospitals portal chatbots are performing multitasking work. A lot of time of patient is saved and tasks are completed in minimum effort

Chatbot is an Entity which imitate human discussion in its particular accepted set-up together with a text or vocal language with techniques such as Natural Language Processing (NLP). The aim of this system is to replicate a person's discussion. The development of chatbot application canbe done with making a user interface to send input and receive response. It is a system that interact with user by keeping the track of the state of interaction and recollecting the preceding commands to give functionality. The medical chat-bots can be developed by using artificial algorithms that scrutinize user's queries and recognize it and give reply to related query. A big disease can start from small problems such as

headache which feels normal but it may beginning of big disease such as brain tumor .most of the disease can be identified by common symptoms so the disease can be predicted if the patient body is analyzed periodically[6].The system give response by use of an efficientGraphical User Interface such that if actual person is chatting with the user. chatterbot that can be used in various fields like education, healthcare, and route assistance. The central part of the chat-bots includes MySQL. It is an interactive system solve users query regarding medicine. so they can get correct guidance for treatment through android app
by using Google API.

METHODOLOGY

The following methodology will be followed to achieve the objectives defined for proposed research work:

1. Detailed study of health care chatbot will be done.

2. Installation and hand on experience on existing approaches of health care chatbot will be done. Relative pros and cons will be identified.

3. Various parameters will be identified to evaluate the proposed system.

4. Comparison of new implemented approach with exiting approaches will be done.

The healthcare chatbot is designed by using python in backend.

For conversation between user and system the natural processing library is used named Flask=(0.11), chatterbot=(0.8.4), SQLAlchemy=(1.1.11)

The database files are in DBSQLITE3 format which are trained in the initial stage of the application model

This chatbot uses Natural language processing techniques to process and analyze the data and give the output inappropriate manner. It brings up the disease-related problems about whether the task mentioned above should be assigned to human staff. This healthcare chatbot system will provide patients healthcare support online at all times. It helps to generate health data and automatically delivers the information of reports to medical management A smart chatbot for customer care by using Software as a Service which analyze message of each application server. It help the user to resolve the issue by providing a human way interactions using LUIS and cognitive services which is implemented on AWS public cloud. Admin feeds input to the

machine so that machine can identify the sentences and taking a decision itself as a response to a question. The database used in the project is MySQL. The illustration and execution of SQL in the pattern matching operation is required.

Essential Concepts

Below are some fundamental concepts related to chatbot technology.

Pattern Matching is predicated on representative stimulus-response blocks. A sentence (stimuli) is entered, and output (response) is created consistent with the user input Eliza and ALICE were the first chatbots developed using pattern recognition algorithms. The disadvantage of this approach is that the responses are entirely predictable, repetitive, and lack the human touch. Also, there is no storage of past responses, which can lead to looping conversations

The **Artificial Intelligence Markup Language (AIML)** was created from 1995 to 2000, and it is based on the concepts of Pattern Recognition or Pattern Matching technique. It is applied to natural language modeling for the dialogue between humans and chatbots that follow the stimulus-response approach. It is an XML-based markup language and it is tag-based. As shown in Fig, AIML is based on basic units of dialogue called categories (tag <category>) which are formed by user input patterns (tag <pattern>) and chatbot responses (tag <template>)

```
<aiml version="1.0.1" encoding="UTF-8"?>
   <category>
      <pattern> My name is * and I am * years old </pattern>
      <template> Hello <star/>. I am also <star index="2"/> years old!</template>
   </category>
</aiml>
```

Example of AIML code

Latent Semantic Analysis (LSA) may be used together with AIML for the development of chatbots. It is used to discover likenesses between words as vector representation Template-based questions like greetings and general questions can be answered using AIML while other unanswered questions use LSA to give replies .

Chatscript, being the successor of the AIML language, is an expert system, which consists of an open-source scripting language and the engine that runs it. It is comprised of rules which are associated with topics, finding the best item that matches the user query string and executing a rule in that topic. Chatscript also includes long-term memory in the form of \$ variables which can be used to store specific user information like the name or age of the user. It is also case-sensitive, widening the possible responses that can be given to the same user

input based on the intended emotion, as uppercase is typically used in conversations to indicate emphasis

RiveScript is a plain text, line-based scripting language for the development of chatbots and other conversational entities. It is open-source with available interfaces for Go, Java, JavaScript, Perl, and Python

Natural Language Processing (NLP), an area of artificial intelligence, explores the manipulation of natural language text or speech by computers. Knowledge of the understanding and use of human language is gathered to develop techniques that will make computers understand and manipulate natural expressions to perform desired tasks. Most NLP techniques are based on machine learning.

Natural Language Understanding (NLU) is at the core of any NLP task. It is a technique to implement natural user interfaces such as a chatbot. NLU aims to extract context and meanings from natural language user inputs, which may be unstructured and respond appropriately according to user intention It identifies user intent and extracts domain-specific entities. More specifically, an **intent** represents a mapping between what a user says and what action should be taken by the chatbot. Actions correspond to the steps the chatbot will take when specific intents are triggered by user inputs and may have parameters for specifying detailed information about it Intent detection is typically formulated as sentence classification in which single or multiple intent labels are predicted for each sentence

TENTATIVE CHAPTER PLAN FOR THE PROPOSED WORK

CHAPTER 1: INTRODUCTION

This chapter will cover the overview of Advanced Healthcare Chat Bot using Python and NLP

CHAPTER 2: LITERATURE REVIEW

This chapter include the literature available for of Advanced Healthcare Chat Bot using Python and NLP

The findings of the researchers will be highlighted which will become basis of current implementation.

CHAPTER 2: BACKGROUND OF PROPOSED METHOD

This chapter will provide introduction to the concepts which are necessary to understand the proposed system.

CHAPTER 4: METHODOLOGY

This chapter will cover the technical details of the proposed approach. In our proposed system the user can chat with the bot regarding the query through text. The system uses an expert system to answer the queries. User can also view the available doctors for that particular disease. This system can be used by the multiple users to get the counselling sessions online. The data of the chatbot stored in the database in the form of pattern-template. Bot will provide analgesics and food suggestions that means which food you have to take based on the disease.

CHAPTER 5: EXPERIMENTAL SETUP

This chapter will provide information about the subject system and tools used for evaluation of proposed method. We are using Python to build the chatbot and other python libraries

CHAPTER 6: RESULTS AND DISCUSSION

The result of proposed technique will be discussed in this chapter. As the result of the chat bot will be given the project final documentation at last

CHAPTER 7: CONCLUSION AND FUTURE SCOPE

Chatbot is great tool for conversation language between human and machine. The application is developed for obtaining a fast response from the bot which implies with none delay it provides the correct result to the user. It’s ended that, the usage of chatbot is user friendly and might be utilized by someone who is aware of the way to sort in their own language. Chatbot provides personalised diagnosis supported symptoms.

Future scope of the project could be AI Based Healthcare chatbot system can also include a mobile assistant in it which will be more functions will be added and can be accessed by many users. Which will also reduce the time and will also be accurate in the health details of patients given to the doctors. We can add biometric system for more secure authentication process.

The future era is that the era of messaging app as a result of people spend longer time in messaging app than the other apps. The implementation of personalized drugs would with success save several lives and build a medical awareness among the people. No matter how far people are, they will have this medical voice communication. The sole demand they have easy desktop or smartphone with active web association. The economical of chatbot will be improved by adding a lot of combination of words and increasing the use of database information so of the medical chatbot may handle all type of diseases

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