CHATBOT SYSTEM FOR HEALTHCARE

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ABSTRACT

Chatbot can be described as software that can interact with human users using Artificial Intelligence. This software is used to perform tasks such as quickly responding to users, informing them, helping to purchase products and providing better service to customers. Healthcare is very important to lead a good life. However, it is very difficult to obtain the consultation with the doctor for every health problem. The idea is to create a Medical Chatbot using Artificial Intelligence that can provide basic details about the disease before consulting a doctor. A Medical Chatbot System provides diagnosis and remedies based on the symptoms provided to the system. The system will be able to measure the seriousness of the diagnosis and if needed, it will connect the user to a doctor available online.The score will be obtained for each sentence from the given input sentence and more similar sentences will be obtained for the query given. The third party, the expert program, handles the question presented to the bot that is not understood or is not present in the database.

Keywords: Chatbot, Healthcare, NLP, Smart Communication, Virtual Conversation.

I. INTRODUCTION

Chat bots or Virtual Assistants have been designed to simplify the interaction between computers and humans and have hit the market. A chat bot is a software that uses Artificial Intelligence (AI) that can converse (or chat) with a user in natural language via virtual chat rooms, websites, mobile apps and messaging applications or through the telephone. Chatbots are often referred to Question Answering system based on Natural Language Processing (NLP). Generating responses to user queries in human like natural language is one of the most common examples of Natural Language Processing leveraging in various enterprises' end-use applications. Chatbot applications slicks interactions between services and people, improving customer experience.

A medical chatbot facilitates the job of a healthcare provider and helps to improve their performance by interacting with users in a human-like way. Chatbots in health care may have the potential to provide patients with access to immediate medical information, recommend diagnoses at the first sign of illness, or connect patients with suitable health care providers (HCPs) across their community.

- Chatbots are cost effective to operate and can run 24 hours a day, which is especially useful for patients may have medical concerns outside of their doctor's operating hours.

- We could decrease the physical contact by the usage of medical chatbots which will provide herbal methods to cure the disease in home itself.

II. LITERATURE SURVEY

In paper[1] it reviews 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 provides an evaluation of individual synchronous Web-based chat technologies as a mode of psychological intervention and support. Based on the current evidence of the application of this technology in this area of mental health research, we see tentative support for this mode of intervention. 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.

In paper [2] 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.

Paper[3] 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. It has some problems such as research and implementation costs, and government regulations are also challenges which are critical to the successful implementation of personalized medicine, but not addressed by the algorithms discussed in this paper

Paper [4] 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. The resultant categories were ranked according to the number of questions in each category. The majority of questions were based on what is query, comprising 47% of the posed questions. The remaining categories comprised less than 7% each of the total questions. The system has not been specially designed for the task of supporting natural dialog in chatbots or, providing responses to student queries.

Paper[5] proposed an idea to offer predictions about patients infected with hepatitis virus. A tool made to suggest a decision is able to extract information from other solved cases so it can obtain experience and can also take into consideration the results of the last researches, but won't be able to replace the most important factor in decision making: human judgment. Therefore, the final decision has to be made by a human expert. These systems are created only to suggest a solution.

Paper[6]suggest that Bot Assistants can be an efficient and low-cost solution to Patient Care.A new Conditional Entropy Retrieval Based model is proposed and also an Attitude Modeling based on Popitz Powers.. Natural language processing is a field of computer science, artificial intelligence, and computational linguistics concerned with the interactions between computers and human, natural, languages.. The latest trend applies Deep Learning on Natural Language Processing, with DeepMind one of the most widely known, currently belonging to Google Deep Mind and Microsoft's Zo Chatbot. The algorithm successfully retrieves the suitable answer with a high success rate in the patient-Bot Assistant dialogue interaction. The results show that even in small training datasets, this method outperforms up to date methods for automated communication. The issue here is, it requires a compact Adjacency Matrix based on the dialogues.

III.   SYSTEM ARCHITECTURE

The most creative and challenging face of the system development is System Design. It provides the understanding and procedural details necessary for the logical and physical stages of development. The design of the Chatbot System employs User Interface and Interaction with Bot Instance with the help of Wikipedia and information stored on Database. This whole process is determined using NLP.
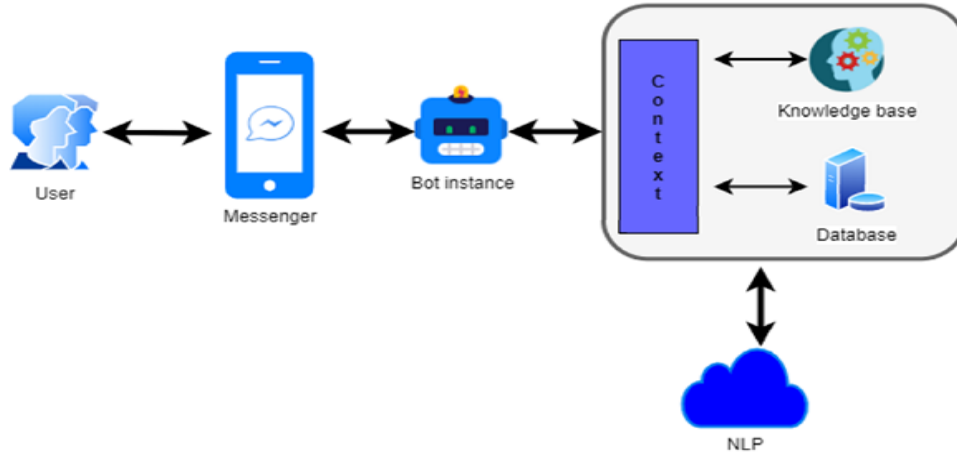
Figure 1: Architectural Design

IV.   DATA FLOW DIAGRAM

A data- flow diagram is a way of representing a flow of data through a process or system. A graphical representation that maps out the flow of information of the Chatbot System is shown below:

Level-0 Data Flow Diagram (DFD) is also known as the context diagram, shows a data system as a whole and emphasizes the way it interacts with external entities. A Data Flow Diagram (DFD) illustrate how data is processed by a system in terms of inputs and outputs. Input going into a process are different from outputs leaving the process. Data stores are first shown at this level.
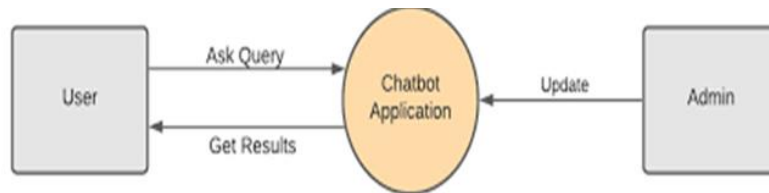
Figure 2: Level-0 DFD of Medical Chatbot

Level- 1 DFD contains more details of checking and updating here, the more processing of images is done here more segregation is done and solution is retrieved and also updated in website at this level, DFD shows how data flows inside the modules mentioned in Level 1. Higher level DFDs can be transformed into more specific lower level DFDs with deeper level of understanding unless the desired level of specification is achieved.
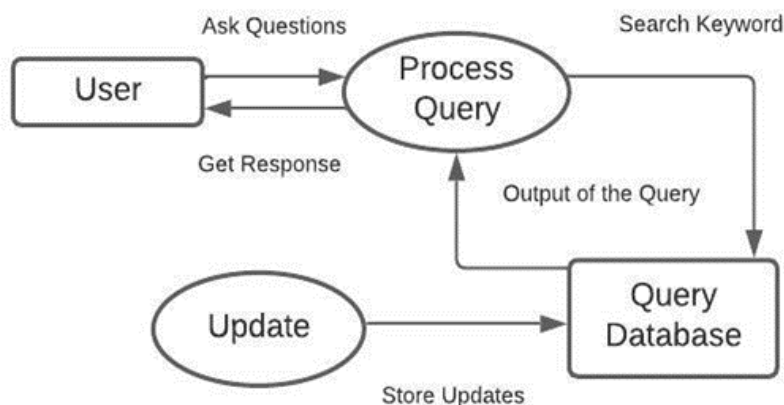
LEVEL-1:

Figure 3: Level-1 DFD of Medical Chatbot

V.   FLOW CHART DIAGRAM

A flow chart is a diagrammatic representation of an algorithm, a step-by-step approach to solving a task. The figure below represents a workflow or process of Chatbot used in Health Care which is a Question and Answer based communication between User and Bot.
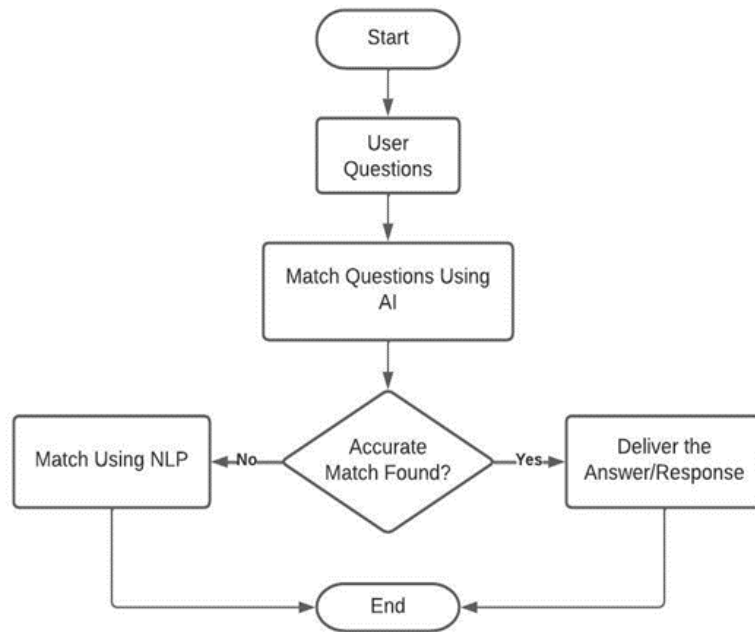

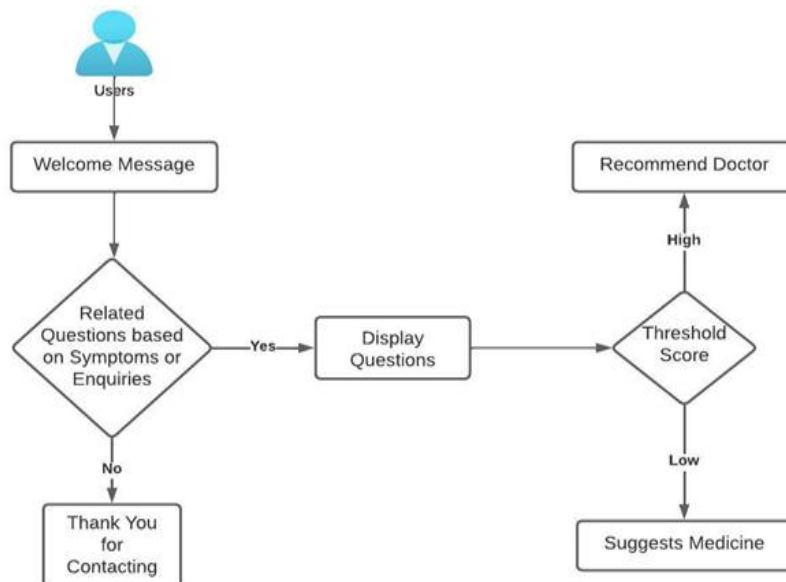**Figure 4:** Flow Chart Diagram of Medical Chatbot

Figure 5: Flow Chart Diagram of Medical Chatbot

VI.   UML DIAGRAMS

USE CASE DIAGRAM

Use case diagram describes what a user expects from a system. it represents a discrete task that involves external interaction with a system. In its simplest form, a use case is shown as an ellipse with the actors involved in the use case represented as stick figures. The patient or user visits for help and enquiries regarding health diagnosis peed symptoms using QnA interface application with Bot. There are 2 actors namely User, AI Doctor and Interactivity application i.e Query in between.
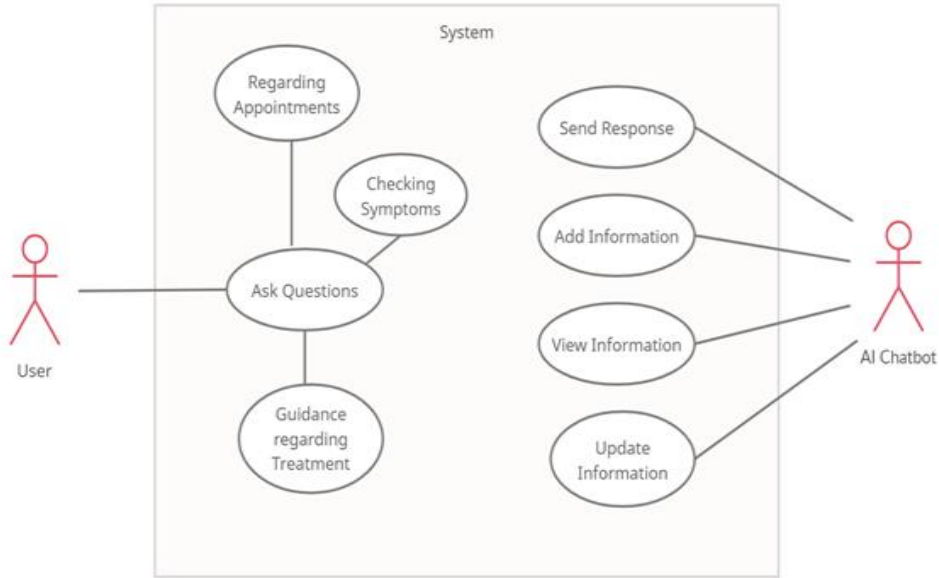
Figure 4: Use Case Diagram of Medical Chatbot

SEQUENCE DIAGRAM

Sequence diagram are the interaction diagrams. Sequence diagram represents the interactions between the actors and the objects in a system and the interactions between them. This diagram emphasizes the time ordering of messages. In the above diagram the communication between different objects of classes of the Chatbot for Health Care System is shown.

The object 'User' interacts with 'Chatbot' by sending a message. The messages between these two objects are synchronous, a reply will be given to the User object by comparing the requested query on the Bot Database. If the match is found, the respond is sent. If not, then the Bot fetches more information from Wikipedia for a detailed and friendly discussion.
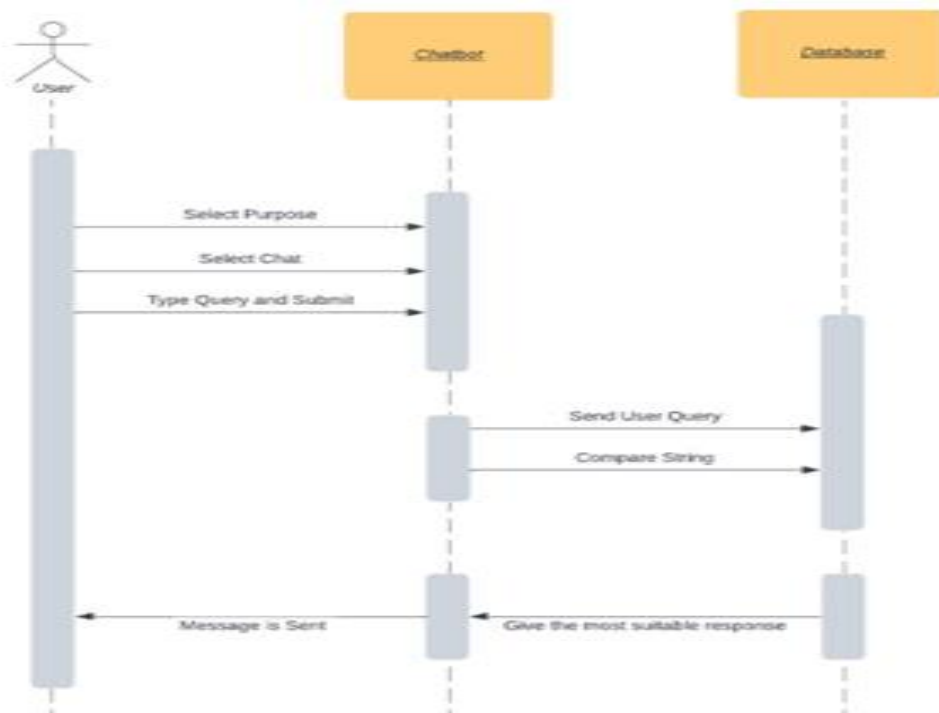

Figure 5: Sequence Diagram of Medical Chatbot

ACTIVITY DIAGRAM

Activity diagram is another important diagram in UML to describe the dynamic aspects of the system. Activity diagram is basically a flowchart to represent the flow from one activity to another activity. The activity can be described as an operation of the system.

The flow of one activity, the user to another activity, Chatbot is represented to show the activities, roles, concurrency and iteration in stepwise process.
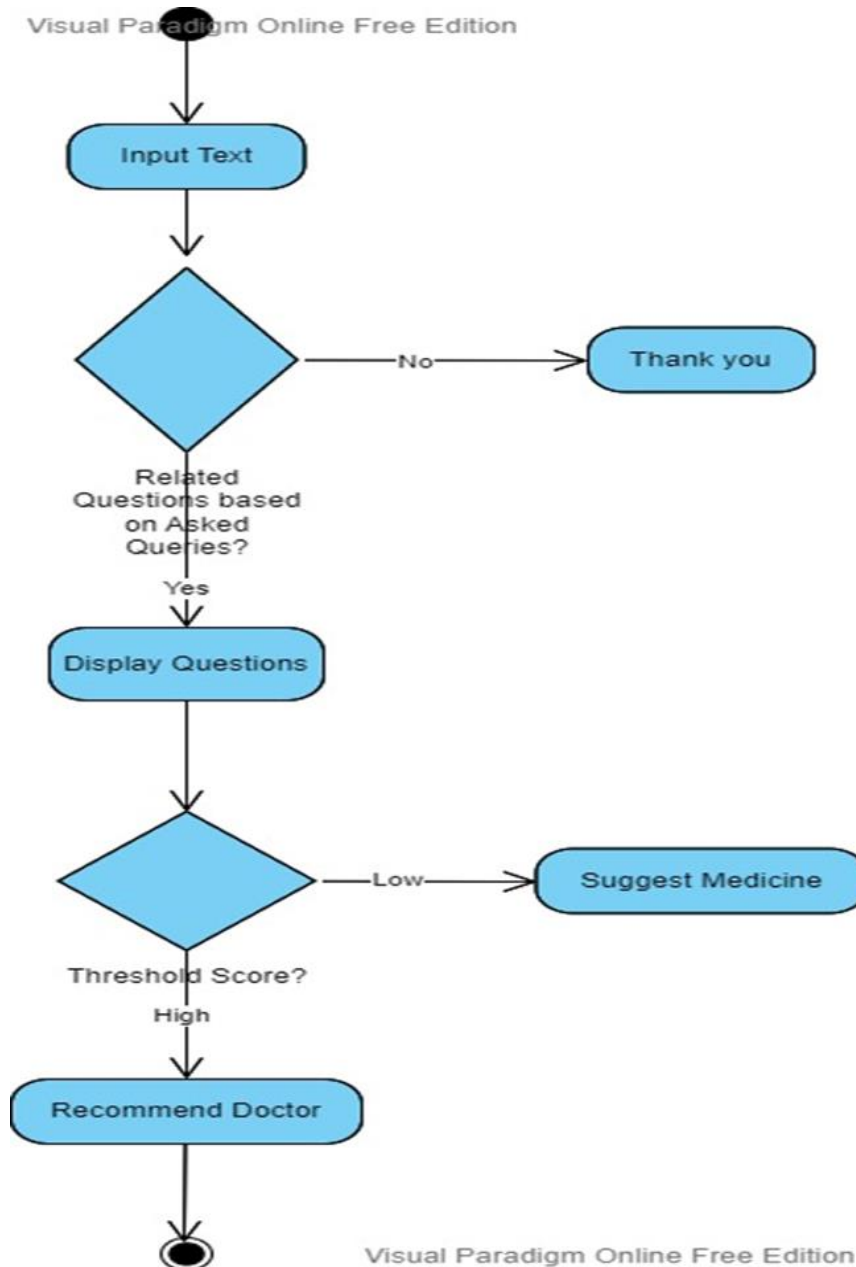

Figure 6: Activity Diagram of Medical Chatbot

CLASS DIAGRAM

Class diagram is a static diagram. It represents the static view of an application. Class diagram shows a collection of classes, interfaces, associations, collaborations, and constraints. It is also known as a structural diagram.
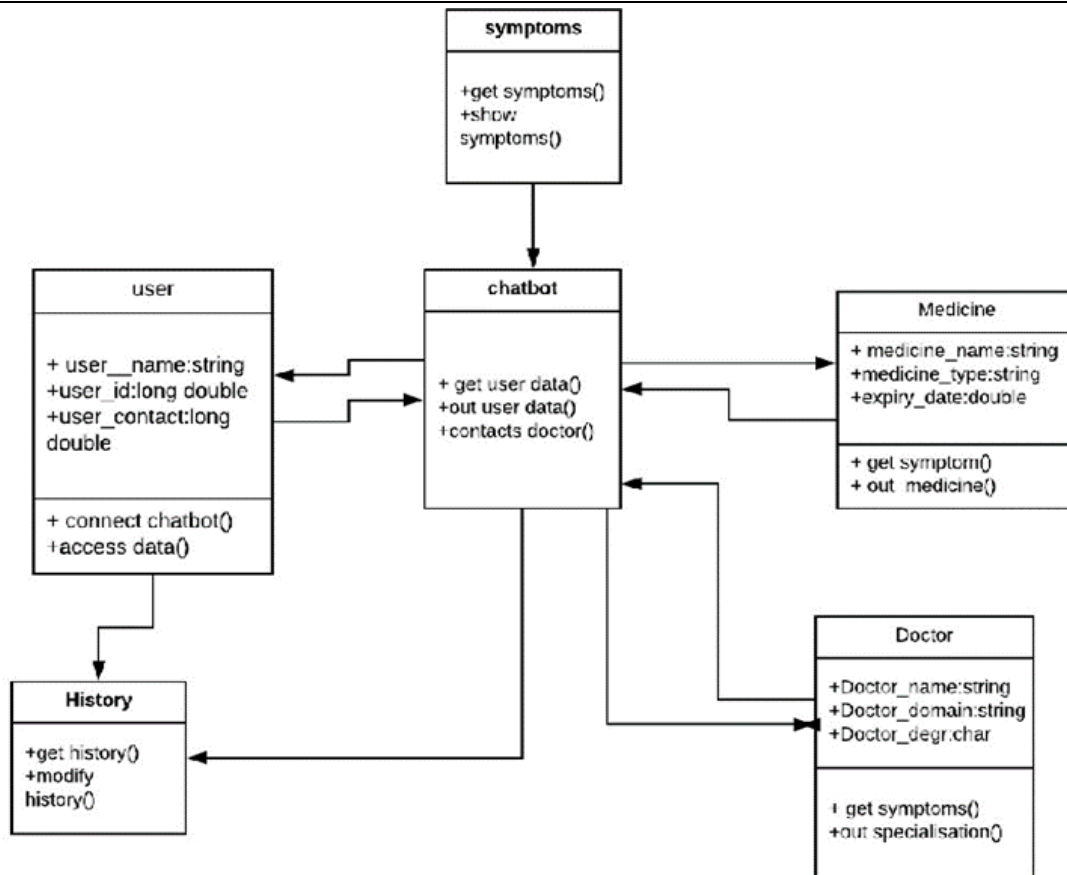
Figure 7: Class Diagram of Medical Chatbot

VII.   CONCLUSION

The proposed system is an efficient, cheap, easy and a quick way to help patients to have a one to one conversation with the Chatbot that helps and assists them to take care of their health effectively. With the chat bot help of Chat bot users can post their symptoms and get the solutions from the bot. The system can be accessed from anywhere and at anytime conveniently. The chat bot is available 24/7. We manually calculated the accuracy and got 78.24 percentage.

ACKNOWLEDGEMENT

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