Health Care Chatbot

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Abstract

Artificial intelligence (AI) is at the forefront of transforming numerous aspects of our lives by modifying the way we analyze information and improving decision-making through problem solving, reasoning, and learning. Machine learning (ML) is a subset of AI that improves its performance based on the data provided to a generic algorithm from experience rather than defining rules in traditional approaches. Advancements in ML have provided benefits in terms of accuracy, decision-making, quick processing, cost-effectiveness, and handling of complex data. Chatbots, also known as chatter robots, smart bots, conversational agents, digital assistants, or intellectual agents, are prime examples of AI systems that have evolved from ML. This paper presents Healthcare Chatbot using Artificial Intelligence that can make a human-system interaction to resolve basic queries regarding health parameters before consulting a doctor. The actual purpose behind this work is to work on the user's symptoms and to provide medical suggestions according to it, to reduce the time and cost required for the process. The chatbot works on provided input by the user, It takes sentence keywords and makes decisions to solve the user's query and answers it accordingly.

Given these effectual benefits, it is not surprising that chatbots have rapidly evolved over the past 2 decades and integrated themselves into numerous fields, such as entertainment, travel, gaming, robotics, and security. Chatbots have been proven to be particularly applicable in various health care components that usually involve face-to-face interactions. With their ability for complex dialog management and conversational flexibility, integration of chatbot technology into clinical practice may reduce costs, refine workflow efficiencies, and improve patient outcomes. A user can be able to recognize the actual disease by providing symptoms of it. As if a person will also know about the solutions or we can say precautions and remedies that they should take accordingly.

CHAPTER 1
INTRODUCTION

1.1 INTRODUCTION

Chatbots are software developed with machine learning algorithms, including natural language processing (NLP), to stimulate and engage in a conversation with a user to provide real-time assistance to patients.

Chatbots have already gained traction in retail, news media, social media, banking, and customer service. Many people engage with chatbots every day on their smartphones without even knowing. From catching up on sports news to navigating bank applications to playing conversation-based games on Facebook Messenger, chatbots are revolutionizing the way we live.

Healthcare payers, providers, including medical assistants, are also beginning to leverage these AI-enabled tools to simplify patient care and cut unnecessary costs. Whenever a patient strikes up a conversation with a medical representative who may sound human but underneath is an intelligent conversational machine we see a healthcare chatbot in the medical field in action.

1.2 Overview of artificial intelligence in digital interventions

The digital mental health care industry has recently begun to incorporate AI into existing platforms and create AI-guided products. This is being done in many ways, such as health communication, virtual reality, symptom and biomarker monitoring, mental health triage, digital phenotyping to predict outcomes, and personalization of content.

Another popular utilization of AI in DMHIs is artificially intelligent chatbots, also referred to as conversational agents or relational agents; these are computer programs integrated into DMHIs that are able to hold a conversation with the human user. The first credited chatbot, ELIZA, was developed by Joseph Weizenbaum in 1966. ELIZA was programmed to respond based on a Rogerian psychotherapeutic approach, searching user input for keywords and then applying a rule based on those keywords to provide a response. Since ELIZA, interest in chatbots has increased considerably, particularly after 2016 and within DMHIs. One review found that 39% of health chatbots focused on mental health issues and another review reported

that 41 mental health chatbots were developed in 2019 alone. Chatbots also have been developed for various groups including children, adolescents, adults, elders, and specific clinical populations. Given this tremendous growth, we focus the remainder of our review on the potential for AI-based chatbots within DHMI rather than other applications of AI.

CHAPTER 2

LITERATURE SURVEY

2   LITERATURE SURVEY

1.] An application of counseling chatbot, which provides conversational service for mental health care based on emotions recognition methods and chat assistant platform. This application doesn't consider the user's psychiatric status through continuous user monitoring.

2.] This provides a text-to-text conversational age that asks the user about their health issue. The user can chat as if chating with a human. The bot then asks the user a series of questions about their symptoms to diagnose and gives suggestions about the different symptoms to clarify the disease. Doesn't give detailed information No features such as duration, intensity of symptoms etc.

3.] In this text-based healthcare chatbots can be designed to effectively support patients and health professionals in therapeutic settings beyond on side consultations. It does not have face to face care and where THCB are likely to fail.

4.] The proposed method is a chatbot based mobile healthcare service that can immediately respond to the accidents that arise in everyday life and to the condition changes of chronic-disease patients. Also proposes a framework for the human-robot interaction that can endure an efficient implementation of the chatbot service. It is a text based bot irrespective of having all advanced features

5.] The Bot Transition program provides a framework and resources based on AAP, AFP and ACP recommendations to promote skill attainment in self-care. A scripted text messaging platform is feasible and appears to be well-received by patients and caregivers. It is designed only for people with special health needs transitioning into adolescents.

6.]]The system uses a question and answer protocol in the form of a chatbot to answer users' queries. The complex questions and answers present in the database are viewed and answered by an expert. This chatbot is comparatively time consuming.

7.]]This chatbot is an attempt to let users understand the symptoms they are facing and get a basic diagnosis about the disease they could be having. Complex interface, time consuming, high installation cost.

8.] Uses both KNN algorithm and decision tree classifier and from that more accurate one is taken and shows the output. As it uses both algorithms it is time consuming

9.] A chatbot is an interactive software application to simulate natural user interactions based on AI modeling. We have proposed a dataset for the commonly occurring medical conditions together with a prototype model to provide quick assistance to the patients.It only gives solutions for the common medical conditions.

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CHAPTER 3
PROBLEM STATEMENT

3   PROBLEM STATEMENT

Although there are many existing chatbots, there are also several problems that need to be solved to give better mental healthcare services.

Lack of voice-based communication applied in mental healthcare chatbot

Lack of diverse content of response for mental healthcare chatbot

The motivation for creating this chatbot is to provide an easier and convenient alternative way of giving mental healthcare services. This chatbot is introduced to focus on giving service to all people to ease their suffering and make their life become better. Everyone no matter who they are should have the right of getting medical help equally. Hence, it is meaningful for me to make use of the knowledge that I learned from university and contribute value to the community and make this world become better.

CHAPTER 4
METHODOLOGY

4   METHODOLOGY

The purpose of our chatbot is to give service to the people who are suffering from body problem or disease by suggesting them medicines regarding their problems. To give them 24x7 availability, we use our hardware boot as a server for client using programming.

A Chatbot is a normal application which has a database, it has an app layer and APIs to call the other external administrations. However, bots cannot comprehend what the customer has planned. It is a very common problem that must be tackled. Bots are generally trained according to the past information which is only available to them. So, in most of the organizations, chatbot maintains their logs of discussions so that they can understand their customers behavior. Makers utilize these logs to analyses what clients are trying to ask. Designers coordinate their client inquiries and reply with the best appropriate answer with the blend of machine learning tools and models. Training a chatbot is very much faster and also on a large scale as compared to human beings. A Healthcare support chatbot is filled with a very large number of conversation logs which help the chatbot to understand what kinds of

questions should be asked and answers should be given.

4.1 Hardware Requirements

- Application server optimum requirements:
  1. 32 GB RAM
  2. 8 Octa Core Processor
  3. 500 GB hard disk space[1]
  4. Ensure C: drive has 100 GB plus free Hard disk space

4.2 Software Requirements

Software Requirements:

Operating System : Windows or Linux

Technology : PYTHON, AIML

CHAPTER 5

SYSTEM ARCHITECTURE

5 SYSTEM ARCHITECTURE

A general chatbot architecture consists of five main components, a User Interface component, a Natural Language Understanding (NLU) component, a Dialogue Management (DM) component, a Backend component, and a Response Generation (RG) Component [6], as illustrated in the figure below
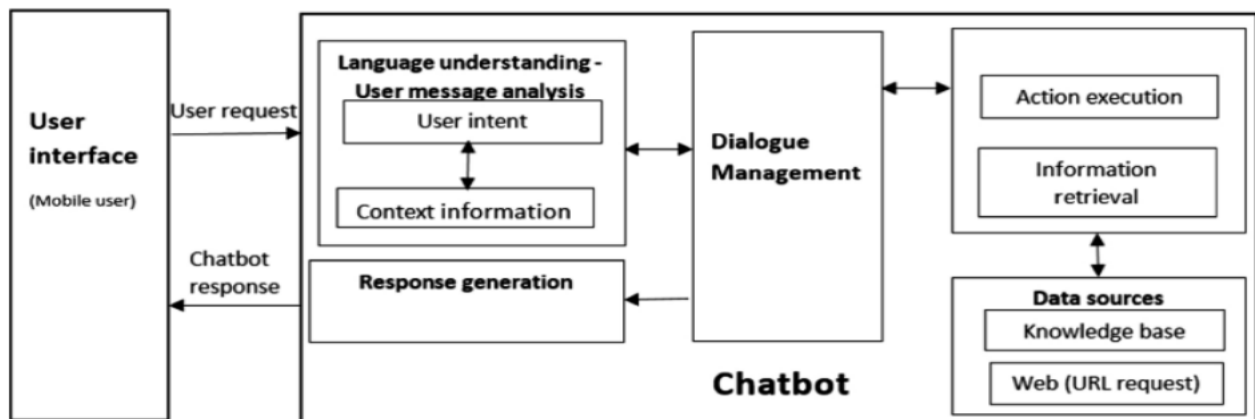

5.1 System architecture

1. Login: After clicking on the chatbot provided in the college website. the chatbots system greet the user and request the user to provide thier mail ID. After that chatbot start chatting with the user.

2. Botindex: When the user proceed to choose chatbots to get an answer to his or her query the chatbot display a page to select few options regarding college and identifies his or her category of query. If the user gets his query cleared and then the task of chatbot is completed.

3. Asking Queries: If the user is not satisfied with the rule-based response then the chatbot system request to enter his or her query in word and the suitable response is given by the chatbot. the user query is first checked in the database. if the query is valid then a suitable response is given to the user. If the query is invalid then the chatbot request user to ask queries regarding the college.
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4. Providing Feedback: After the chat, the chatbot takes feedback from the user. feedback is take

5. n in order to know the user's experience with the chatbot. if the user gives feedback positively then the bot thanks the user and provides a box to enter any further queries. if the user gives feedback negatively then the bot asks the user to elaborate his or her query in order to respond. username of the user is also stored and helps the admin to track user actions. chatbot

5.2 Use Case Diagram
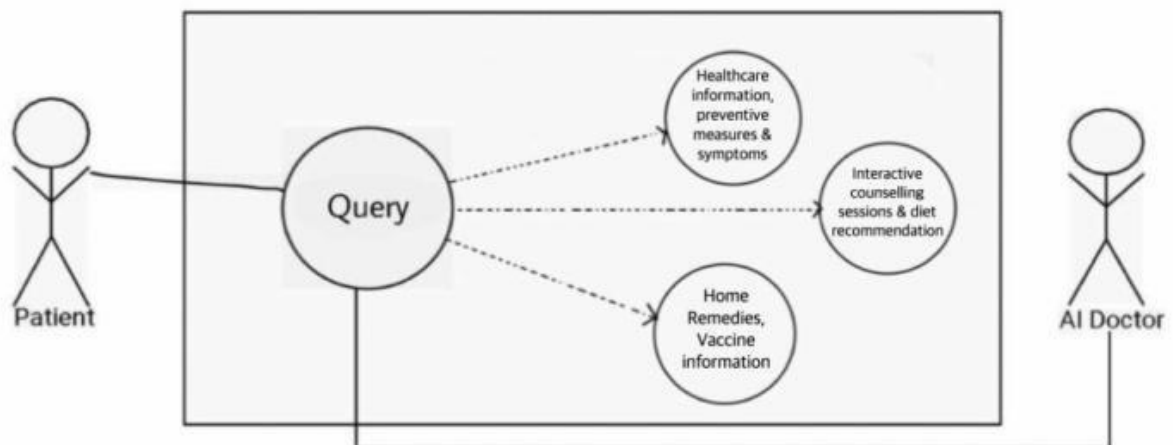
5.3 Chatbot Flowchart
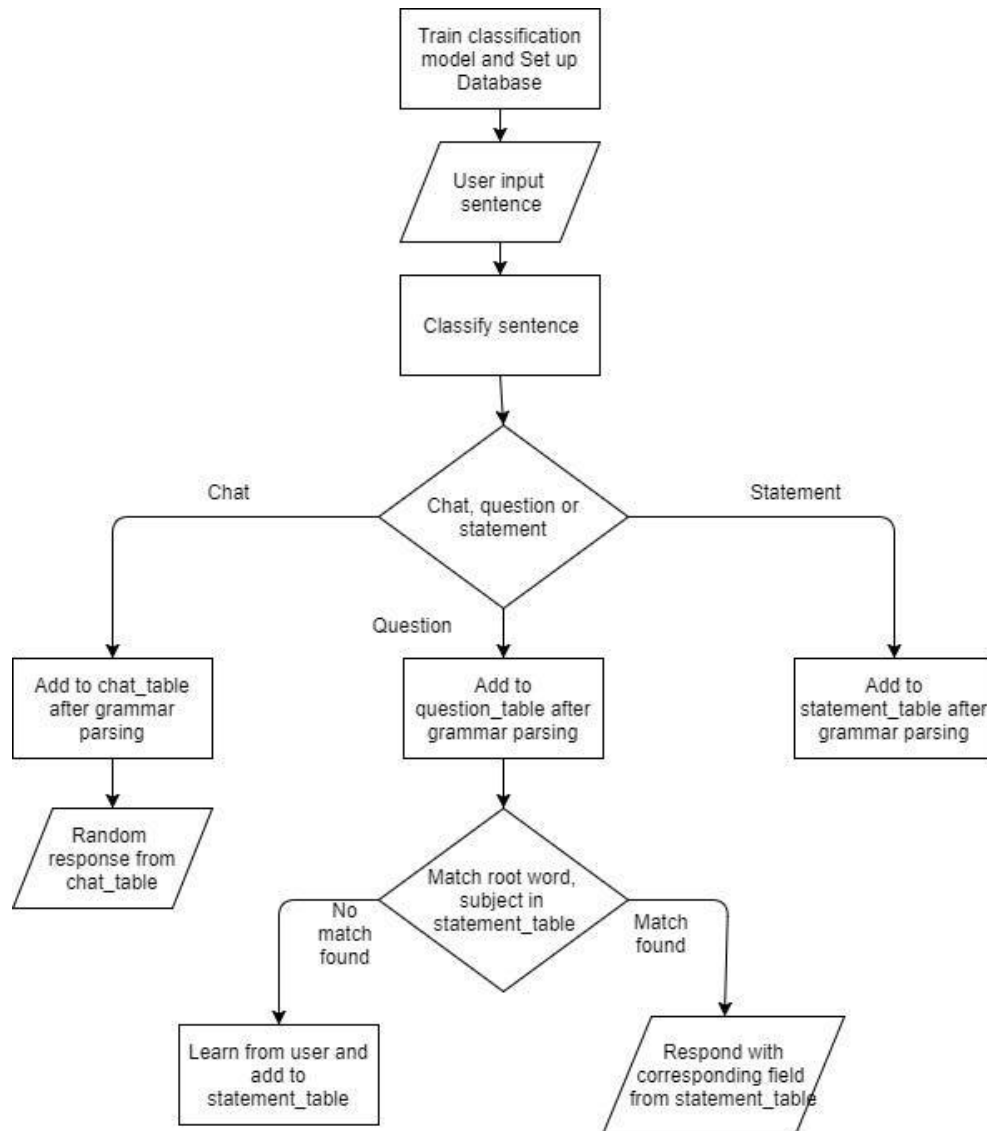
From this flowchart are used to show the flow of message from one activity to the other activity Activityis the specific operation. The user will give the personal details such as name, age, date of birth, contact number, etc. Chatbot will ask the symptoms from the user and by using natural processing language process it will respond to the disease and suggest the medicines for specific disease. Afterwards it will ask to book the appointment in the hospital. The details will be stored in the hospital database in which every staff member can access the reports . At last, the health care bot will provide the appointment details and allow user to exit the portal by ending up the conversation

5.4 Sequence Diagram
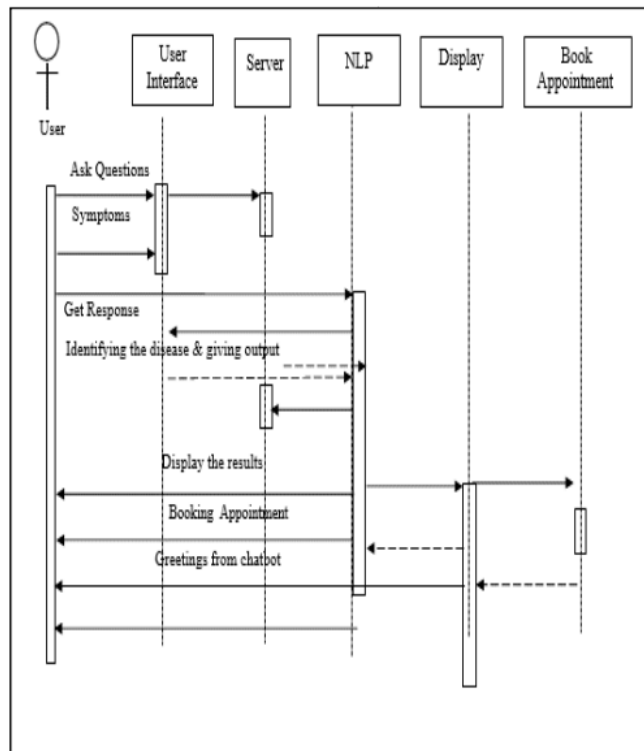
A sequence diagram simply illustrates interaction between objects in a sequential order i.e. theorder in which these interactions take place. Also the,terms event diagrams or event scenarios to refer to a sequence diagram used in a proper format.This diagram is widely used by entrepreneurs and software engineers to formulate and understand requirements for new and existing projects. The user will give the personal details such as name, age, date of birth, contact number, etc. Chatbot will ask the symptoms from the user and by using natural processing language process it will respond to the disease and suggest the medicines for specific disease. Afterwards it will ask to book the appointment in the hospital. At last, the health care bot will provide the appointment details and allow user to exit the portal by ending up the conversation.

5.1 Modules in healthcare chatbot
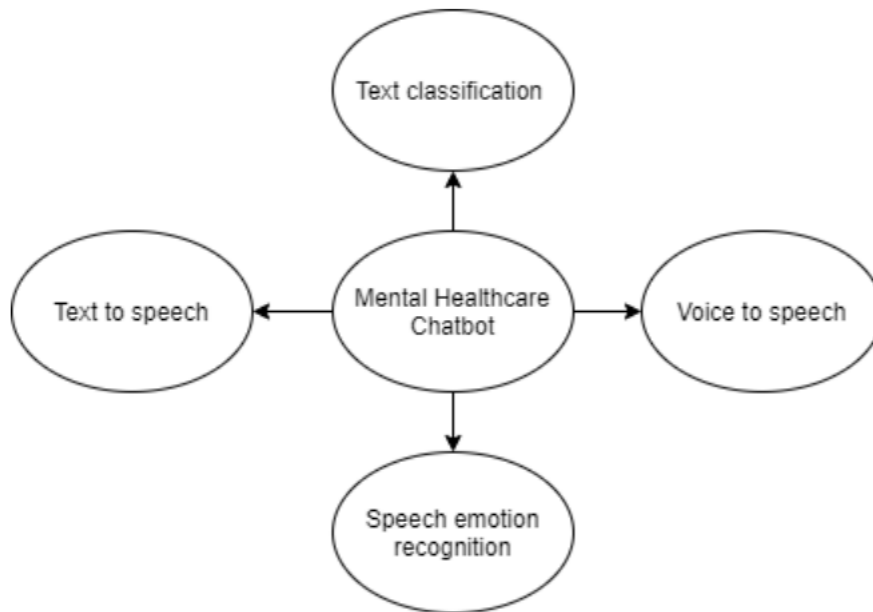
CHAPTER 6
ADVANTAGES AND DISADVANTAGES

6 Advantages and Disadvantages

6.1 Advantages:

1. Accessible anytime: I'm sure most of you are always kept on hold while operators connect you to a customer care executive. On an average people spend around 7 minutes until they are assigned to a person. Gone are the frustrating days of waiting in a queue for the next available operative. They are replacing live chat and other forms of slower contact methods such as emails and phone calls. Since chatbots are basically virtual robots they never get tired and continue to obey your command. They will continue to operate every day throughout the year without requiring to take a break. This improves your customer UX and helps you rank highly in your sector. Another advantage of this instant response is that you can also skillfully craft your chatbot to maintain your image and brand.

2. Handling Capacity: Unlike humans who can only communicate with one human at a time, chat bots can simultaneously have conversations with thousands of people. No matter what time of the day it is or how many people are contacting you, every single one of them will be answered immediately. Imagine you own a restaurant, and you have a good reputation for your food of which most of your revenues

come from delivery. As the demand keeps rising, you will have more customers to take orders from but very few staff to attend them all. Having a chatbot would eliminate such problem and cater to each and every person and ensure that no order is missed. Companies like Taco Bell and Dominos are already using chatbots to arrange delivery of parcels.

3. Flexible attribute: Chatbots have the benefit that it can quite easily be used in any industry. Unlike other products where you have to do a lot of development and testing to change platforms, chatbots are relatively easy to switch. One has to just train the bot by giving the right conversation structure and flow to switch its current field or industry. Or if there is a lot of back and forth between two sections of the industry say customer support and sales, then you could have custom built presets which would already have the conversation flow and structure to carry out the interactions with the user

. 4. Customer Satisfaction: Humans are bound to change of emotions. Chatbots, on the other hand, are bound by some rules and obey them as long as they're programmed to. They will always treat a customer in the perfect way no matter how rough the person is or how foul language the person uses. Not everyone orders the same food everyday, people's choices may change everyday. In this case, it can use your order history to make suggestions for the next order, learn your address details and much more. Customers love this smooth interaction and want all their transactions to be as simple as possible

. 5. Cost Effective: Hiring a human for a job is never a cheap affair, and it will be expensive if your revenue are not high or sales targets are not met and would create havoc in the business. Due to the boundaries of human beings, a single human can only handle one or two people at the same time. More than that would be extremely tough for the employee. Chatbots could help solve this age-old problem. As one chatbot is equal to loads of employees, it can easily communicate with thousands of customers at the same time. We would only need a handful of people to jump into conversations sometimes when necessary. Hence, it would drastically bring down the expenses and bring about a steep rise in revenue and customer satisfaction

. 6. Faster Onboarding: Before you want to accomplish a task, you first must learn how to work on the task and complete it. Only then will they be considered fit for the job. There is a continuous teaching involved in every level of hierarchy the employee will go through. Also, there will be a lot of change in the employees, some stay, some get fired, some more join in etc. What we want to say is, employees will change; it's a fact. And this would require you to allot a lot time of your employees into grooming the new joinees. Chatbots could eliminate that time to almost zero, but provide a very clean and easy to understand conversation flow and structure that needs to be maintained by the chatbot. No doubt there will be changes in this too, but it will rather take a fraction of your time to resolve as compared to human employees.

6.2 Disadvantages

1.Too many functions Most of developers strive to create a universal chatbot that will become a fully-fledged assistant to user. But in practice functional bots turn out not to cope with the majority of queries. They often do not understand the user, forget what they were told 5 minutes earlier, and have many other disadvantages. And that is no wonder, as the development of a universal bot, which would understand natural language and could evaluate context, takes years of hard work for a team of experienced programmers. And even in this case, such programs should be constantly improved while in service. However, modern technologies allow building rather useful bots to perform specific actions such as booking train tickets or providing support to bank customers.

 2.Primitive algorithms There are two types of bots: based on artificial intelligence, being able to learn in the process of communication; programmed for specific behavior scenarios. Artificial intelligence chatbots are considered to be better, as they can respond depending on the situation and context. But the development of complex algorithms is required for this purpose. Meanwhile, only IT giants and few developers possess such powerful technological base. Therefore, it would be better for ordinary companies to focus on the second variant of bots, as they are more reliable and simpler. Namely for the reason they do not possess intelligence, they w

ill not be able to adopt rude communication patterns and get beyond the control of creators. 3.Complex interface Talking to a bot implies talking in a chat, meaning that a user will have to write a lot. And in case a bot cannot understand the user's request, he will have to write even more. It takes time to find out which commands a bot can respond to correctly, and which questions are better to avoid. Thus, talking to a chatbot does not save time in the majority of cases. Perhaps the efficiency of virtual assistants will increase due to the implementation of voice recognition function in the future. But for the time being their functional capabilities are very restricted, and they can be truly useful only in a few business areas.

CHAPTER 8
PROJECT PLAN

8.1 System Implementation plan

Our Health-Care Chatbot is implemented as a web application. Health-Care Chatbot uses Artificial Intelligence and Machine Learning technologies. The best programming language for implementing the AI and ML technologies is Python. To deploy the Chatbot on the web we have used Flask Framework. The chatbot uses a dataset with approximately 130 different symptoms and 40 different types of diseases. This dataset was then cleaned, and the string fields were encoded to numerical form. After that the data is now used to train the machine learning model. The Classification Algorithms and machine learning models that are used to the dataset are Support Vector Classifier (SVC), Gaussian Naive Bayes and Random Forest Classifier. The models are implemented in Python using SVC, GaussianNB and RandomForestClassifier modules from sklearn library. After training the three models we will be predicting the disease for the input symptoms by combining the predictions of all three models. This makes our overall prediction more robust and accurate. The input symptoms will be matched to the symptoms in the dataset and the disease will be predicted accordingly. We have also used another dataset that includes the list of some doctors of Mumbai and the web link to their web page. So according to the disease that is predicted the web link of the doctor that is specialized for that particular disease treatment is provided.

CHAPTER 9
CONCLUSION

9 Conclusion

From developing and implementation perspective, chatbots or smart assistants with artificial intelligence are dramatically changing businesses. Chatbots are the new resolution especially for college websites, and ecommerce websites etc. They will reduce the customer or user service and have a significant impact on time and saving money. Chatbots provides easy and quick information to the user. And resolve many issues and queries at same time.

There are many different aspects of the implementation of a chatbot and its working with many different conversational interfaces and data sets have been presented which included interaction, the user experience design and a general reusable software architecture of chatbots.

Some of the characteristics of chatbot application were viewed as appropriate for the given context, like "effectiveness" If the Healthcare chatbot is to be further developed, this could be something to draw upon. Through this prototype try to touched when making the chatbot which gives proper solution to healthcare.

Future scope of this chatbot is very vast. The smartness and intelligence of this chatbot can be increased by conducting more study and increasing the database so that Chabot could answer all type of question about every type of disease. Audio system can also be included in this system to make this Chabot more interactive.

CHAPTER 7
Software Information

7.1 Technology

About Python:

Dating from 1991, Python is a relatively new programming language. From the start, Python was considered a gap-filler, a way to write scripts that "automate the boring stuff" (as one popular book on learning Python put it) or to rapidly prototype applications that will be implemented in one or more other languages. However, over the past few years, Python has emerged as a first-class citizen in modern software development, infrastructure management, and data analysis. It is no longer a backroom utility language, but a major force in web application development and systems management and a key driver behind the explosion in big data analytics and machine Perfect for IT, Python simplifies many kinds of work, from system automation to working in cutting-edge fields like machine learning

Python is easy to learn. The number of features in the language itself is modest, requiring relatively little investment of time or effort to produce one's first programs. Python syntax is designed to be readable and straightforward. This simplicity makes Python an ideal teaching language, and allows newcomers to pick it up quickly. Developers spend more time thinking about the problem they're trying to solve, and less time thinking about language complexities or deciphering code left by others.

Python is not a "toy" language. Even though scripting and automation cover a large chunk of Python's use cases (more on that below), Python is also used to build robust, professionalquality software, both as standalone applications and as web services

What is Python used for?

The most basic use case for Python is as a scripting and automation language. Python isn't just a replacement for shell scripts or batch files, but is also used to automate interactions with web browsers or application GUIs or system provisioning and configuration in tools such as Ansible and Salt. But scripting and automation represent only the tip of the iceberg with Python.

Python is used for general application programming. Both CLI and cross-platform GUI applications can be created with Python and deployed as self-contained executables. Python doesn't have the native ability to generate a standalone binary from a script, but third-party packages like cx_Freeze or PyInstaller can be used to accomplish that. • Python is used for data science and machine learning. Sophisticated data analysis has become one of fastest moving areas of IT and one of Python's star use cases. The vast majority of the libraries used for data scienc

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e or machine learning have Python interfaces, making the language the most popular high-level command interface to for machine learning libraries and other numerical algorithms. • Python is used for web services and RESTful APIs. Python's native libraries and third-party web frameworks provide fast and convenient ways to create everything from simple REST APIs in a few lines of code, to full-blown, data-driven sites. Python's latest versions have powerful support for asynchronous operations, allowing sites to handle up to tens of thousands of requests per second with the right libraries. • Python is used for metaprogramming. In Python, everything in the language is an object, including Python modules and libraries themselves. This allows Python to work as a highly efficient code generator, making it possible to write applications that manipulate their own functions and have the kind of extensibility that would be difficult or impossible to pull off in other languages.

CHAPTER 9
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9. REFERENCES

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