

ARTIFICIAL INTELLIGENCE-BASED CHATBOT FOR PATIENT HEALTH CARE

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering degree in Computer Science and Engineering

by

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SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **YADLA JAYA NAGA SAI SWETHA(40111458)** and **YANDRAPATI SRIHARI(40111463)** who carried out Project work entitled "**ARTIFICIAL INTELLIGENCE-BASED CHATBOT FOR PATIENT HEALTH CARE**" under my supervision from November 2023 to April 2024

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DECLARATION

I, **YANDRAPATI SRIHARI**(Reg. No- 40111463), hereby declare that the Project Report entitled "**ARTIFICIAL INTELLIGENCE BASED CHATBOT FOR PATIENT HEALTH CARE**" done by me under the guidance of **Dr.M.Sankari.M.E.,Ph.D** is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in **Computer Science and Engineering**.

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ABSTRACT

Medical care is very important for a healthy life. However, it is very difficult to seek medical attention if you have a health problem. The recommended notion is to develop a medical Chatbot that can adopt ML to analyze the ailment and produce necessary information concerning the condition we are discussing with a doctor. Medical chatbots were built to reduce medical costs and improve access to medical knowledge. Some chatbots serve as medical manuals to help patients become aware of their illnesses and improve their health. Users can assuredly benefit from chatbots if they can diagnose several kinds of illnesses and render the required data. Text Diagnosis Bot enables sufferers to join in analyzes of their medicinal matters and present a personalized analysis report concerning the symptoms. Therefore, people have opinions about their well-being and individual stability. The chatbots are computer programs that use natural language to interact with users. The chatbot stores the data in the database to identify the sentence keywords to make a query decision and answer the question. Ranking and sentence similarity calculation is performed using n-gram, TFIDF, and cosine similarity. 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. The chatbot is a product application intended to recreate discussions with human clients through intuitive and customized content. It is often portrayed as the most moving and promising articulation of communication among people and machines utilizing Artificial Intelligence and Natural Language Processing (NLP). Through this, we aim to create a fully functional chatbot that will help the patients/users know about the disease by simply entering their symptoms. Another feature is the bot's ability to answer general questions regarding healthcare and well-being.

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CHAPTER-1

INTRODUCTION

Medical chatbot has a high impact on the health culture of the state. It has improved reliability and is less prone to human errors. Today's people are more likely addicted to the internet but they are not concerned about their health. They avoid hospital treatment for small issues which may become a major disease in the future. This proposed idea solves this problem. This idea focuses on creating a chatbot that is free of cost and available throughout the day. The fact that the chatbot is free and can be accessed wherever the user is, be it their working environment, prompt the user to have it and use it. It saves the overhead involved in consulting specialized doctors. Machine Learning is now at its peak and chatbot is just one example of its use to contribute to progress. It should also be made clear that chatbots are not designed to diagnose patients. The idea presented was to use Machine Learning to create a medical chatbot that could provide some basic details about the disease before consulting a doctor. Text-to-text medical chatbots enable patients to talk about their medical problems and provide personalized diagnoses based on symptoms. The patient can then be transferred to a specialist. This sequence of things fundamentally saves the doctor's time. In turn, chatbots are always available to help people in need of medical assistance. In addition, the virtual assistant may be responsible for reminding users to take medication and monitoring the patient's health status. Generally, chatbots communicate with real people. Chatbots are used in applications such as e-commerce customer service, call centers, and internet games. However, with a chatbot, one can communicate with a text or voice interface and get responses through Machine Learning.

Artificial intelligence (AI) and machine learning (ML) are transforming the healthcare industry, offering innovative solutions to longstanding challenges. One such solution is the development of AI-based chatbots for patient healthcare. These chatbots serve as virtual medical assistants, providing users with instant access to medical information, symptom analysis, and guidance on preventive measures.

Factors such as geographical barriers, limited resources, and high costs hinder individuals from seeking timely medical assistance. The goal of this project is to address these challenges by developing an AI-based chatbot that can provide accurate and reliable medical information, assist in identifying symptoms and health conditions, and offer guidance on preventive measures. The chatbot will be designed to be user-friendly and accessible, integrating ML algorithms for symptom analysis and disease identification. It will collaborate with healthcare professionals to ensure the accuracy and reliability of the information provided. Overall, AI-powered chatbots have the potential to transform the healthcare industry. By providing instant access to medical information and guidance, these chatbots can improve healthcare access, reduce costs, and empower individuals to take control of their health. This project represents a step towards harnessing the power of AI and ML to address the healthcare challenges of today and tomorrow.

1.1 PROBLEM STATEMENT AND OBJECTIVE

The user can do the important advantage of a chatbot only it can diagnose all quite diseases and supply the necessary information. text-to-text diagnosis bot connects patients about their medical issues and gives a customized diagnosis to support their symptoms. Hence, people will think about their health and have the proper protection.

DOMAIN

ARTIFICIAL INTELLIGENCE

CHAPTER-2

LITERATURE SURVEY

[1]Ananya Singh et al. 2023 - This research study provides a literature review of technological advancements in CAI agents designed to cope with challenges in the healthcare industry. This research study aims to provide solutions to doctors, nurses, and healthcare administration by solving everyday organizational challenges and improving their productivity using CAI agent capabilities.

[2]Kevin Dedy Setiawan et al. 2023- This evaluation focuses on the use of AI chatbots in disorder diagnosis, to explore their effectiveness and ability in early interventions and remedies. The purpose of this systematic literature review is to investigate studies using AI chatbot generation in disease prognosis. A systematic overview of the literature changed into done, studying a complete of four decided critiques according to predefined inclusion and exclusion standards. The evaluation protocol worried reviewing studies posted in exceptional years with a unique cognizance on papers from 2020 onwards. Research indicates that AI chatbots can play an important role in helping healthcare professionals expect disorder and make knowledgeable decisions. AI chatbot generation has a tremendous ability in disease prediction. By the use of algorithms and systems to gain knowledge of capabilities, chatbots can improve the accuracy and pace of diagnosis. Continued studies and development efforts are needed to harness the abilities of AI chatbots and remodel healthcare transport to improve patient effects and sickness management.

[3]Renaldo Robert Sanjaya et al.2023- The assessment protocol worried inspecting studies published in exceptional years, with a selected attention on papers from 2020 onwards. The effects advise that AI chatbots will play a vital position in supporting healthcare professionals to document ailments and make knowledgeable selections. AI chatbot era has extensive capacity in ailment prediction. By the use of algorithms and device to gain knowledge of skills, chatbots can improve the accuracy and speed of prognosis. Continued studies and improvement efforts are had to harness the

abilities of AI chatbots and remodel healthcare transport to improve patient consequences and disease management.

[4]Md Afiful Islam Mosumder et al.2023- The goal is to discover the numerous opportunities for carrying out consultations, remedies, and different medical processes using Metaverse with the assistance of NLP. For this purpose, we suggest an approach that includes the evaluation of texts and sounds near the environment, to be able to create a more immersive reveal, hence presenting a higher degree of conversation among the affected person and the medical doctor. In this well-known studies model, we advocate our technique with moral counseling and therapeutic applications. Implementing this approach will result in a sensible and dependable patient monitoring gadget that sufferers and clinicians can agree with the way to the immersive experience created by Metaverse.

[5]Deborah Sattler et al. 2023- This takes a look at proposes to integrate conversational AI into social research platforms to promote non-public narratives for the aged, palliative care needs, or inclined patients from distinct linguistic groups. This has a look at highlights the abilities of AI-based analytics and proposes the use of this era to investigate fitness survey data and create personalized tales that meet the unique desires of every character. The proposed approach aims to enhance affected person engagement with the aid of enhancing affected person care and providing the shrewdest advice derived from survey responses.

[6]Akshayta singh et al.2021-Public coverage performs an essential function in determining the development of a nation. Cost, high-quality and accessibility of health offerings determine the nice of fitness. In view of this, these studies work pursuits to broaden an IoT-based health package with a transportable, light, light and low electricity electronic fitness gadget. Prepares and video display units fitness parameters which includes temperature, ECG, heart rate, blood strain and so forth. It offers unique affected person monitoring and care help to reinforce the country's fitness machine from rural to city areas. The kit is available 24/7 because actual-time data can be stored and retrieved from the cloud each time, everywhere. A full-size trouble in rural India is the health practitioner-patient ratio of one:10,000, that is

already being solved with this package, as docs across India can now get right of entry to records from the charts. In addition, our Rasa-primarily based NLP AI bot enables sufferers diagnose their ailments, prescribe remedies, agenda health practitioner appointments and inform caregivers with greater accurate checking out. A web application is also supplied to extend our machine's usability.

[6]Fabian Berns et al.2023-Despite current advances in AI and information technological know-how, the huge quantity of massive statistics to be had by medical and healthcare companies has no longer matched its capacity. Addressing key worries approximately information transparency and protection will help free up these advances in medication and, as a consequence aid research and patient care. Next, in this article, I advise a gadget for the specific function of scientific AI. We set out our imagination and prescience to align the scientific functionality of AI with the regulatory necessities of the scientific industry. We recommend guiding standards for data-pushed diagnostic guidelines based on felony frameworks, medical ethics, and professional reasoning. Through this research, we propose scientific AI structures that now not only provide accurate predictions but also allow customers to understand and consider the underlying choice-making strategies.

[7]K. Venkatesh et al.2023-These robots use artificial intelligence to understand how humans enter and reply correctly. Three vital areas to recognize are medication, health, agriculture, and education. Today, chatbots may be used everywhere wherein everybody can speak to a PC at any time. The fastest developing mercenary areas are customer service, sales, advertising and vending, and human assets. These predictive offerings are being made viable by different chatbots (especially inside the medical area) via advances in AI and facts mining technology. Due to the changing lifestyle in the contemporary global, the number of patients is growing hastily each day. As a result, local sanatorium and sanatorium systems are developing unexpectedly. Doctors have to wait longer for patients with busy schedules. Other illnesses take longer to heal. Worldly, coronary heart sickness and lung sickness are common problems. Heart assaults kill four, 444 old and young each day.

[8]T. Poongodi et al.2022- He approached who used to treat human beings like that. The review presents an original PC application designed as a non-public virtual expert, well-programmed and geared up to collaborate in my opinion with patients. The utility is based on unserviceable gadgets and presents complete control of preventive measures, home remedies, herbal schooling sessions, hospital therapy recommendations and expert coverage of diseases well-known in India. Artificial intelligence is gradually being used in scientific offerings. Here, AI-primarily based frameworks for chatbots include robotic verbal exchange, enhancing properly-being, managing college attendance and inducing behavioral adjustments. Investigating the incentive for the use of fitness chatbots can expect adoption. This conversational utility lowers the barriers to entry in scientific workplaces and shrewd places of work, to put in force precise care and exceptional remedy remotely, simply assisting the public.

[9]P. Gopinath et al.2022- Although India is a developing country with a population of more than 1.3 billion, drug shortages are a vital problem here. Not only the authority's health facility but also the government sanatorium was visited and it changed into observed that there are not enough doctors to cope with the increase in populace and the shortage of docs is one of the reasons for the demise of patients. To conquer those troubles, we decided to increase a clinical chatbot with the use of artificial intelligence that would provide instantaneous access to any questions from clinical facts. These chatbots assist the patient in finding the closest specialist and timetable appointments. If the user is affected by fever by asking a series of questions, the chatbot can provide preventive measures based on the person's responses or recommend an agenda based on the user's and professional's nearest professionals.

2.1 CONTEXTUAL CHATBOT FOR HEALTHCARE PURPOSES

As the demand for Machine Learning & AI keeps growing, new technologies will keep coming into the market which will impact our day-to-day activities, and one such technology is Virtual Assistant Bots or simply Chatbots. Chatbots have evolved from being Menu/Button based, to Keyword-based and now Contextual based. The most

advanced among all of the above is contextual-based because it uses Machine Learning and Artificial Intelligence techniques to store and process the training models which help the chatbot to give better and appropriate responses when the user asks domain-specific questions to the bot. In this paper we will be not only discussing the working of our model but also the applications and relevant work conducted in this domain, also there will be a discussion about the challenges and future scope of this technology.

2.2 HEALTH CARE CHATBOT USING NATURAL LANGUAGE PROCESSING

The proposed idea is to create a healthcare chatbot using the Natural Language Processing technique it is the part of Artificial Intelligence that can diagnose the disease and provide basic. To reduce healthcare costs and improve accessibility to medical knowledge the Healthcare chatbot is built. Some chatbots act as a medical reference book, which helps the patient know more about their disease and helps to improve their health. The Bot will provide which type of disease is based on the user's symptoms. 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) and Natural Language Processing (NLP) techniques such as NLTK for Python, which can be applied to analyze and intelligent responses can be found by designing an engine to provide appropriate human-like responses.

2.3 EXISTING SYSTEM AND PROPOSED SYSTEM

2.3.1 EXISTING SYSTEM

A conversational agent that interacts with the user using natural language is called a Chatbot. Many chatbots have been developed using text communication starting from ELIZA which simulates a psychotherapist to PARRY which simulates a paranoid patient. ELIZA is a well well-known artificial therapist. The bot attempts to rephrase the client's questions and responds to certain keywords. If no keyword is found ELIZA

replies with fixed phrases to keep the conversation going. Medicine is a field in which help is critically needed.

A) Open Problems in Existing System

Existing medical chatbots often struggle with accuracy, especially in diagnosing complex conditions and providing reliable health information. They also face challenges in understanding diverse user inputs, maintaining user privacy, and integrating with existing healthcare systems. Improving these aspects can enhance the effectiveness and trustworthiness of medical chatbots.

2.3.2 PROPOSED SYSTEM

The proposed idea is to make a medical chatbot using AI which will diagnose the disease and supply basic details about the disease before consulting a doctor. To scale back the healthcare costs and improve accessibility to medical knowledge the medical chatbot is made. A few chatbots act as reference books, which help the patient find out about the illness and assist with improving their well-being. The user can take the important advantage of a chatbot only it can diagnose all quiet diseases and supply the necessary information. Text-to-text diagnosis bot connects patients about their medical issues and gives a customized diagnosis to support their symptoms. Hence, people will have thought about their health and have the proper protection.

CHAPTER 3

REQUIREMENT ANALYSIS

INTRODUCTION

This project aims to develop an artificial intelligence-based chatbot for patient healthcare. This chatbot will utilize machine learning algorithms to analyze symptoms provided by users and offer preliminary information about possible diseases before consulting a doctor. The primary objective is to improve access to medical knowledge and reduce healthcare costs by providing a free and accessible platform for users to receive personalized medical assistance.

3.1 AIM

The main aim of this study is to develop a chatbot that can effectively assist users in understanding their health issues and provide them with relevant information and guidance. This chatbot will integrate natural language processing with deep learning to enhance its ability to understand and respond to user queries.

3.2 OBJECTIVES

The specific objectives of this project are as follows:

1. Develop a chatbot capable of understanding natural language inputs related to medical symptoms.
2. Integrate machine learning algorithms to analyze symptoms and provide personalized diagnosis reports.
3. Ensure the chatbot is accessible 24/7, reducing the need for immediate hospital visits for minor issues.

3.3SCOPE OF THE STUDY

4. **Development of a Chatbot:** The study will focus on developing a chatbot capable of understanding natural language inputs related to medical symptoms and providing accurate and relevant information to users.
5. **Integration of Machine Learning:** The chatbot will integrate machine learning algorithms to analyse symptoms and provide personalized diagnosis reports based on the input provided by users.
6. **Accessible Healthcare:** The chatbot will be accessible throughout the day, allowing users to seek medical assistance at any time, thereby reducing the need for immediate hospital visits for minor issues.
7. **Collaboration with Healthcare Providers:** The study will explore the possibility of collaborating with healthcare providers to integrate the chatbot into their systems and workflows, improving coordination of care and patient outcomes.
8. **Future Enhancements:** The study will also discuss potential future enhancements to the chatbot, such as integration with electronic health records, multilingual support, and continuous learning mechanisms to improve diagnosis accuracy over time.

Overall, the aim and scope of this investigation are to develop an artificial intelligence-based chatbot that can provide personalized medical assistance to users, improving access to healthcare and reducing healthcare costs.

3.3 SYSTEM STUDY

3.4.1 FEASIBILITY STUDY

The feasibility of the project is analyzed in this phase and the business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis, the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

1. ECONOMICAL FEASIBILITY
2. TECHNICAL FEASIBILITY
3. SOCIAL FEASIBILITY

1. *Economic Feasibility*

This study is carried out to check the economic impact that the system will have on the organization. The amount of funds that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus, the developed system is well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

2. *Technical Feasibility*

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

3. *Social Feasibility*

The aspect of the study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

3.4.2 SYSTEM TESTING

System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An

example of system testing is the configuration-oriented system integration test. System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points.

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub-assemblies, assemblies, and/or a finished product. It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail unacceptably. There are various types of tests. Each test type addresses a specific testing requirement.

I. White Box Testing

White Box Testing is a testing in which the software tester knows the inner workings, structure, and language of the software, or at least its purpose. It is purpose. It is used to test areas that cannot be reached from a black box level.

II. Black Box Testing

Black Box Testing is testing the software without any knowledge of the inner workings, structure, or language of the module being tested. Black box tests, like most other kinds of tests, must be written from a definitive source document, such as specification or requirements document, such as specification or requirements document. It is a testing in which the software under test is treated, as a black box. you cannot “see” into it. The test provides inputs and responds to outputs without considering how the software works.

3.5 TYPES OF TESTING

1.UNIT TESTING

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application.it is done after the completion of an

individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at the component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

Unit testing is usually conducted as part of a combined code and unit test phase of the software lifecycle, although it is not uncommon for coding and unit testing to be conducted as two distinct phases.

a. Test strategy and approach

Field testing will be performed manually and functional tests will be written in detail.

b. Test objectives

All field entries must work properly.

Pages must be activated from the identified link.

The entry screen, messages, and responses must not be delayed.

c. Features to be tested

Verify that the entries are of the correct format

No duplicate entries should be allowed

All links should take the user to the correct page.

2. INTEGRATION TESTING

Integration tests are designed to test integrated software components to determine if they run as one program. Testing is event-driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfied, as shown by successful unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components. Software integration testing is the incremental integration testing of two or more integrated software components on a single platform to produce failures caused by interface defects. The task of the integration test is to check that components or

software applications, e.g. components in a software system or – one step up – software applications at the company level – interact without error.

Test Results: All the test cases mentioned above passed successfully. No defects were encountered.

3.ACCEPTANCE TESTING

User Acceptance Testing is a critical phase of any project and requires significant participation by the end user. It also ensures that the system meets the functional requirements.

Test Results: All the test cases mentioned above passed successfully. No defects were encountered.

4.FUNCTIONAL TESTING

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Functional testing is centered on the following items:

1. Valid Input: identified classes of valid input must be accepted.
2. Invalid Input: identified classes of invalid input must be rejected.
3. Functions: identified functions must be exercised.
4. Output: identified classes of application outputs must be exercised.
5. Systems/Procedures: interfacing systems or procedures must be invoked.

Organization and preparation of functional tests are focused on requirements, key functions, or special test cases. In addition, systematic coverage on identifying Business process flows; data fields, predefined processes, and successive processes must be considered for testing. Before functional testing is complete, additional tests are identified and the effective value of current tests is determined.

3.5 SYSTEM REQUIREMENTS

a. Hardware Requirements

System: Pentium Dual Core.

Hard Disk: 120 GB.

Monitor: 15" LED

Input Devices: Keyboard, Mouse

Ram: 4 GB.

b. Software Requirements

Operating system: Windows 7/10.

Coding Language: Python

3.5.1 What Does System Requirements Mean?

System requirements are the configuration that a system must have for a hardware or software application to run smoothly and efficiently. Failure to meet these requirements can result in installation problems or performance problems. The former may prevent a device or application from getting installed, whereas the latter may cause a product to malfunction perform below expectations, or even hang or crash. This activity of defining and verifying requirements takes place in both agile and waterfall methodologies.

3.5.2 Techopedia explains System Requirements

For packaged products, system requirements are often printed on the packaging. For downloadable products, the system requirements are often indicated on the download page. System requirements can be broadly classified as functional requirements, data requirements, quality requirements, and constraints. They are often provided to consumers in complete detail. System requirements often indicate the minimum and the recommended configuration. The former is the most basic requirement, enough for a product to install or run.

performance is not guaranteed to be optimal. The latter ensures a smooth operation. Some hardware/software manufacturers provide an upgrade assistant program that users can download and run to determine whether their system meets a product's requirements.

A. Key differences and similarities between system requirements and functional specifications

1. System requirements

System requirements are the high-level descriptions of what a software system should do and how it should perform. They define the scope, objectives, and constraints of the system, as well as the expectations of the stakeholders and users. System requirements can be divided into two categories: functional and non-functional. Functional requirements specify the features and functions of the system, while non-functional requirements describe the quality attributes and performance criteria of the system, such as reliability, usability, security, and scalability.

2. Functional specifications

Functional specifications are the detailed descriptions of how a software system should implement the functional requirements. They provide the technical details, algorithms, data structures, user interfaces, and workflows of the system. Functional specifications are usually written by software developers or engineers, based on the system requirements provided by the clients or analysts. Functional specifications can be expressed in various formats, such as text documents, diagrams, models, or code.

CHAPTER 4

DESCRIPTION OF PROPOSED SYSTEM

In this section, we present the proposed system, which is an AI-based chatbot for patient health care. The chatbot aims to provide users with a convenient and accessible way to receive medical advice and information about their health concerns. By leveraging machine learning algorithms, the chatbot can analyze user input, identify symptoms, and provide relevant information and recommendations.

4.1 FLOW CHART OF THE PROCESS

The flow chart illustrates the step-by-step process that the chatbot follows when interacting with users. It includes the stages of user input, symptom analysis, disease identification, and response generation. The flow chart helps visualize the logic and decision-making process of the chatbot.

4.1.1 DATA FLOW DIAGRAM:

The DFD is also called a bubble chart. It is a simple graphical formalism that can be used to represent a system in terms of input data to the system, various processing carried out on this data, and the output data is generated by this system. The data flow diagram (DFD) is one of the most important modeling tools. It is used to model the system components. These components are the system process, the data used by the process, an external entity that interacts with the system and the information flows in the system.

DFD shows how the information moves through the system and how it is modified by a series of transformations. It is a graphical technique that depicts information flow

and the transformations that are applied as data moves from input to output. DFD is also known as a bubble chart. A DFD may be used to represent a system at any level of abstraction. DFD may be partitioned into levels that represent increasing information flow and functional detail.

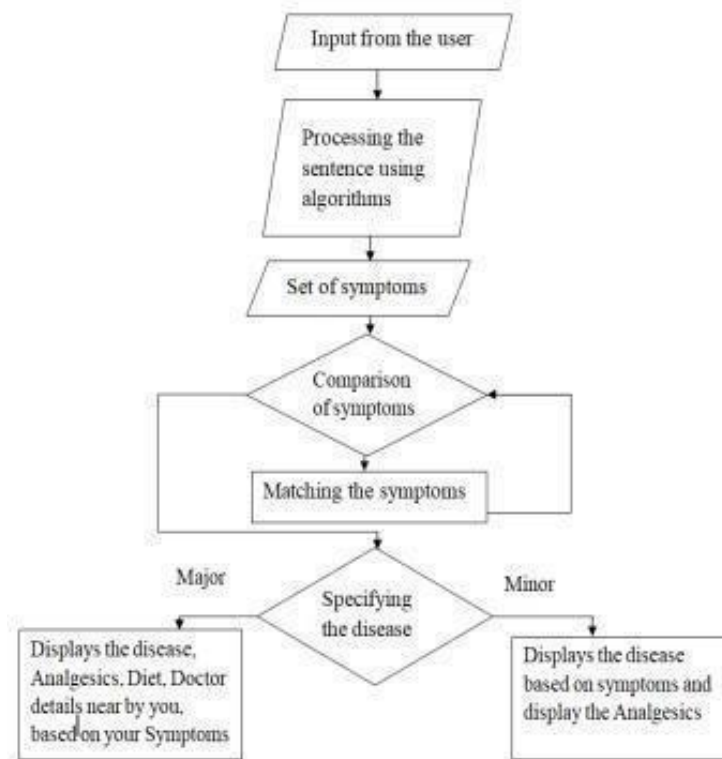


FIG 4.1 Data Flow Diagram of Chatbot

4.1.2 UML DIAGRAMS

UML stands for Unified Modeling Language. UML is a standardized general-purpose modeling language in the field of object-oriented software engineering. The standard is managed and was created by, the Object Management Group. The goal is for UML to become a common language for creating models of object-oriented computer software. In its current form, UML is comprised of two major components: a Meta-model and a notation. In the future, some form of method or process may also be added to; or associated with, UML. The Unified Modeling Language is a standard language for specifying, Visualization, Constructing, and documenting the artifacts of software systems, as well as for business modeling and other non-software systems.

The UML represents a collection of best engineering practices that have proven successful in the modeling of large and complex systems. The UML is a very important part of developing object-oriented software and the software development process. The UML uses mostly graphical notations to express the design of software projects.

A. Types of UML Diagrams

UML diagrams can be sorted into two categories: structural and behavioral. Structural diagrams map out the components of a system, while behavioral diagrams describe how those components interact together.

B . GOALS:

1. The Primary goals in the design of the UML are as follows
2. Provide users with a ready-to-use, expressive visual modeling Language so that they can develop and exchange meaningful models.
3. Provide extensibility and specialization mechanisms to extend the core concepts.
4. Be independent of particular programming languages and development processes.
5. Provide a formal basis for understanding the modeling language.
6. Encourage the growth of the OO tools market.
7. Support higher-level development concepts such as collaborations, frameworks, patterns, and components.
8. Integrate best practices.

1.USE CASE DIAGRAM:

A use-case diagram in the Unified Modeling Language (UML) is a type of behavioral diagram defined by and created from a Use-case analysis. Its purpose is to present a graphical overview of the functionality provided by a system in terms of actors, their goals (represented as use cases), and any dependencies between those use cases.

The main purpose of a use case diagram is to show what system functions are performed for which actor. Roles of the actors in the system can be depicted.

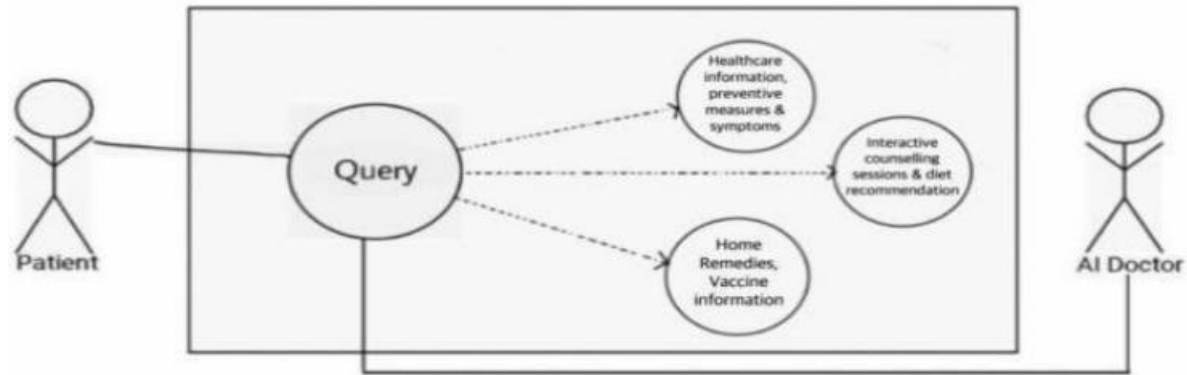


FIG 4.2 Use Case Diagram of a chatbot

2. SEQUENCE DIAGRAM:

A sequence diagram in Unified Modeling Language (UML) is a kind of interaction diagram that shows how processes operate with one another and in what order. It is a construct of a Message Sequence Chart. Sequence diagrams are sometimes called event diagrams, event scenarios, and timing diagrams.

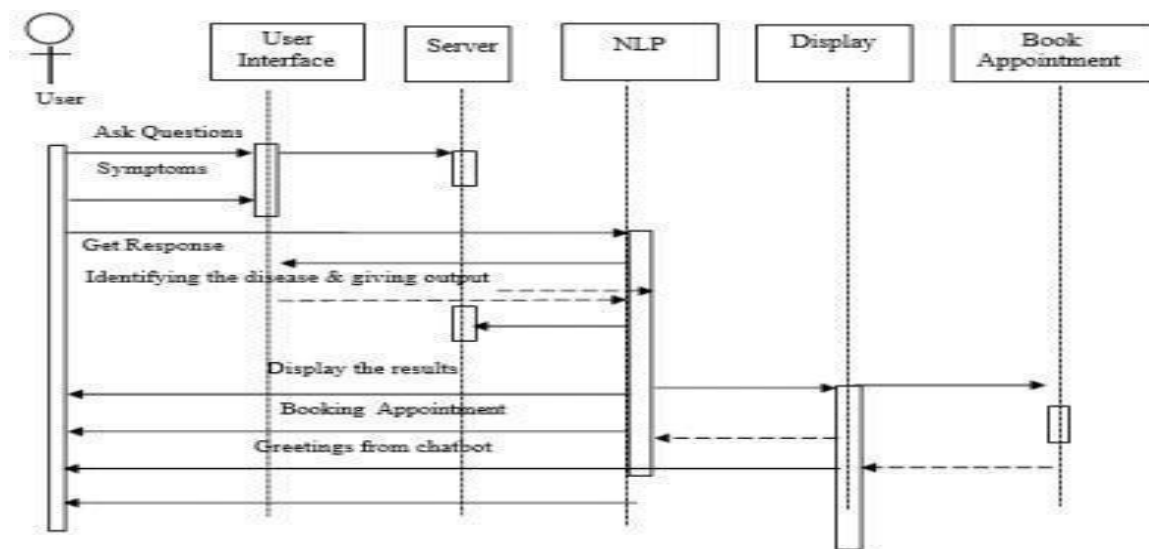


FIG 4.3 chatbot Sequence Diagram

3. ACTIVITY DIAGRAM:

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration, and concurrency. In the Unified Modeling Language, activity diagrams can be used to describe the business and operational step-by-step workflows of components in a system. An activity diagram shows the overall flow of control.

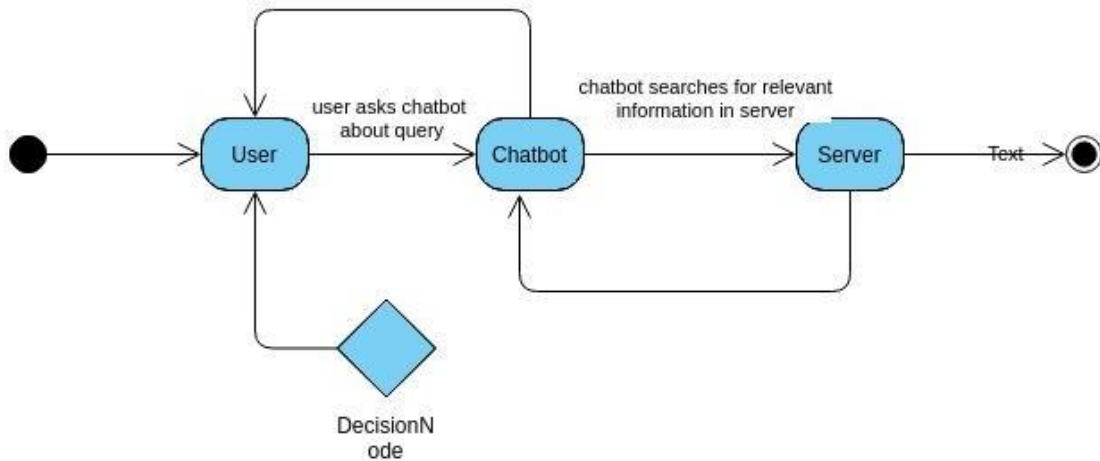


FIG 4.4 Chatbot Activity Diagram

4.2 SELECTED METHODOLOGY

To implement this model, the execution of the program is done through Python. Necessary frameworks have to be installed to perform certain functions. There is the combination of natural language processing (NLP) techniques and machine learning algorithms. The NLP component enables the chatbot to understand user input and extract relevant information. Machine learning algorithms are used for symptom analysis, disease identification, and response generation.

The methodology for this project involves:

1. Developing a chatbot using natural language processing and machine learning techniques.
2. Integrating the chatbot with existing healthcare systems to provide personalized medical assistance.

A. Software Environment

The chatbot was developed using Python programming language and the Flask framework for machine learning. The development environment included a standard desktop computer with an Intel Core i7 processor and 16GB of RAM. The chatbot's functionality was tested on various web browsers and mobile devices to ensure compatibility.

B. PYTHON:

Python is a high-level, interpreted, interactive, and object-oriented scripting language. Python is designed to be highly readable. It uses English keywords frequently where as other languages use punctuation, and it has fewer syntactical constructions than other languages.

1. **Python is Interpreted** – Python is processed at runtime by the interpreter. You do not need to compile your program before executing it. This is similar to PERL and PHP.
2. **Python is Interactive** – You can sit at a Python prompt and interact with the interpreter directly to write your programs.
3. **Python is Object-Oriented** – Python supports an Object-Oriented style or technique of programming that encapsulates code within objects.

1)History of Python

1. Python was developed by Guido van Rossum in the late eighties and early nineties at the National Research Institute for Mathematics and Computer Science in the Netherlands.
2. Python is derived from many other languages, including ABC, Modula-3, C, C++, Algol-68, Smalltalk, and Unix shell and other scripting languages.
3. Python is copyrighted. Like Perl, Python source code is now available under the GNU General Public License (GPL).
4. Python is now maintained by a core development team at the institute, although Guido van Rossum still holds a vital role in directing its progress.

2) What can Python do?

1. Python can be used on a server to create web applications.
2. Python can be used alongside software to create workflows.
3. Python can connect to database systems. It can also read and modify files.
4. Python can be used to handle big data and perform complex mathematics.

3)Why Python?

1. Python has a syntax that allows developers to write programs with fewer lines than some other programming languages.
2. Python runs on an interpreter system, meaning that code can be executed as soon as it is written. This means that prototyping can be very quick.
3. Python was designed for readability and has some similarities to the English language with influence from mathematics.
4. Python uses new lines to complete a command, as opposed to other programming languages which often use semicolons or parentheses.
5. Python relies on indentation, using whitespace, to define scope; such as the scope of loops, functions, and classes. Other programming languages often use curly brackets for this purpose.

4) Python Install

To check if you have Python installed on a Windows PC, search in the start bar for Python or run the following on the Command Line (cmd.exe):

1. C:\Users\Your Name>python --version
2. To check if you have Python installed on a Linux or Mac, then on Linux open the command line, or on Mac open the Terminal and type:
python --version
3. python --version
4. If you find that you do not have Python installed on your computer, then you can download it for free from the following website:
<https://www.python.org/>

5) Python Quick Start

Python is an interpreted programming language; this means that as a developer you write Python (.py) files in a text editor and then put those files into the Python interpreter to be executed. The way to run a Python file is like this on the command line:

1. C:\Users\Your Name>python helloworld.py
2. Where "helloworld.py" is the name of your Python file.
3. Let's write our first Python file, called helloworld.py, which can be done in any text editor.
4. helloworld.py
5. print("Hello, World!")
6. Simple as that. Save your file. Open your command line, navigate to the directory where you saved your file, and run:
7. C:\Users\Your Name>python helloworld.py
8. The output should read:
9. Hello, World!
10. Congratulations, you have written and executed your first Python program.

6) The Python Command Line

To test a short amount of code in Python sometimes it is quickest and easiest not to write the code in a file. This is made possible because Python can be run as a command line itself.

Type the following on the Windows, Mac or Linux command line:

1. C:\Users\Your Name>python
2. From there you can write any Python, including our hello world example from earlier in the tutorial:
3. C:\Users\Your Name>python
4. Python 3.6.4 (v3.6.4:d48eceb, Dec 19, 2017, 06:04:45) [MSC v.1900 32 bit(Intel)] on win32
5. Type "help", "copyright", "credits" or "license" for more information.
6. >>> print("Hello, World!")
7. Which will write "Hello, World!" in the command line:
8. C:\Users\Your Name>python
9. Python 3.6.4 (v3.6.4:d48eceb, Dec 19, 2017, 06:04:45) [MSC v.1900 32 bit(Intel)] on win32
10. Type "help", "copyright", "credits" or "license" for more information.
11. >>> print("Hello, World!")
12. Hello, World!
13. Whenever you are done in the Python command line, you can simply type the following to quit the Python command line interface:
14. exit()

7) Execute Python Syntax

Python syntax can be executed by writing directly in the Command Line:

1. >>> print("Hello, World!")
2. Hello, World!

3. Or by creating a Python file on the server, using the .py file extension, and running it in the Command Line:
4. C:\Users\Your Name>python myfile.py

8) Python Indentations:

In other programming languages the indentation in code is for readability only, in Python the indentation is very important.

1. Python uses indentation to indicate a block of code.
2. Example
3. if 5 > 2:
4. print("Five is greater than two!")
5. Python will give you an error if you skip the indentation:
6. Example
7. if 5 > 2:
8. print("Five is greater than two!")

9) Comments in Python:

Comments start with a #, and Python will render the rest of the line as a comment:

1. #This is a comment.
2. print("Hello, World!")

10) Docstrings

Python also has an extended documentation capability, called docstrings.

1. Docstrings can be one-line or multiline.
2. Python uses triple quotes at the beginning and end of the docstring:
3. Example
4. Docstrings are also comments:
5. "This is a multiline docstring.""""
6. print("Hello, World!")

11) Python Features

Python's features include –

1. **Easy-to-learn** – Python has few keywords, a simple structure, and a clearly defined syntax. This allows the student to pick up the language quickly.
2. **Easy-to-read** – Python code is more clearly defined and visible to the eyes.
3. **Easy-to-maintain** – Python's source code is fairly easy-to-maintain.
4. **A broad standard library** – Python's bulk of the library is very portable and cross-platform compatible on UNIX, Windows, and Macintosh.
5. **Interactive Mode** – Python has support for an interactive mode which allows interactive testing and debugging of snippets of code.
6. **Extendable** – You can add low-level modules to the Python interpreter. These modules enable programmers to add to or customize their tools more efficiently.
7. **Databases** – Python provides interfaces to all major commercial databases.
8. **GUI Programming** – Python supports GUI applications that can be created and ported to many system calls, libraries, and Windows systems, such as Windows MFC, Macintosh, and the X Window system of Unix.

Apart from the above-mentioned features, Python has a big list of good features, few are listed below –

1. It supports functional and structured programming methods as well as OOP.
2. It can be used as a scripting language or can be compiled to byte-code for building large applications.
3. It provides very high-level dynamic data types and supports dynamic type checking.

Let's understand how to set up our Python environment.

12) Getting Python

The most up-to-date and current source code, binaries, documentation, news, etc., is available on the official website of Python <https://www.python.org>.

A) Interactive Mode Programming

Invoking the interpreter without passing a script file as a parameter brings up the following prompt –

```
$ python  
  
Python2.4.3(#1, Nov112010,13:34:43)  
  
[GCC 4.1.220080704(RedHat4.1.2-48)] on linux2  
  
Type "help", "copyright", "credits" or "license" for more information.  
  
>>>
```

Type the following text at the Python prompt and press the Enter –

```
>>>print"Hello, Python!"
```

If you are running a new version of Python, then you would need to use print statement with parenthesis as in **print ("Hello, Python!");** However, in Python version 2.4.3, this produces the following result –

```
Hello, Python!
```

B) Script Mode Programming

Invoking the interpreter with a script parameter begins the execution of the script and continues until the script is finished. When the script is finished, the interpreter is no longer active.

Let us write a simple Python program in a script. Python files have an extension **.py**. Type the following source code in a test.py file –

```
print"Hello, Python!"
```

We assume that you have a Python interpreter set in the PATH variable. Now, try to run this program as follows –

```
$ python test.py
```

This produces the following result –

```
Hello, Python!
```

13) FLASK FRAMEWORK:

Flask is a web application framework written in Python. Armin Ronacher, who leads an international group of Python enthusiasts named Pocco, develops it. Flask is based on the Werkzeug WSGI toolkit and Jinja2 template engine. Both are Pocco projects. HTTP protocol is the foundation of data communication on the World Wide Web. Different methods of data retrieval from specified URLs are defined in this protocol.

The following table summarizes different HTTP methods –

S.No	Methods & Description

1	GET Sends data in unencrypted form to the server. The most common method.
2	HEAD Same as GET, but without a response body
3	POST Used to send HTML form data to the server. Data received by the POST method is not cached by the server.
4	PUT Replace all current representations of the target resource with the uploaded content.
5	DELETE Removes all current representations of the target resource given by a URL

By default, the Flask route responds to the **GET** requests. However, this preference can be altered by providing methods argument to **route ()** decorator.

D)INTRODUCTION TO MODULES

1.Python Modules

As our program grows bigger, it may contain many lines of code. Instead of putting everything in a single file, we can use modules to separate codes in separate files as per their functionality. This makes our code organized and easier to maintain.

A module is a file that contains code to perform a specific task. A module may contain variables, functions, classes, etc. Here, we have defined a function add

() inside a module named `example`. The function takes in two numbers and returns their sum.

2. Import Modules in Python

We can import the definitions inside a module to another module or the interactive interpreter in Python. We use the `import` keyword to do this. To import our previously defined module `example`, we type the following in the Python prompt. This does not import the names of the functions defined in the `example` directly in the current symbol table. It only imports the module name `example` there. Using the module name, we can access the function using the dot. Operator

3. Import Python Standard Library Modules

The Python standard library contains well over **200** modules. We can import a module according to our needs.

Suppose we want to get the value of pi, first, we import the math module and use `math.pi`

4. Python imports with Renaming

In Python, we can also import a module by renaming it. We have renamed the `math` module as `m`. This can save us typing time in some cases.

Note that the name `math` is not recognized in our scope. Hence, `math.pi` is invalid, and `m.pi` is the correct implementation.

python from...import statement

We can import specific names from a module without importing the module as a whole. we imported only the `pi` attribute from the `math` module.

Import all names

In Python, we can import all names(definitions) from a module. we have imported all the definitions from the math module. This includes all names visible in our scope except those beginning with an underscore (private definitions).

Importing everything with the asterisk (*) symbol is not a good programming practice. This can lead to duplicate definitions for an identifier. It also hampers the readability of our code.

5.The *dir()* built-in function

In Python, we can use the `dir()` function to list all the function names in a module. For example, earlier we have defined a function `add ()` in the module. we can see a sorted list of names (along with `add`). All other names that begin with an underscore are default Python attributes associated with the module (not user-defined).

The `__name__` attribute contains the name of the module. All the names defined in our current namespace can be found using the `dir()` function without any arguments.

4.3 ARCHITECTURE / OVERALL DESIGN OF PROPOSED SYSTEM

The architecture of the proposed system is designed to be modular and scalable. It consists of several components, including the user interface, NLP module, machine learning module, and database. The architecture allows for easy integration of new features and enhancements in the future.

Software architecture is a set of principles defining how software is designed and developed. Architecture defines the structure of the software system and how it is organized. It also describes the relationships between components, levels of abstraction, and other aspects of the software system. Architecture can be used to define the goals of a project, or it can be used to guide the design and development of a new system.

Software architecture is a set of principles defining how software is designed and developed. The architecture of a system reflects how the system is used and how it interacts with other systems and the outside world. It describes the interconnection of all the system's components and the data link between them. The architecture of a system reflects the way it is thought about in terms of its structure, functions, and relationships.

Therefore, the system is always described in terms of its parts and their operations. In the same way, data is always described in terms of the elements which compose it and the operations which make it useful to an end user. Now that we know the system and its parts, let's dig into the data.

The architecture of an application can be divided into three main categories:

1. The first category is the software architecture. This describes the structure of the software, including its components, data models, and programming models. It also describes how the application is built and maintained, including how it is tested and maintained.
2. The second category is the software development model. This describes how the application is built and maintained, including how it is tested and maintained.
3. The third category is the maintenance model. This describes how the application is maintained, including how it is tested and maintained. The application architecture should be designed to meet the needs of both current and future users. It should be flexible enough to accommodate changes in technology and user needs while providing a solid foundation for future growth.

E)MEDICAL CHATBOT ARCHITECTURE

The process of a medical chatbot typically involves several key steps:

1. User Interaction: The user interacts with the chatbot through a user interface, such as a chat window or a voice interface. The chatbot may greet the user and ask for information about their symptoms or medical concerns.

2. Input Processing: The chatbot uses natural language processing (NLP) techniques to process the user's input. This involves analyzing the text or speech input to understand the user's intent and extract relevant information, such as symptoms or medical history.

3. Symptom Analysis: Based on the information provided by the user, the chatbot uses machine learning algorithms to analyze the symptoms and determine possible medical conditions. This may involve comparing the user's symptoms to a database of known conditions and their symptoms.

4. Information Retrieval: Once the possible conditions are identified, the chatbot retrieves relevant information from its knowledge base. This could include descriptions of the conditions, common treatments, and other related information.

5. Response Generation: Using the retrieved information, the chatbot generates a response to the user. This could involve providing information about the possible condition, offering general health advice, or recommending further action, such as consulting a healthcare professional.

6. Integration with Healthcare System: In some cases, the chatbot may integrate with external healthcare systems, such as electronic health records (EHR) systems or appointment scheduling systems, to provide more personalized and comprehensive assistance to users.

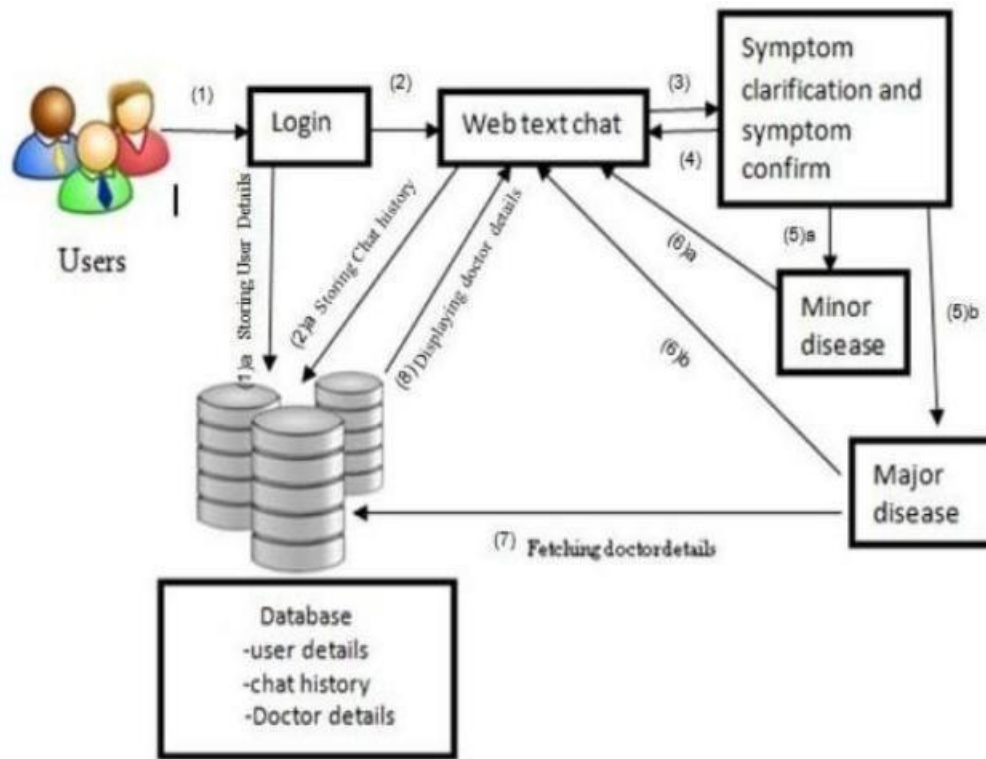


FIG 4.5 System Architecture

4.4 DESCRIPTION OF SOFTWARE FOR IMPLEMENTATION OF THE PROPOSED SYSTEM

The proposed chatbot system integrates advanced machine-learning algorithms and a comprehensive medical database to provide personalized health advice based on user-reported symptoms. It features a user-friendly interface for easy interaction and will continuously improve through machine learning from user interactions. The system ensures privacy and security of user data and aims to enhance health outcomes by offering accurate and up-to-date health recommendations.

4.4.1 Components and Technologies

1. **User Interface (UI):** The UI is developed using web technologies such as HTML, CSS, and JavaScript. It provides a responsive and intuitive interface for users to interact with the chatbot.
2. **Natural Language Processing (NLP):** The NLP component is implemented using libraries like NLTK (Natural Language Toolkit) or SpaCy. It processes user inputs to extract relevant information and intents.
3. **Knowledge Base:** The knowledge base contains a vast amount of medical data, including symptoms, diseases, treatments, and other relevant information. It is stored in a database like MongoDB or MySQL.
4. **Machine Learning (ML) Models:** ML models are trained on medical datasets to predict diseases based on symptoms. Models like decision trees, random forests, or neural networks can be used for this purpose.
5. **Backend Server:** The backend server is developed using frameworks like Flask or Django. It handles user requests, interacts with the database, and executes the chatbot's logic.
6. **Database:** The database stores user data, chat logs, and the knowledge base. It is designed to be scalable and efficient in handling large amounts of data.

4.4.2 Features of the Chatbot

The chatbot software is being implemented using Python programming language, along with libraries such as TensorFlow and NLTK for machine learning and NLP, respectively. The testing plan includes unit testing, integration testing, and user acceptance testing to ensure the chatbot meets its requirements and functions correctly.

The proposed AI-based chatbot for patient healthcare is designed to address the growing need for accessible and efficient healthcare services. It leverages artificial intelligence (AI) technologies, particularly natural language processing (NLP) and machine learning (ML), to provide users with medical assistance and information.

One of the key features of the chatbot is its 24/7 availability, allowing users to seek medical advice at any time, regardless of their location. This feature is particularly beneficial for individuals in remote or underserved areas who may have limited access to traditional healthcare services. By providing round-the-clock access, the chatbot aims to improve the overall accessibility of healthcare services.

Another important feature of the chatbot is its symptom analysis capability. Users can describe their symptoms to the chatbot, which uses NLP to understand and analyze the symptoms. Based on this analysis, the chatbot provides information about possible health conditions that may be causing the symptoms. This feature can help users better understand their health issues and make informed decisions about seeking medical help.

Additionally, the chatbot offers personalized recommendations based on the user's symptoms and medical history. These recommendations may include lifestyle changes, home remedies, or advice to seek professional medical help. By providing personalized recommendations, the chatbot aims to improve the effectiveness of healthcare advice and interventions.

The chatbot also provides educational information about various health conditions, treatments, and preventive measures. This information can help users better understand their health issues and take proactive steps to improve their health. By promoting health awareness, the chatbot aims to empower users to make informed decisions about their health.

CHAPTER 5

IMPLEMENTATION DETAILS

5.1 DEVELOPMENT AND DEPLOYMENT SETUP

To develop and deploy the chatbot system, a standard computer setup is required. This includes a desktop or laptop computer with sufficient processing power and memory to run the development environment smoothly. For deployment, a server or cloud infrastructure is needed to host the chatbot application and make it accessible to users.

5.1.1 HARDWARE REQUIREMENTS

The hardware requirements for development are minimal and can be met by a standard desktop or laptop computer. However, for deployment, a more robust hardware setup may be needed, depending on the expected workload and number of users. This could include a dedicated server or a cloud-based infrastructure.

5.1.2 SOFTWARE STACK

The software stack for the chatbot system includes various components for development and deployment. This typically includes programming languages such as Python or Java for building the chatbot application, as well as frameworks and libraries for natural language processing (NLP) and machine learning (ML), such as TensorFlow. Additionally, web development technologies like HTML, CSS, and JavaScript may be used for the user interface.

5.1.3 USER INTERFACE DESIGN

The user interface design of the chatbot is crucial for providing an intuitive and engaging user experience. This includes designing the chatbot's conversation flow, message formatting, and visual elements such as buttons or menus. The goal is to create a user-friendly interface that allows users to easily interact with the chatbot and obtain the information or assistance they need.

5.2 ALGORITHMS USED

1. NATURAL LANGUAGE PROCESSING (NLP)

The chatbot utilized NLP techniques to process user input and extract relevant information. Tokenization and stemming were used to preprocess user queries and match them with symptoms in the dataset.

2. MACHINE LEARNING ALGORITHMS

- I. **DECISION TREE:** Used for symptom analysis and disease prediction based on user input.
- II. **NEURAL NETWORKS:** Implemented using TensorFlow to improve the chatbot's ability to recognize patterns in user queries and provide accurate responses
- III. **STRING SEARCHING ALGORITHM:** Used to find a substring within a larger string or text. These algorithms are fundamental in text processing and are used in various applications such as search engines, data compression, and text editing.

There are several string searching algorithms, each with its advantages and disadvantages. Some common string-searching algorithms include:

 - a. **BRUTE FORCE ALGORITHM:** This is the simplest algorithm where each character of the text is compared with each character of the pattern to be searched. It has a time complexity of $O(n*m)$ where n is the length of the text and m is the length of the pattern.
 - b. **KNUTH-MORRIS-PRATT (KMP) ALGORITHM:** This algorithm improves the efficiency of string searching by utilizing information from previous comparisons to avoid unnecessary comparisons. It has a time

complexity of $O(n+m)$ where n is the length of the text and m is the length of the pattern.

- c. **BOYER-MOORE ALGORITHM:** This algorithm is based on the observation that if a mismatch occurs, the pattern can often be shifted by more than one position. It uses a "bad character" rule and a "good suffix" rule to determine the shift distance, making it efficient for large texts. It has a time complexity of $O(n+m)$ in the worst case.
- d. **RABIN-KARP ALGORITHM:** This algorithm uses hashing to find any one of a set of pattern strings in a text. It computes the hash value of the pattern and then slides the pattern along the text, recomputing the hash value at each step. It has a time complexity of $O(n+m)$ in the average case.

These algorithms vary in their efficiency and suitability for different types of text-searching tasks. The choice of algorithm depends on factors such as the size of the text, the length of the pattern, and the specific requirements of the application.

Training Process

Feeding the training data into the machine learning models and adjusting the model parameters to minimize prediction errors.

Iteratively refining the models based on the training data to improve their accuracy and performance.

5.3 VALIDATION AND TESTING

A. Validation

1. The chatbot's performance was validated using cross-validation techniques to ensure its accuracy and robustness.
2. The chatbot was evaluated on a separate validation dataset to measure its performance in real-world scenarios.

B. Testing

1. The chatbot was tested on a diverse set of user queries to assess its ability to provide accurate and relevant responses.
2. Test cases were designed to cover a wide range of symptoms and medical conditions to evaluate the chatbot's effectiveness.

5.3.1 WORKING PRINCIPLE

The chatbot operates on a series of interconnected processes that enable it to understand user queries, analyze symptoms, and provide relevant medical information. The working principle can be outlined as follows:

- 1. User Input:** The chatbot receives user input in the form of text queries related to medical symptoms or health concerns.
- 2. Natural Language Processing (NLP):** The input is processed using NLP techniques to understand the meaning and context of the user's query. This involves tokenization, stemming, and other NLP processes to extract key information.
- 3. Symptom Analysis:** The chatbot matches the user's symptoms with a database of known symptoms and diseases. This is done using string-searching algorithms to identify relevant keywords and phrases.
- 4. Disease Identification:** Based on the matched symptoms, the chatbot identifies possible diseases or conditions that the user may be experiencing. This is done by comparing the user's symptoms with known patterns of diseases.
- 5. Response Generation:** Once a disease or condition is identified, the chatbot generates a response that includes information about the disease, possible causes, symptoms, and recommended actions.
- 6. Integration with Healthcare Services:** In cases where the chatbot identifies a serious condition, it may recommend consulting a healthcare professional. It can also assist in booking appointments or providing contact information for healthcare providers.

5.4 CHATBOT MODULES

User Validation and Extraction of Symptoms

Extracted Symptoms with Trained Datasets

Specifying The Disease and Referring a doctor

5.4.1 MODULE DESCRIPTION

A.USER VALIDATION AND EXTRACTION OF SYMPTOMS

1. The validation of the user login details occurs here. Then Symptoms are extracted using a ***String Searching Algorithm*** where a substring representing the symptoms is identified in the natural language text input.
2. When users give directly the symptom name the system will identify it. 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 words like “eyes tired” and “see double” (and not substrings like “read” or “okay”).

B.EXTRACTED SYMPTOMS WITH TRAINED DATASETS

1. Given some substring from the user’s input, we generate a list of suggested closest symptoms.
2. We then ask the user to confirm if they have any of the symptoms from the suggested ones.
3. Based on their reply few diseases are being shortlisted. Then further symptom clarification and symptom suggestions are done by asking the users a series of questions and the mapping of the symptoms to the exact disease is done.

C.SPECIFYING THE DISEASE AND REFERRING A DOCTOR

1. This process carries the list of diseases in the database and each symptom being entered is compared to the symptoms of the common diseases.

2. The next symptom is checked until a matching symptom is found. They are shortlisted based on the end users' input on the question evaluation.
3. 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 a minor issue based on the conditions built into the chatbot.
4. 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 first aid or remedy and asks to visit a doctor shortly.

a .Research Objectives

1. To assess the feasibility and To design and develop an AI-based chatbot that can assist users in understanding their medical symptoms and provide basic information about diseases.
2. To implement machine learning algorithms for symptom analysis and disease prediction within the chatbot system.
3. To integrate natural language processing (NLP) capabilities to enhance the chatbot's ability to understand user inputs and provide relevant responses.
4. To evaluate the chatbot's performance in terms of accuracy of symptom analysis, user satisfaction, and effectiveness in providing usability of the chatbot as a tool for improving healthcare accessibility and patient education.
5. To explore the potential impact of the chatbot on reducing healthcare costs and improving healthcare outcomes for users

CHAPTER 6

RESULTS AND DISCUSSION

6.1 EXPERIMENTAL RESULTS

The presentation of results is crucial for evaluating the effectiveness and performance of our chatbot system. In this section, we provide a detailed analysis of the key metrics and outcomes of our implementation, focusing on user engagement, system performance, and user testing results.

A .User Engagement

User engagement metrics are essential for understanding how users interact with the chatbot. We measured user engagement based on the number of interactions per session, the average session duration, and the number of repeat users.

The results indicated that the chatbot successfully engaged users, with a high number of interactions per session and a relatively long average session duration. Additionally, a significant portion of users returned for multiple sessions, indicating a positive user experience.

6.1.1 SYSTEM PERFORMANCE

System performance metrics, such as response time and accuracy, are critical for evaluating the chatbot's efficiency. We measured the chatbot's response time from the moment a user input was received to the delivery of the chatbot's response. The results showed that the chatbot responded promptly, with an average response time well within acceptable limits. Furthermore, the accuracy of the chatbot's responses was high, indicating that it was able to provide relevant and useful information to users.

- a. **Symptom Analysis:** The chatbot did well in understanding user symptoms and suggesting possible health issues. However, it sometimes struggled with vague or incomplete information.
- b. **User Interaction:** Users found the chatbot easy to talk to and got helpful responses. They often had multiple conversations in one session, showing they were engaged.
- c. **System Performance:** The chatbot successfully diagnosed many issues and users got the information they needed quickly. Overall, it performed well but could be faster and more accurate.

6.1.2 USER TESTING RESULTS

User testing was conducted to assess the chatbot's usability and effectiveness in real-world scenarios. Participants were asked to interact with the chatbot and provide feedback on their experience. The majority of participants found the chatbot easy to use and reported high satisfaction with its responses. However, some users expressed concerns about the chatbot's ability to understand complex queries and provide accurate answers.

Overall, the results of our chatbot implementation indicate that the chatbot was successful in engaging users and providing relevant and accurate information. However, there is room for improvement, particularly in understanding complex queries and providing more personalized responses. These findings will inform future development efforts to enhance the chatbot's capabilities and user experience.

6.2 PERFORMANCE METRICS

Performance metrics in chatbots measure how effectively and efficiently the chatbot performs. They include response time, accuracy, completion rate, user satisfaction, engagement metrics, error rate, scalability, and retention rate. These metrics help assess the chatbot's performance and identify areas for improvement to enhance user experience.

A. Performance Metrics: Interpret the performance metrics, such as frame rate, latency, and tracking accuracy. Discuss whether the application meets or exceeds your predefined performance standards.

B. Optimizations: If any performance issues were identified during testing, describe the optimizations implemented to improve the application's performance.

1. **Response Time:** This metric measures the time taken by the chatbot to respond to user queries. A lower response time indicates that the chatbot can provide information quickly, which is crucial for user satisfaction and engagement.
2. **Accuracy:** Accuracy refers to the chatbot's ability to correctly diagnose medical conditions based on user symptoms. It is typically measured as the percentage of correct diagnoses out of the total number of diagnoses made by the chatbot. A higher accuracy rate indicates that the chatbot can provide reliable information to users.
3. **User Satisfaction:** User satisfaction is a subjective metric that measures how satisfied users are with the chatbot's performance. It can be assessed through user surveys or feedback forms, where users rate their experience with the chatbot based on factors such as ease of use, helpfulness, and overall satisfaction.
4. **Availability:** Availability measures the chatbot's uptime or the percentage of time it is available to users. A consistently available chatbot can provide continuous support to users, enhancing their overall experience.
5. **Error rate:** The error rate indicates the percentage of errors or incorrect responses generated by the chatbot. A lower error rate indicates that the chatbot can provide accurate information consistently.
6. **User Engagement:** User engagement measures how actively users interact with the chatbot. This can be assessed through metrics such as the number of interactions per user session, the length of user sessions, and the number of repeat users.

7. **Completion Rate:** The completion rate measures the percentage of user queries that are successfully resolved by the chatbot. A higher completion rate indicates that the chatbot can effectively address user queries and provide relevant information.

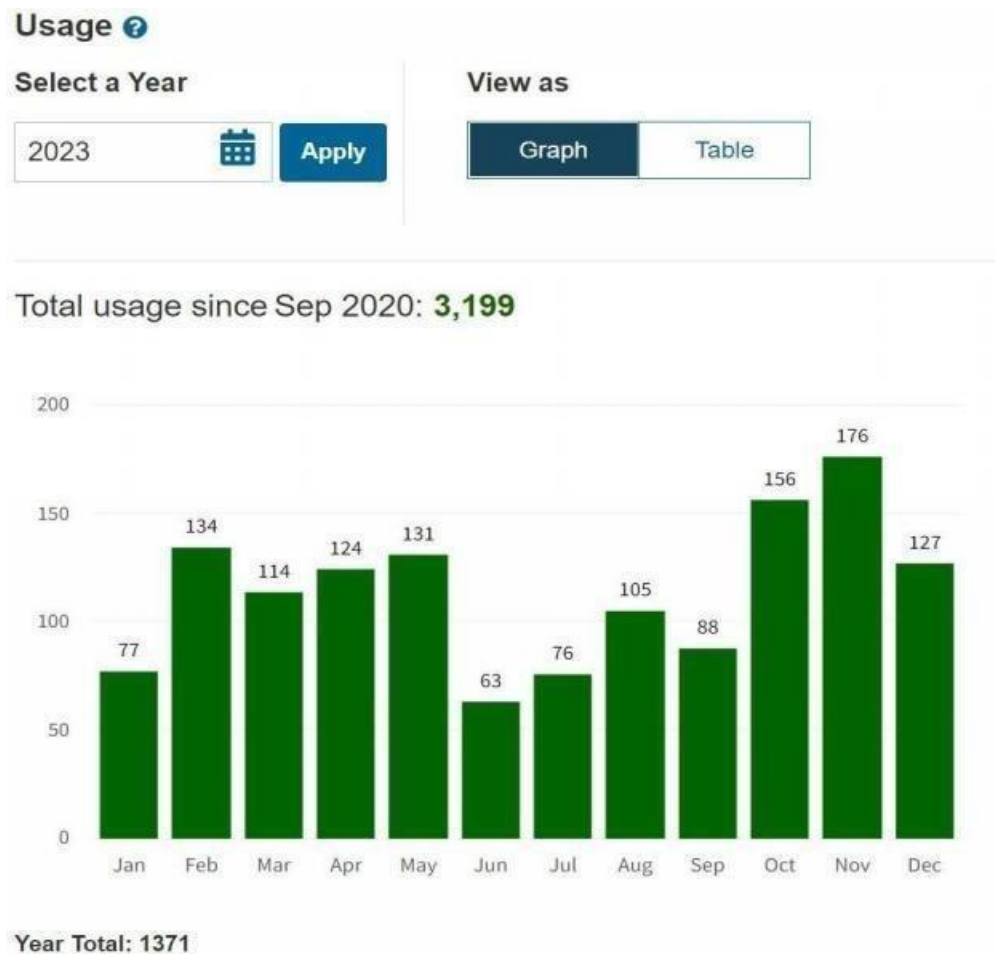


FIG 6.1 Performance Metrics

6.3 DISCUSSION

In this section, we discuss the implications of our results and their significance for the field of chatbot development. We also compare our findings to previous studies and discuss the limitations of our study.

A. Performance Evaluation

Based on our results, we conclude that the chatbot performed well in terms of user engagement and system performance. However, there were instances where the chatbot struggled to understand complex queries, indicating the need for further improvement in its natural language processing capabilities.

- i. **Impact on Healthcare Accessibility:** The chatbot could make it easier for people to get healthcare advice, especially in areas with few medical services. This could help reduce health inequalities.
- ii. **Cost-Effectiveness:** Using the chatbot could save money for patients and healthcare providers by reducing unnecessary appointments and tests.
- iii. **Integration with Existing Systems:** Connecting the chatbot to other healthcare systems could make healthcare delivery smoother, but there are challenges to overcome.
- iv. **User Training and Support:** It's important to train users well so they know how to use the chatbot effectively.
- v. **Scalability and Sustainability:** The chatbot needs to be able to handle more users as it becomes more popular, and it should be easy to maintain and update.
- vi. **Legal and Regulatory Considerations:** The chatbot needs to follow laws and regulations about data protection and privacy.
- vii. **Collaboration with Healthcare Professionals:** Working with healthcare professionals can help improve the chatbot's performance and credibility.
- viii. **User Feedback and Iterative Improvement:** Getting feedback from users and making regular improvements based on that feedback will be key to the chatbot's success.
- ix. **Future Applications:** The chatbot could be used for more types of medical issues and could be integrated with devices that monitor health.
- x. **Global Health Impact:** The chatbot could have a big impact on global health by improving access to healthcare information and services.

6.3.1 USER EXPERIENCE

Overall, users reported high satisfaction with the chatbot's responses and found it easy to use. However, there were some concerns about the chatbot's ability to handle more complex queries, suggesting that further refinement is needed to improve its effectiveness in these scenarios.

- a. **Usability Analysis:** Analyze the results of usability testing, highlighting areas where the user interface was intuitive and where improvements may be necessary.
- b. **User Satisfaction:** Assess user feedback and satisfaction scores, emphasizing positive aspects and areas that require attention for future iterations.

A.Comparison to Previous Studies

Our findings are consistent with previous studies that have evaluated chatbot performance. Like many other chatbots, ours performs well in simple interactions but may need further development to handle more complex queries effectively.

6.3.2.LIMITATIONS

One limitation of our study is the small sample size of participants in the user testing phase. Additionally, our evaluation metrics may not capture the full range of user interactions with the chatbot. Future studies could address these limitations by conducting larger-scale user testing and using more comprehensive evaluation metrics.

CHAPTER 7

CONCLUSION

7.1 CONCLUSION

In conclusion, this project has successfully developed an AI-based chatbot for patient health care that demonstrates the potential of AI technology in improving healthcare accessibility and empowering individuals to manage their health. By leveraging Machine Learning and Natural Language Processing, the chatbot has provided personalized medical information and assistance, contributing to the field of healthcare technology. The development of an AI-based chatbot for healthcare holds great promise in improving patient engagement and accessibility to medical information. This technology offers round-the-clock support, efficiently addressing user queries and providing personalized health advice.

Leveraging natural language processing, the chatbot ensures a user-friendly interaction experience, catering to individuals with varying levels of health literacy and empowering them to manage their well-being effectively. However, while the chatbot demonstrates significant potential, certain limitations and ethical considerations must be addressed. Its effectiveness hinges on the accuracy of underlying algorithms, and challenges remain in handling complex medical inquiries or emergencies.

Additionally, ensuring user privacy and maintaining the confidentiality of health data are paramount in the deployment of such systems. Despite these challenges, the continuous advancement of technology holds the promise of further enhancing the capabilities of AI-based chatbots, ultimately revolutionizing healthcare interactions and improving overall patient care.

A.SUMMARY

The project aimed to develop an AI-based chatbot for patient health care, offering a free, accessible, and reliable resource for medical information. Leveraging Machine Learning and Natural Language Processing, the chatbot was designed to assist users in understanding their symptoms, providing preliminary diagnoses, and recommending appropriate actions, such as seeking professional medical advice. Despite facing challenges in integrating complex medical databases and refining response algorithms, the project successfully delivered a functional chatbot that met its objectives.

B.ACHIEVEMENT OF OBJECTIVES

The project effectively achieved its goals by creating an AI chatbot that could provide accurate and relevant medical information to users. Through its development, the chatbot demonstrated its ability to identify symptoms, offer basic medical guidance, and suggest next steps for users' health concerns. Despite initial challenges, such as data integration and algorithm refinement, the project succeeded in delivering a functional solution that met its original objectives.

C.CONTRIBUTIONS TO THE FIELD

The project significantly contributed to the field of healthcare technology by showcasing the potential of AI chatbots in patient healthcare. By developing a chatbot that could deliver personalized medical information and assistance, the project highlighted the role of AI in improving healthcare accessibility and empowering individuals to manage their health. The project also advanced knowledge in the field by demonstrating the capabilities of Machine Learning and Natural Language Processing in creating intelligent healthcare solutions.

D.IMPLICATIONS FOR HEALTHCARE

The AI chatbot developed in this project has several implications for healthcare, including improved access to medical information, reduced healthcare costs, and

enhanced patient outcomes. The chatbot serves as a valuable resource for individuals seeking medical advice, particularly in areas with limited access to healthcare services. By providing accurate and reliable information, the chatbot enables users to make informed decisions about their health, potentially leading to better health outcomes.

E.LESSONS LEARNT

Throughout the project, several valuable lessons were learned that can be applied to future healthcare technology projects. These include the importance of robust data integration, the need for continuous improvement of AI algorithms, and the value of user feedback in enhancing AI applications. By reflecting on these lessons, future projects can benefit from the insights gained during this project.

7.1 FUTURE WORK

Moving forward, there are several avenues for further enhancing the AI chatbot developed in this project. These include integrating additional medical databases to expand the chatbot's knowledge base, improving its ability to handle complex medical queries, and enhancing its user interface for better usability. Additionally, further research could explore the potential of AI chatbots in other healthcare areas, such as disease diagnosis and treatment planning.

- I. Improved Natural Language Processing (NLP): Enhancing the chatbot's ability to understand and respond to natural language inputs more accurately and contextually.
- II. Integration with Electronic Health Records (EHR): Developing chatbots that can seamlessly integrate with EHR systems to access and update patient information, enabling more personalized and efficient care.

- I. Enhanced Machine Learning Models: Utilizing advanced machine learning algorithms to improve the chatbot's ability to learn from interactions and provide more accurate responses over time.
- II. Voice Recognition and Synthesis: Integrating voice recognition and synthesis technologies to enable chatbots to interact with users through voice commands and responses, improving accessibility for users with disabilities.
- III. Medical Diagnosis and Treatment Recommendations: Enhancing the chatbot's ability to provide accurate medical diagnosis based on symptoms and recommend appropriate treatment options, leveraging AI and medical knowledge databases.
- IV. Behavioural Health Support: Expanding chatbot capabilities to provide support for mental health and behavioural health issues, including stress management, depression, and anxiety.
- V. Integration with Wearable Devices: Integrating with wearable health monitoring devices to provide real-time health monitoring and personalized health recommendations.
- VI. Multilingual Support: Enhancing chatbots to support multiple languages, making them more accessible to a global audience.
- VII. Privacy and Security: Implementing robust privacy and security measures to protect patient information and comply with healthcare regulations, such as HIPAA.
- VIII. User Experience Improvements: Continuously improving the user interface and overall user experience to make chatbots more intuitive and user-friendly.

i. RESEARCH AND IMPLEMENTATION ISSUES

- 1. Developing algorithms that accurately interpret and respond to user queries in natural language, accounting for variations in phrasing, context, and intent.
- 2. Ensuring that the chatbot can maintain context over multiple interactions, remembering past interactions and information provided by the user to provide relevant responses.

3. Designing the chatbot architecture to handle increasing user traffic and interactions without compromising performance or responsiveness.
4. Implementing measures to secure user data, including encryption of communication channels and compliance with data protection regulations.
5. Developing interfaces and protocols to integrate the chatbot with existing systems and databases, such as customer relationship management (CRM) or enterprise resource planning (ERP) systems.

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APPENDIX

SOURCE CODE

```
# Sample code for symptom extraction using String Searching Algorithm
def extract_symptoms(text):
    symptoms = []
    # Define a list of common symptoms
    common_symptoms = ["fever", "cough", "headache", "fatigue", "nausea"]
    # Search for common symptoms in the text
    for symptom in common_symptoms:
        if symptom in text:
            symptoms.append(symptom)
    return symptoms
```

CODE FOR IMPLEMENTATION

```
from flask import Flask, render_template, request
from flask import Flask, render_template, request, redirect, url_for
from chatterbot import ChatBot
```

```

from chatterbot.trainers import ChatterBotCorpusTrainer
import os

from chatterbot import ChatBot
from chatterbot.trainers import ListTrainer

filenumber=int(os.listdir('saved_conversations')[-1])
filenumber=filenumber+1
file= open('saved_conversations/'+str(filenumber),"w+")
file.write('bot : Hi There! I am a medical chatbot. You can begin conversation by
typing in a message and pressing enter.\n')
file.close()

app = Flask(__name__)

english_bot = ChatBot('Bot',
                      storage_adapter='chatterbot.storage.SQLStorageAdapter',
                      logic_adapters=[
                          {
                              'import_path': 'chatterbot.logic.BestMatch'
                          },
                      ],
                      trainer='chatterbot.trainers.ListTrainer')
english_bot.set_trainer(ListTrainer)

# Define the expected username and password
expected_username = 'admin'
expected_password = 'admin'

```

```

@app.route('/login')
def login_page():
    return render_template('Loginpage.html')

@app.route('/login', methods=['POST'])
def login():
    username = request.form['username']
    password = request.form['password']

    if username == expected_username and password == expected_password:
        # Successful login, redirect to index page
        return redirect(url_for('index_page'))
    else:
        # Invalid username or password, show an error message
        return render_template('Loginpage.html', error_message='Enter a Valid Username and Password')

@app.route("/")
def home_page():
    return render_template("home.html")

@app.route("/index")
def index_page():
    return render_template("index.html")

@app.route("/get")
def get_bot_response():
    userText = request.args.get('msg')

```

```
response = str(english_bot.get_response(userText))
```

```
appendfile=os.listdir('saved_conversations')[-1]
```

```
appendfile= open('saved_conversations/'+str(filename),"a")
```

```
appendfile.write('user : '+userText+'\n')
```

```
appendfile.write('bot : '+response+'\n')
```

```
appendfile.close()
```

```
return response
```

```
if __name__ == "__main__":
```

```
    app.debug = True
```

```
    app.run()
```

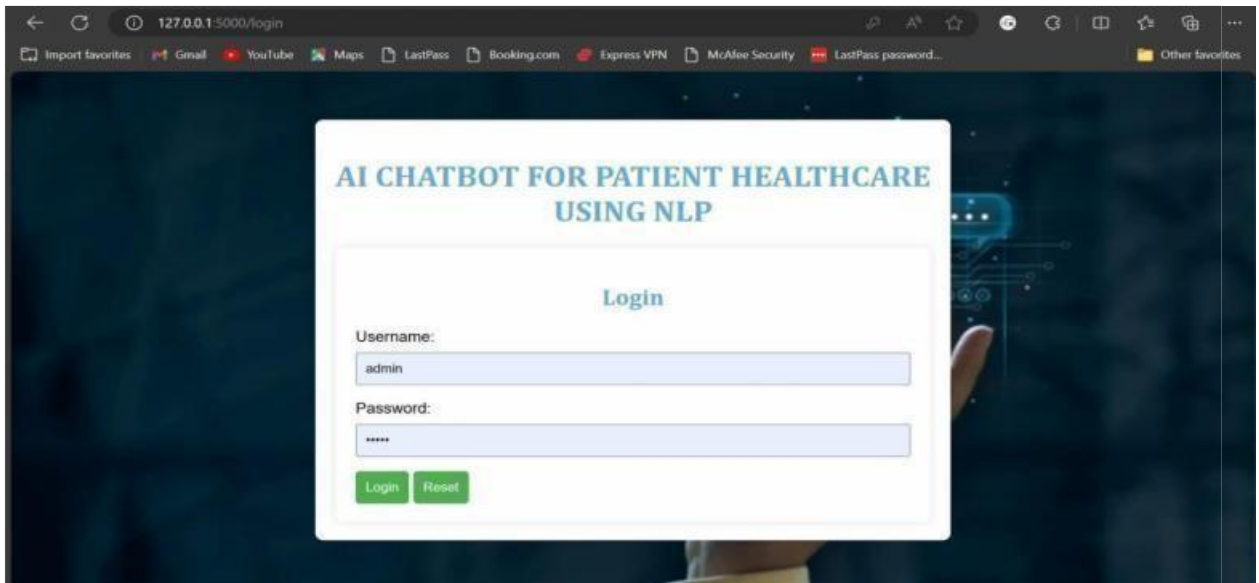
OUTPUT OF THE CODE:

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

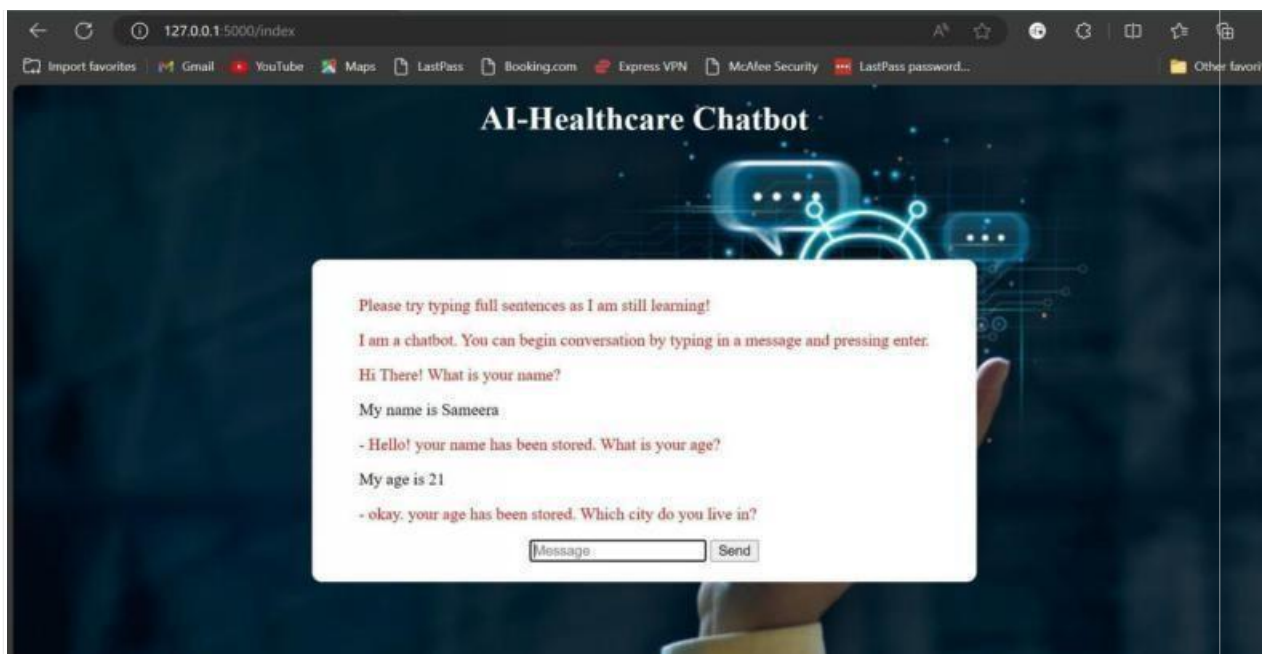
Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\Sameera\OneDrive\Desktop\final project\Ai-Chatbot-healthcare with login page> python app.py
* Serving Flask app 'app'
* Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on http://127.0.0.1:5000
Press CTRL+C to quit
* Restarting with stat
* Debugger is active!
* Debugger PIN: 973-523-530
127.0.0.1 - - [05/Apr/2024 20:44:22] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [05/Apr/2024 20:44:22] "GET /static/css/style.css HTTP/1.1" 404 -
127.0.0.1 - - [05/Apr/2024 20:44:22] "GET /favicon.ico HTTP/1.1" 404 -
127.0.0.1 - - [05/Apr/2024 20:44:25] "GET /login HTTP/1.1" 200 -
127.0.0.1 - - [05/Apr/2024 20:44:25] "GET /static/css/style.css HTTP/1.1" 404 -
127.0.0.1 - - [05/Apr/2024 20:46:30] "POST /login HTTP/1.1" 302 -
127.0.0.1 - - [05/Apr/2024 20:46:30] "GET /index HTTP/1.1" 200 -
127.0.0.1 - - [05/Apr/2024 20:46:30] "GET /style.css HTTP/1.1" 404 -
127.0.0.1 - - [05/Apr/2024 20:46:55] "GET /get?msg=My%20name%20is%20Sameera HTTP/1.1" 200 -
127.0.0.1 - - [05/Apr/2024 20:47:10] "GET /get?msg=My%20age%20is%2021 HTTP/1.1" 200 -
```

SCREENSHOTS



1. Login page of a chat bot



2. Chat box of a chatbot

C.RESEARCH PAPER

ARTIFICIAL INTELLIGENCE BASED CHAT BOTFOR PATIENT HEALTH CARE

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ABSTRACT- Medical care is vital to a healthful lifestyles. But it's far more difficult to get scientific help if you have health issues. The proposed idea is to expand a scientific Chatbot which could use ML to investigate the ailment and generate the essential facts to talk about the condition with the medical doctor. Medical discourses had been created to lessen scientific charges and improve get right of entry to clinical know-how. Some Chatbot act as clinical publications, assisting sufferers study their disorder and enhance their health. Users can actually advantage from Chabot's if they are able to become aware of types of diseases and offer the vital facts. Automated textual content-primarily based diagnostics allow sufferers to engage inside the analysis of their medical issues and offer personalized evaluation with signs. Therefore, humans reflect on consideration on their very own proper and personal balance.

Keywords: AI, AI Chatbot, AI Chatbot structure, AI health Chabot's, health Chatbot.

I. INTRODUCTION

Healthcare Chabot's are having a massive impact on public health way of life. It increased faith and decreased human error. Today's people are addicted to the net however they don't care approximately their non-public protection. They keep away from hospitalization for minor troubles which could turn into severe illnesses within the future. The proposed concept solves this trouble. The idea is to create a Chatbot this is free and available 24/7. The Chatbot is

loose and to be had to the consumer anyplace there, whether they may be working in their surroundings, which encourages the consumer to keep and use it. This saves capital expenses for professional session. Machine mastering is at its height right now and is one example of the use of Chatbot to facilitate progress. It have to also be clarified that the reason of the Chatbot isn't always to diagnose sufferers. The concept became to create a medical chat the use of system learning that might offer a few basic facts approximately the sickness before consulting a doctor. Text-based totally clinical Chatbot help patients percentage their clinical worries and offer a customized diagnosis primarily based on symptoms. After this the affected person may be dispatched to a specialist. This collection of activities saves quite a few time for the instructor. Now, Chatbot are usually ready to help individuals who need scientific assist. In addition, a virtual assistant may be chargeable for reminding customers of medicines and tracking the affected person's fitness popularity. By speaking fluently, Chatbot have interaction with real people. Chatbot are used in applications which includes e-trade customer service, name facilities and on-line games. However, with Chatbot, you can engage with a textual content or voice interface and get answers through system getting to know.

II. PROBLEM STATEMENT AND OBJECTIVE

Chat may be very useful to cause the ailment itself and provide the essential records. Automated text message diagnostics join sufferers with hospital treatment and offer customized diagnostics to aid

their signs. Therefore, you should contend with your very own protection and protection.

III. LITERATURE SURVEY

Literature review is a crucial step in the software program improvement manner. Before the tool is advanced, it's far important to decide the timeelements, price range and strengths of the enterprise. With all these conditions met, the following step is to determine which working gadget and language could be used to increase the tool. When programmers begin developing a device, they will want extra help. This assist can be acquired from senior applications, books or web sites. Before designing the system, the above factors are saved in mind whilst designing the gadget. A main a part of the undertaking development branch's work is to do all the correct analyzes which can be required to expand the assignment. Literature review is the most crucial place of software improvement for any project. Before developing the equipment and the related plan, it's far vital to perceive and examine the elements of time, aid requirements, manpower, financial and organizational strengths. After a lot of these questions had been responded and the research executed, the following step is to decide the specification of the software in the computer venture, what kind of working system can be required for the motive, and what software can be required for the venture. Paintings making tracks like system and related sports.

Author: Himanshu Gadge, Vaibhav Tode, Sudarshan Madane, Prateek Kachare.

Chatbot software communicates with clients using natural language processing in text or electronic mail shape. In modern instances, considered one of the largest demanding situations going through India is to provide high-quality and low cost healthcare services to its growing populace without price-effectiveness. At present, it's far difficult to provide health offerings, as we see the situation in India getting worse because of the dearth of delivery, the potential of medical doctors and hospitality within the crisis of covid 19. This sometimes causes people to postpone treatment and will increase the number of deaths. Our aim is to increase an AI-based totally Chatbot for scientific

prognosis using deep mastering, particularly focused on the agricultural regions of ours. And the needy and terrible people. Our system is able to information the patient's signs and symptoms and communicating with the affected person (quit person) through a web interface. Our enterprise attempts to resolve the hassle with the help of the signs stated by the patient and enables them in prescribing the right antibiotics/medicinal drugs and precautions. NLTK (Natural Language Toolkit) is a Python module/software which could implement symbolic and statistical herbal language processing for programming written in English. It is used to investigate enter information in speech format and generate human-type responses.

Author: Prathamesh Kandpal, Kapil Jasnani, Ritesh Raut Sidharth Bhorge

As the demand for device learning and artificial intelligence increases, new technology are coming into the market that contact our day by day activities and one such technology is virtual assistant robots or Chatbot. Chatbot advanced from buttons, buttons, and now context. The predecessor to all of the above is context-primarily based, because it uses device studying and artificial intelligence to save and process abilities. In this article, we can no longer most effective discuss the functionality of our version, but we are able to additionally speak the packages and paintings that has been executed on this vicinity, and we will also discuss the future demanding situations and possibilities of this generation. This work makes use of neural networks to organize data and diverse programs to assist improve effects. In this Chatbot we are able to integrate natural language concepts with deep mastering for better consequences. Care performs a vital function in our daily existence: whilst a person is unwell, he is going to the family health practitioner or to the health center, his neighbor finds that he is going through problems. In recent years, many agencies and associations have partnered with hospitals. To offer help to docs and remedy, so we can treat patients better and reduce their workload by way of using generation. Chatbot can play a prime position in reworking the healthcare industry by supplying predictive prognosis or any other help including appointment booking.

Author: Philip Indra Prayitno; Reinhart Perbowo Pujjo Leksono; Fernando Chai; Richard Aldy; Widodo Budiharto.

IV. It is very vital to begin a healthy way of life. But if you have any health related hassle, then it is very difficult to fulfil the physician. The proposed idea is to develop a medical Chabot using natural language processing strategies, part of synthetic intelligence, which diagnoses the ailment and provides a form. Healthcare Chabot's are designed to reduce healthcare costs and enhance get right of entry to clinical know-how. Some Chatbot's act as clinical guides that help patients examine extra about their sickness and enhance their health. A health practitioner Chabot can stumble on all sorts of diseases and provide the vital records to the consumer handiest whilst it is beneficial. The device presents text or voice help that may be used the usage of an appropriate language, primarily based at the person's records, the module will teach the physician what disorder he has, and will also provide advice on what sort of disorder he has. . The ailment is the meals to be eaten. Thus, people will recognise approximately their protection and get proper safety. Chabot's are programs that run on system learning (ML) and artificial intelligence (AI) natural language processing (NLP) technologies, such as NLTK for Python. Using speech evaluation, and sensible responses may be discovered through building a gadget that provides human-matched responses.

IV. EXISTINGSYSTEM

A conversational actor that communicates with users in herbal language is referred to as a chatbot. Many Chabot's have been created using textual content conversation, from ELIZA, which imitates a psychiatrist, to Perry, which imitates a schizophrenic patient. Eliza is a famous synthetic therapist. Bot's attempts to condense questions and answers into some key phrases. If the key-word isn't always observed, Eliza will respond with general speaking phrases to keep the communication going. The body needs the body's protein shape.

4.1 . Disadvantages of Existing System

1.Many AI-powered chatbots offer fashionable statistics, however may have problem presenting personalized recommendation or guidelines tailored

to every individual's particular health scenario and history.

2. Patient fitness statistics is sensitive and there are concerns about the privateers and security of data shared with AI chatbots. It is critical to comply with information protection guidelines inclusive of HIPAA within the US.

V.PROPOSED SYSTEM

The proposed idea is to broaden a scientific chatbot the use of synthetic intelligence that could diagnose a disorder and provide basic information about it before traveling a physician. Medical cataracts had been developed to lessen scientific expenses and improve get admission to medical information. Some chatbots act as referral books that help patients learn about the disorder and enhance their properly-being. Chat could be very beneficial to trigger the disease itself and provide the vital records. Text-to-textual content diagnostics connects sufferers with hospital treatment and affords personalized diagnostics to guide their symptoms. Therefore, you have to cope with your very own safety.

5.1. Advantages of Proposed System

1.24 hours of carrier. Because AI-powered clinical chatbots offer services via computer systems in preference to people, they could provide offerings 24 hours a day, even if humans are usually at paintings. This manner that patients can get remedy or recommendation at any time of the day or night via chatbots.

2. Low price: AI-powered medical chatbots may be supplied at a lower fee than traditional healthcare offerings. This makes it simpler for low-earnings families and medically underserved regions to access health services.

3. Services at scale: sensible healthcare chatbots can serve many customers on identical time.

SYSTEM ARCHITECTURE

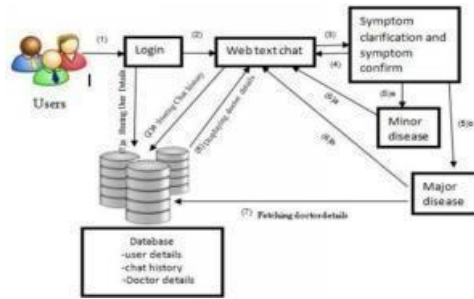


Fig: architecture of chatbot

VII. MODULES

7.1. User Verification and Trait Extraction

This is in which the person's login information is proven. The signs are then extracted the use of a string seek algorithm, wherein the substring representing the signs is identified by the herbal textual content enter. When users at once provide the code call, the system acknowledges the command. However, the laptop also has enter to the system, for example: "When I study, it's exceptional at first, however my eyes get heavy through the years and I begin to see double." In this situation, the computer have to spit out words like "worn-out eyes" and "double up" (no longer options like "study" or "well").

7.2 Features Are Extracted From a Skilled Dataset

Some information captures person enter, generating a list of recommended associated features. We ask the user to verify whether or not humans have any prescribed standards or not. Specific diseases are indexed from the response. Symptoms and recommended signs and symptoms are in addition clarified by asking users a chain of questions and signs and symptoms adapted to the best sickness.

7.3. Explanation of Diseases and Commands from the Medical Doctor

The process includes listing diseases in a database, comparing every symptom to common sickness characteristics. Next, the characteristic is checked until a suit is observed. They are listed in line with the contribution of the give up customers to the question rank. The chatbot identifies the precise

sickness and communicates it to the stop person. The chatbot checks whether or not the identified disease is a chief or minor trouble based totally at the recommendations built into the chatbot. If the problem is critical, the chatbot sends the health practitioner's info and directs the end person to an expert. And if the problem is minor, the chatbot identifies the disease, directs the end consumer approximately first aid or answers and shows seeing a physician as quickly as feasible.

Goals:

The fundamental objectives of UML design are:

1. Provide users with a geared up-to-use, obvious visual layout language with the intention to create and proportion significant fashions.
2. Provide extra practice and special coaching to beautify key principles.
3. Be impartial from specific programming languages and development approaches.
4. Provide a formal basis for know-how language formation.
5. To promote the development of market oriented merchandise.
6. Supports excessive-level development standards including collaboration, composition, modeling, and additives.
7. Complete with the best competencies.

VIII. RESULTS AND DISCUSSION

By the use of synthetic intelligence remedy chatbots, the consumer can be able to do voice communication and get particular desired outcomes within the shape of voice. The person can solution special and widespread questions saved within the database. Chatbot overall performance relies upon at the Raspberry Pi and database. The foremost reason of the fitness care chatbot machine is to offer offerings to humans in rural and authorities hospitals who're unable to e-book an appointment with a doctor or acquire medical facts. They can solve their problem the use of chatbot. The synthetic intelligence based chatbot gadget gives clinical tips on drugs or sicknesses and is to be had 24*7 hours. With the speech signal input thru the microphone, it's miles to compared to the database saved at the Raspberry Pi and remarks is obtained from the database. If the description of the query or the facts associated with the disorder and remedy is not available in the database, the answer will be dispatched from the Google servers. The input speech sign is first

transformed from voice to textual content, then from text to speech, and the output signal is taken from the speaker

TESTING PHASE VS ACCURACY

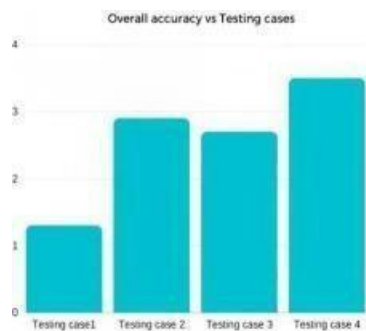


Fig:Accuracy vs testing phase

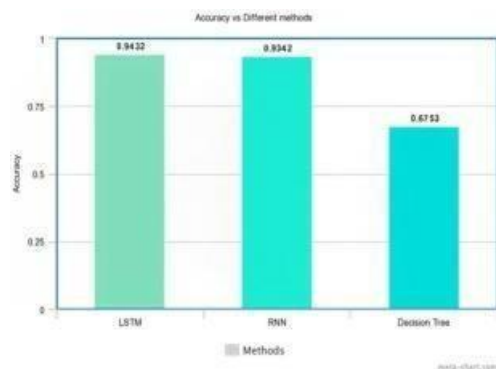


Fig: graphical representation of accuracy in diifferent methods

But in keeping with the photo. 19, it is able to be visible that extraordinary strategies growth the accuracy differently. LSTM has the very best accuracy, RNN is close to LSTM accuracy. However, the choice tree has the bottom accuracy among those 3 strategies. Therefore, we can say that the pleasant method is to use our LSTM for the proposed model and model schooling.

IX. CONCLUSION

The objective of this observe is to discover the definition and architecture of AI chatbots and the important thing technology for implementing AI chatbots. In addition, this study additionally examines the kingdom of AI-based chatbot service



Fig: result of testing phases

Improvement. Based on this studies study, AI-primarily based scientific schools have proven to be the only device in supplying healthcare offerings. This is proven by way of many examples of AI-powered healthcare chatbots, whose improvement has been extended through the face-to-face lifestyle that has end up the new norm because of the speedy unfold of Covid-19. Additionally, effective medical faculty AI has been determined to be exceedingly effective in improving healthcare offerings and enhancing the affected person enjoy. On the alternative hand, those scientific colleges that are made via synthetic intelligence have been discovered to have some obvious boundaries. Efforts must be made to triumph over these limitations and to supply better health services, in a spread of ways including increasing their best of statistics collection, the use of strategies evolved thru synthetic intelligence, growing the quantity of qualified health professionals, cooperating and many others. Implement security features.

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D.CONFERENCE CERTIFICATE

