

# Implementation of Virtual Assistant for Medical ChatBot using Artificial Intelligence and Machine Learning

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**Abstract:** The goal of this research paper is to examine the many types of algorithms utilised in detection. Artificial intelligence is one of the fascinating and all-encompassing fields of computer science with a promising future. AI tends to mimic human behaviour in machines. "Artificial intelligence" is made up of the words "artifice al" and "intelligence," where "artificial" denotes something that is "man-made" and "intelligent" denotes something that has "thinking power." When a machine can possess human-like abilities like learning, reasoning, and problem-solving, this is known as artificial intelligence. The ability of machine learning to recognise or forecast outcomes based on data points includes data points from any domain, including image, text, video, and speech. Science's field of machine learning enables computers to learn without explicit programming. Machine learning is one of the most exciting technologies ever created. As the name suggests, the computer's capacity for learning is what gives it a more human-like character Machine learning is being actively used now, perhaps in a lot more places than one might imagine. There are several uses for machine learning, and one of them with the help of data, machine learning can automatically learn from the past and identify distinct patterns in a dataset. This examination will go into the underlying ideas and principles of machine learning algorithms, examining their advantages, disadvantages, and potential applications. Understanding the nuances of several algorithms can help us choose the best approach for a particular problem or dataset. This review seeks to offer helpful insights into the varied terrain of machine learning algorithms, whether you are a novice or an experienced practitioner.

The idea is to create a medical chatbot that can diagnose the disease and provide basic details about the disease before consulting a doctor. This will help to reduce healthcare costs and improve accessibility to medical knowledge through medical chatbot. The chatbots are computer programs that use natural language to interact with users. Our project focuses on providing the users immediate and accurate prediction of the diseases based on their symptoms. For the prediction of diseases, we have used Decision tree algorithm. Chatbots can play a major role in reshaping the healthcare industry by providing predictive diagnosis.

**Keywords:** Natural Language Processing (NLP), Convolutional neural network (CNN), Machine learning (ML), Artificial Intelligence, Disease prediction, Chatbot

## I. INTRODUCTION

Many customer support processes, as well as websites for businesses, organizations, and organizations are being automated by chat bots. Questions that are more regular or common receive quick answers from the user. We have a suggested chatbot system for patients here. Patients may have many questions about illnesses, medications, and other services. Through this chat bot system, they can quickly receive a response without having to question any random individual. An AI agent that can engage in conversation with a user is a chatbot. The majority use a messenger-style user interface with a user input and a chatbot output Based on what the user has just sent, the chatbot responds to the user's input. It could be a salutation, a topic of discussion, or even a visual. The most fundamental chatbots function by matching user input with a library of prepared dialogues. For instance, if a user says, "Thank you," the chatbot will respond with "You're welcome." It is possible to set up the predetermined collection of dialogues to mimic a typical conversation between two people. When a user says something the chatbot does not understand, such as "Thank you" when they mean "Thanks a lot," the chatbot may become confused because it will be trying to match the "Thank you" input with

"Welcome." The attempt to specify every possible combination of a user expressing "Thanks" results in a lot of tedious labor. The more sophisticated chatbots of today have natural language processing that can pick up information from user input. They have access to APIs to obtain user information like news, weather, time, etc. They are even able to make reservations and process orders entirely through a chatbot interface. As messaging is at the core of a mobile phone, chatbots are perfectly suited for mobile devices. Since the 2000s, when SMS texts first gained popularity, messaging has advanced significantly and is currently in decline. In Ireland, SMS usage fell by 44% between 2011 and 2015. 1.7 billion texts were sent in 2015 as opposed to 3 billion in 2011. [John Hargan, 2015, Kill biller] Despite the fact that SMS usage is declining, individuals are still sending messages; they are just using alternative providers now.

## II. PROBLEM STATEMENT

The programme was created primarily to provide healthcare services in remote parts of India and to discover any gaps that could arise in the use of cloud computing in the healthcare sector. Limited internet access and sluggish internet services are the primary issues in rural regions. People in rural regions lack the necessary expertise to use a smartphone app for healthcare.

## III. OBJECTIVE

To build an intelligent AIML-based chatbot that can carry on a rich, engaging conversation with a human user that incorporates information that has been searched for on Google.

Basic functionality: the capacity to reply to simple words and phrases.

Advanced logic: the capacity to discuss a variety of subjects.

Pull information from Google. For instance, how is the weather, current news stories, etc.

Rather of relying solely on human input, the bot should be able to choose what subjects to discuss

## IV. FUTURE SCOPE

The messaging app age will take over society in the future because people use messaging applications for longer periods of time than other apps. The implementation of tailored medicine would successfully save a large number of lives and raise public awareness of medical problems. No matter how far apart the folks are from one another, they will talk about their medical conditions. They could only require a simple smartphone or desktop computer with an internet connection. The effectiveness of the medical ChatBot is regularly boosted by adding new word combinations and increasing the use of the database for it to be able to treat all forms of illnesses.

## V. LITERATURE SURVEY

**Designing and Developing a Chatbot for Depression:** This study describes the development of a chatbot that uses cognitive-behavioral therapy (CBT) techniques to provide support and advice to people with depression. The chatbot was tested on a small group of participants and showed promising results in reducing depressive symptoms.

**Chatbots in healthcare:** This study provides an overview of the current state of research on chatbots in healthcare. The authors identify several areas where chatbots have been used, including mental health, chronic disease management, and patient education.

**A Review of Chatbots in Healthcare:** This review article summarizes the literature on chatbots in healthcare and discusses the challenges and opportunities for future development. The authors highlight the potential for chatbots to improve access to healthcare services, but also note the need for further research on their effectiveness and ethical considerations.

**Chatbots in Mental Health:** This review article focuses specifically on the use of chatbots in mental health. The authors identify several potential benefits of chatbots in this area, including increased accessibility, reduced stigma, and improved engagement with treatment.

## VI. PROJECT REQUIREMENT

**1. User Interface:** Application Based chatbot

**2. Hardware Interfaces:**

RAM: 8 GB

Processor: Intel i5 Processor

IDE: PyCharm

Coding Language: Python Version 3.5

Operating System: Windows 10

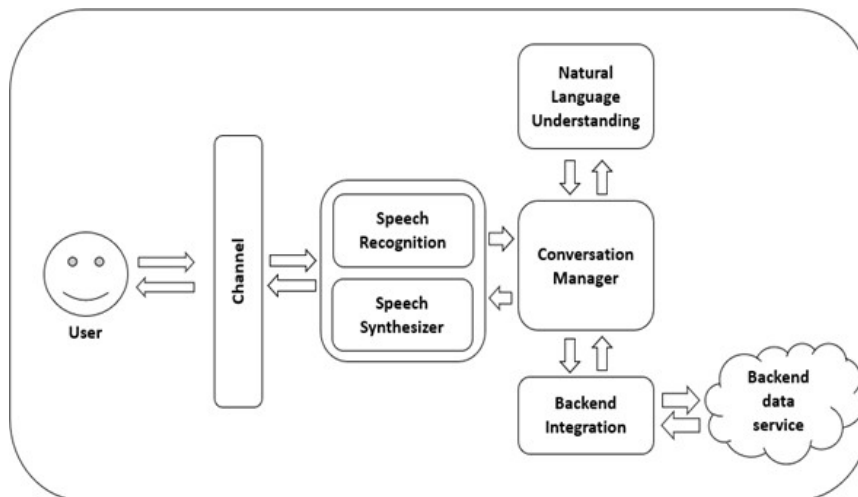
**3. Software Interfaces:**

Operating System: Windows 10

IDE: PyCharm, Spyder

Programming Language: Python

## VII. SYSTEM ANALYSIS



**Fig. System Architecture**

Module:

Module 1: Press the button for voice input.

Module 2: We need to give our question or query to system.

Module 3: System will recognize the speech.

Module 4: Recognize the query using Speech Recognition Module and convert to text using text Conversion.

Module 5: Translate the query using translator.

Module 6: Match the query in database (Use NLP).

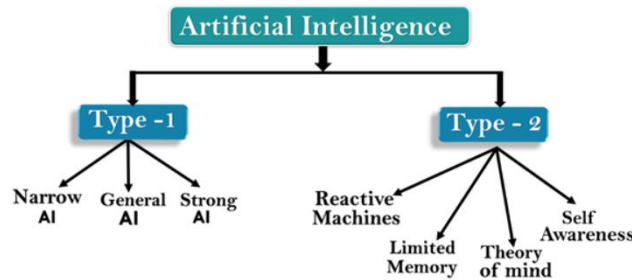
Module 7: Response to query by translating in quick way.

## VIII. METHODOLOGY

Artificial Intelligence:

Building computers and machines with the ability to reason, learn, and behave in ways that would typically need human intelligence or that use data of a size beyond what people can analyse is the focus of the study of artificial intelligence. Computer science, data analytics, statistics, hardware and software engineering, languages, neurology, even philosophy and psychology are just a few of the numerous disciplines that fall under the umbrella of AI.

**Types of artificial intelligence:**



**Machine Learning:**

Computers can learn without being explicitly programmed thanks to the branch of research known as machine learning. Machine learning is one of the most exciting technologies ever created. The ability to learn is what, as the name suggests, gives the computer a more human-like quality. Machine learning is being actively used right now, possibly in a lot more ways.

There are two types of Machine learning:

- Supervised learning
- Un-supervised learning

**Supervised Learning:**

In Supervised Learning, algorithms learn from labelled data. The algorithm decides the label to use after comprehending the input. Based on patterns, the algorithm chooses which label to assign to new data and links the patterns to the unlabelled new data. For problems where the available data is made up of labelled examples, which means that each data point has an associated label, supervised learning (SL) is a machine learning paradigm. Classification and regression are the two categories into which supervised learning may be separated. Regression makes predictions about a numerical value based on previously observed data, whereas classification makes predictions about the category to which the data belongs.

**Convolutional neural networks (CNN)** Some of the most popular neural networks in contemporary artificial intelligence are convolutional neural networks (CNN). CNNs, which are most frequently employed in image identification, employ multiple discrete layers (a convolutional layer, followed by a pooling layer) that separate and filter various portions of an image before reassembling it (in the fully connected layer). Before looking for more complicated features in later layers, the initial convolutional layers may search for simple features of an image like colours and edges.

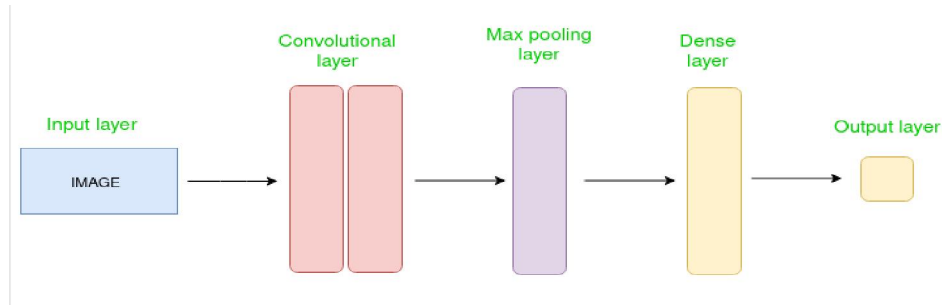
A typical Deep Learning neural network architecture in computer vision is this one. A computer can comprehend and analyse visual data or images thanks to the field of artificial intelligence known as computer vision. In machine learning, artificial neural networks perform amazingly well. In many datasets, including those with images, audio, and text, neural networks are used.

**An average neural network has three main types of layers:**

**Input Layers:** It is the layer where we input data into our model. The entire number of features in our data (or the number of pixels in the case of a picture) is equal to the number of neurons in this layer.

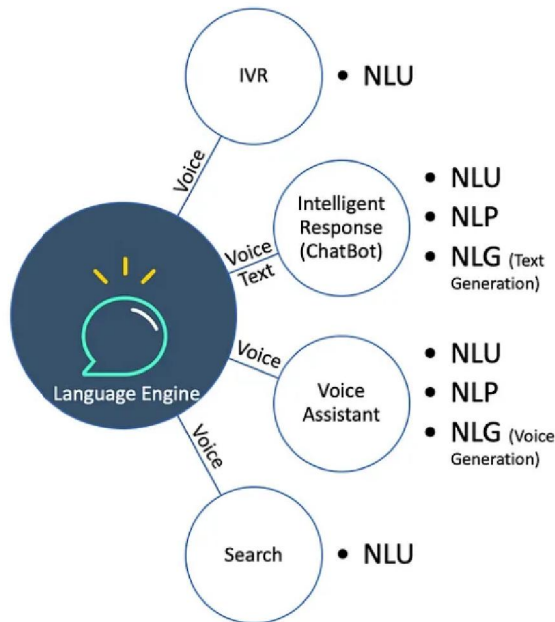
**Hidden Layer:** The hidden layer is then fed the input from the input layer. Depending on our model and the volume of the data, there may be numerous hidden levels. The number of neurons in each hidden layer might vary, but they are typically more than the number of features. Each layer's output is calculated by multiplying the output of the layer below it by its learnable weights, adding learnable biases, and then computing the activation function, which makes the network nonlinear.

**Output Layer:** The output of each class is then converted into the probability score for each class using a logistic function, such as sigmoid or SoftMax, using the data from the hidden layer as input



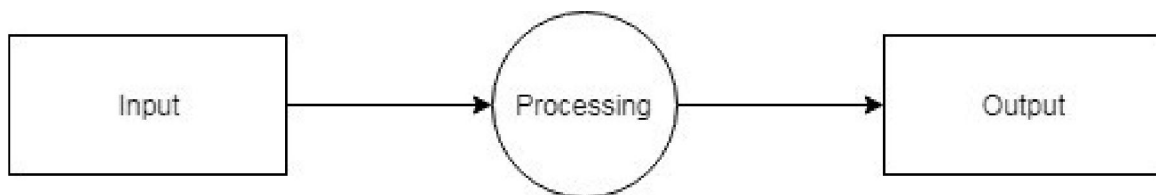
**Natural language processing (NLP): -**

The ability of a computer program to comprehend spoken and written human language is known as natural language processing (NLP). A part of artificial intelligence (AI) includes it. NLP has enabled computers to understand natural language on par with people. Natural language processing employs artificial intelligence to take real-world input, analyse it, and make sense of it, regardless of whether the language is spoken or written. Computers have reading programs and microphones to collect audio, much as people have a range of sensors like ears to hear and eyes to see. Similar to how humans use their brains to process different inputs, computers have programs to do the same. The input is finally transformed into computer-readable code during processing.

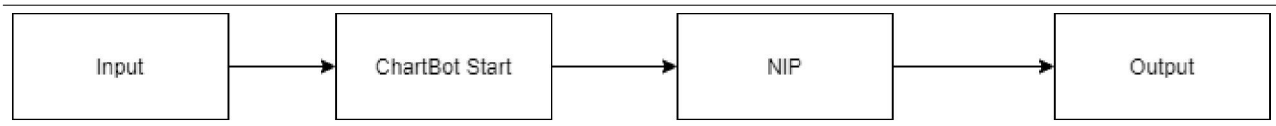


**Data Flow Diagram:**

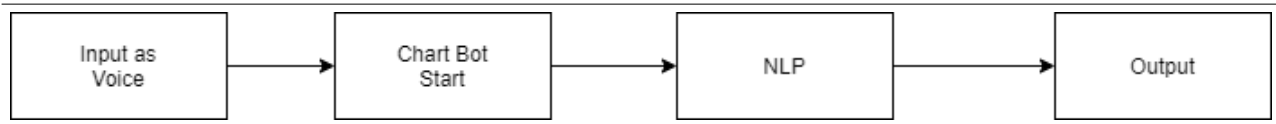
In a data flow diagram, we demonstrate the movement of data through our system in a DFD0, where a rectangle represents input, output and a circle represent our system. In DFD1, we demonstrate the system's real input and output, which are text or images for input and rumour detection, respectively. In DFD 2, we demonstrate user and admin operations



**Fig. Data Flow diagram**



**Fig. Data Flow1 diagram**



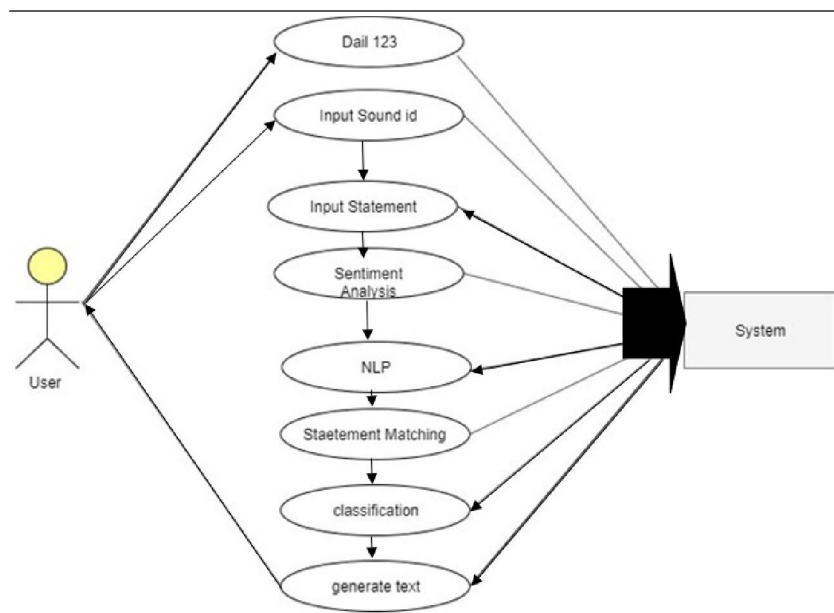
**Fig. Data Flow2 diagram**

**UML Diagram:**

Software blueprints are written in the standard language known as Unified Modelling Language. The artefacts of a software-intensive system may be visualised, specified, constructed, and documented using the UML. Although UML is process neutral, it is best applied in use case driven, architecture-enterprise, iterative, and incremental processes.

**There are several accessible UML diagrams.**

**Use case Diagram.**



**Fig. Use case Diagram**

Activity Diagram

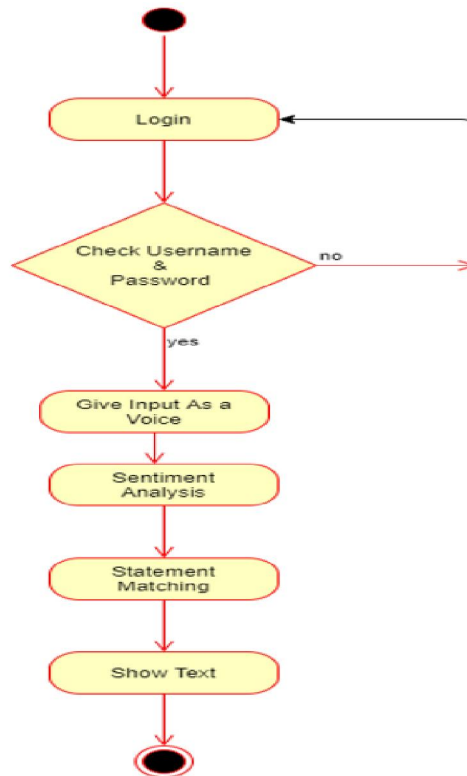


Fig. Activity Diagram

**IX. OTHER SPECIFICATIONS**

**Advantages:**

- Shorter Wait Times.
- Flexible customer support.
- Prompt medical counsel.
- Significant Cost Savings.
- Patient Comments.
- 24/7 Support.

**Disadvantages:**

- No Real Human Interaction.
- Limited Information.
- Security Concerns

**X. DESIGN**

AI chatbots can eventually result in better patient outcomes by enhancing engagement, personalising treatment, increasing efficiency, and expanding accessibility. Patients who are more actively involved in their care are more likely to adhere to their treatment plans and experience positive health results.

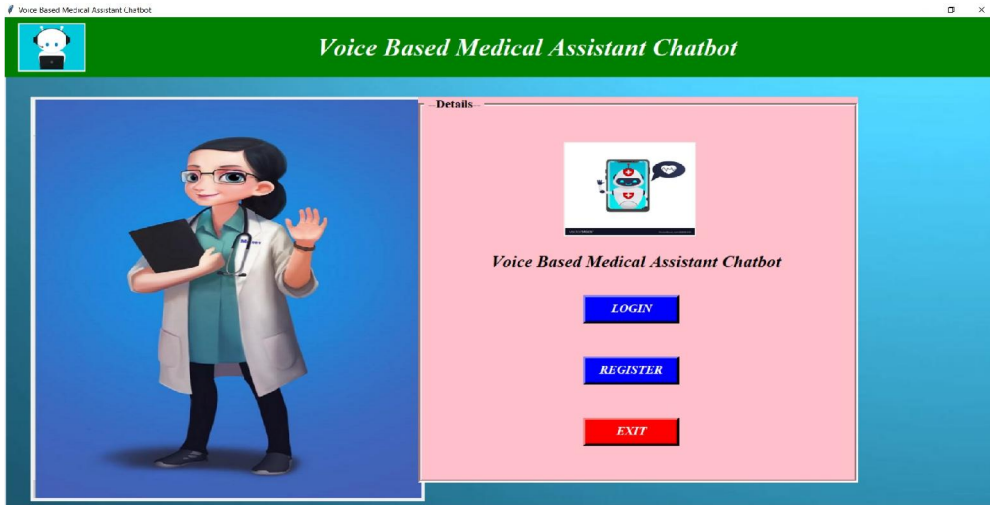


Fig. Home Page

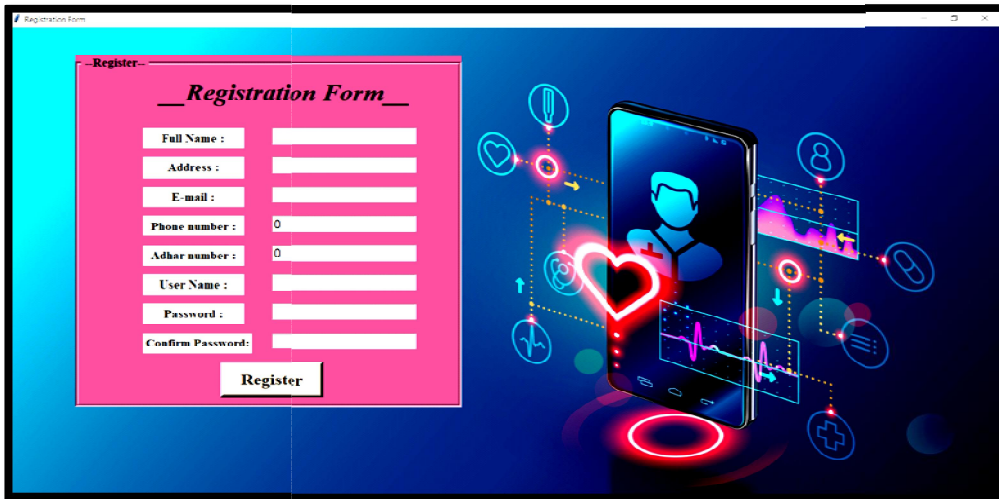


Fig. Registration Form Page

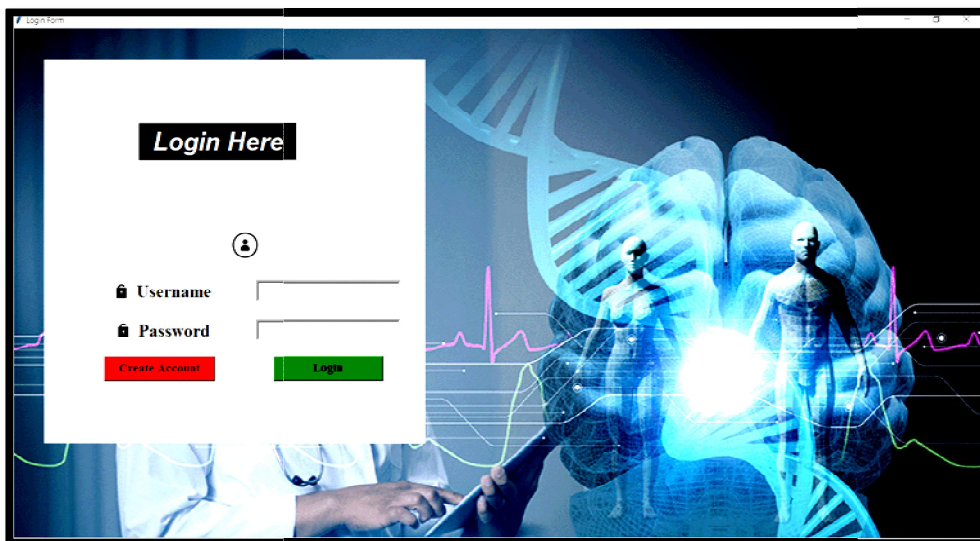
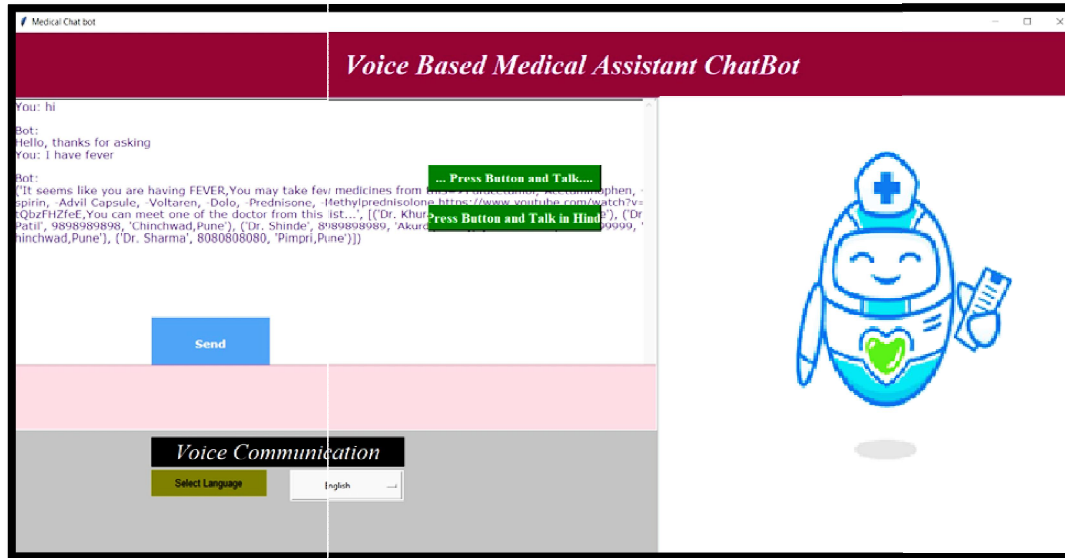


Fig. Login Page





**Fig. Result Page (Chat Result)**

## XI. CONCLUSION

The structure we develop to make client advantages straightforward. We are attempting to make the framework easy to link at that point. There will be no compelling motivation to wait on for the response or push the catch to select a choice. Here, we employ the language translator, speech to content, and speech recognition modules. In addition to serving as a customer service agent for several businesses, institutions, and sectors, chatbots may also serve as everyone's personal assistant. Bots created on our website can also assist with memory. It may also assist several businesses in luring clients from around the country. When individuals are bored, they may utilise it to keep them entertained by emailing them jokes, facts, quotations, and other things.

When designing our project, performance was our primary priority in order to enable it to serve millions of users simultaneously. The proposed approach got to the conclusion that the methodology is successful after the best testing results and replies from the produced system.

## ACKNOWLEDGMENT

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