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A Project Report
on

AYUSHYASIRI

Submitted in partial fulfillment of the requirements for the VIII Semester of the degree of ***Bachelor of Engineering in Information Science and Engineering*** *of Visvesvaraya Technological University, Belagavi*

by

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CERTIFICATE

Certified that the project work entitled ***"AyushyaSiri"*** has been successfully carried out at **RNSIT** by **Akanksha Mishra** bearing USN **1RN19IS015**, **Sathvik S** bearing USN **1RN19IS135**, **Saumya Shukla** bearing USN **1RN19IS137** and **Sumit Kushwaha** bearing USN **1RN19IS159** bonafide students of **RNS Institute of Technology** in partial fulfillment of the requirements of final year degree in **Bachelor of Engineering in Information Science and Engineering of Visvesvaraya Technological University, Belagavi** during academic year **2022-2023**. The project work phase-I has been approved as it satisfies the academic requirements in respect of project work for the said degree.

Mr. T S Bhagavath Singh	**Dr. Suresh L**	**Dr. Ramesh Babu HS**
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DECLARATION

We, **Akanksha Mishra[1RN19IS015], Sathvik S [1RN19IS135], Saumya Shukla [1RN19IS137] and Sumit Kushwaha [1RN19IS159],** students of VIII Semester BE, in Information Science and Engineering, RNS Institute of Technology hereby declares that the Project entitled ***AyushyaSiri*** has been carried out by us and submitted in partial fulfillment of the requirements for the *VIII Semester of the degree of* ***Bachelor of Engineering in Information Science and Engineering*** *of Visvesvaraya Technological University, Belagavi* during the academic year 2022-2023.

Place: Bengaluru

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ABSTRACT

At the current time virtual assistant is a part of human life and has been a normal person with whom weinteract right from the start like playing your song up to controlling the switch of your fan it has been all over the place. Now taking a step forward let us bring an idea of virtual assistant being part of healthcare domain. **AyushyaSiri** is a project which helps a person to identify if any disease is present in him/her by considering the facts of the current visible symptoms the person has. A general practice to predict whether a person is showing any symptom to a particular disease is to have a general health check-up and then proceed with the diagnosis based on the result of the report.

This would be an unnecessary procedure if it is for simple or minor disease that is where our project can be useful. Apart from identifying the disease it provides other services like scheduling an appointment for an online or an offline consultation, online shopping of the medicines required. The main aim of the project is to lend immediate help to the person who feels sick right from viral fever toa few of the selected disease. This project also focuses on good interaction with person to understand thesymptoms and predict the possible action to be taken at the earliest without any delay.

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LIST OF ABBREVIATIONS

ML	Machine Learning
AI	Artificial Intelligence
DIY	Do-It-Yourself
NLP	Natural Language Processing
IVA	Intelligent Virtual Assistant
EHR	Electronic Health Records
SVM	Super Vector Machine

Chapter 1

INTRODUCTION

The need for a smart healthcare system that can balance the demands of the populace with rising demand has arisen as a result of a rise in the number of sick people in relation to the number of healthcare facilities. Furthermore, as more patients and individuals get sick, a lot of data is generated from medical records, which can be processed by ML and DL models to produce better results. Therefore, creating a smart healthcare system aid in not only watching out for the patient and alleviating their suffering, but also in providing medications or identifying diseases. In our case, we wish to contribute to this development by suggesting an e-health strategy that incorporates an intelligent virtual assistant.

Our goal is to give patients a tool to help them with daily activities, making it easier to monitor their health parameters and to receive treatment. We explored basing our strategy on an Intelligent Virtual Assistant (IVA), which is a technology capable of assisting the end user in completing a task more quickly and effectively than usual. Machine learning is a field that makes predictions from historical data. The study of computer systems known as ”machine learning” allows for the learning of machine learning models from data and past experience. Two stages make up the machine learning algorithm: Training and testing come first. Machine learning technology is struggling from previous decades to anticipate the disease from a patient’s symptoms and from the patient’s history. Machine learning technology can effectively handle healthcare problems. Our ability to develop models using machine learning (ML) allows us to swiftly clean and process data and offer results. Healthcare is the best sector to start with when introducing machine learning in medicine. By using artificial intelligence, the computer can think. Machine intelligence is increased thanks to AI. The powerful technology used to create virtual assistants has reduced workload and made it simple to complete numerous jobs at once.

Hereby, we introduce AyushyaSiri, a user-supporting intelligent virtual assistant. It specifically enables:

- to utilize a Symptom Checker to determine the user’s condition
- to place order for medicines
- to offer DIY treatments for minor ailments that can be cured
- to make the user more cognizant of diseases and symptoms that are connected.

Existing System:

Some of the examples of existing health care services and platforms with characteristics similar to our chatbot are as mentioned below:

- **Eliza:** It is one of the first conversational systems able to emulate the style of a psychotherapist. It is a straightforward system based on simple, non-personalized pattern-matching answers.
- **Florence:** It is a health chatbot whose primary purpose is to generate reminders for medications and treatments. An additional medical dictionary function has been recently added.
- **Dr.A.I.:** It is an application developed by HealthTap, and has telemedicine consultations as its strong point.
- **Babylon Health:** It is an application that offers a chat-like interface. Once the user has started a chat withthe digital assistant, she can provide her health status, and answer additional questions that are asked by the system.
- **Melody:** The chatbot is part of the Baidu Doctor application, which was created as a platform for patients to meet their doctors.

Each of them has its peculiarities, but none of them integrates self-diagnosis, ordering medicine, online home remedies recommendation, etc.. into the same tool.

Proposed System-

An integrated system would be better compared to individual system for multiple requirements and tasks. So, our system consists of:

1. A Symptom Checker
2. A Symptom Checker
3. Order Medicine online
4. Schedule an appointment
5. User Profile

The Symptom Checker involves our chatbot AyushyaSiri, which helps in identifying the disease based on the user response, in the form of chatting with the bot. In Multiple Disease Prediction System, we can predict whether the person is suffering from Heart, Diabetes or Parkinson's disease using some machine learning algorithms used in the project. Also, other options are provided to the user where they can place an order for the medicine online, schedule an appointment with the doctor if needed and can view their profile by clicking on user profile which will give them the details of whatever doctors they had appointmentwith, what medicines were ordered and so on.

Chapter 2

LITERATURE SURVEY

[1] Big data in healthcare: management, analysis and future prospects

In the healthcare industry, various sources for big data include hospital records, medical records of patients, results of medical examinations, and devices that are a part of internet of things. Biomedical research also generates a significant portion of big data relevant to public healthcare. This data requires proper management and analysis in order to derive meaningful information. There are various challenges associated with each step of handling big data which can only be surpassed by using high-end computing solutions for big data analysis.

It explains how an electronic medical record (EMR) stores the standard medical and clinical data gathered from the patients. EHRs, EMRs, personal health record (PHR), medical practice management software (MPM), and many other healthcare data components collectively have the potential to improve the quality, service efficiency, and costs of healthcare along with the reduction of medical errors. The big data in healthcare includes the healthcare payer-provider data (such as EMRs, pharmacy prescription, and insurance records) along with the genomics- driven experiments (such as genotyping, gene expression data) and other data acquired from the smart web of internet of things (IoT). The adoption of EHRs was slow at the beginning of the 21st century however it has grown substantially after 2009. The management and usage of such healthcare data has been increasingly dependent on information technology. The development and usage of wellness monitoring devices and related software that can generate alerts and share the health related data of a patient with the respective health care providers has gained momentum, especially in establishing a real-time biomedical and health monitoring system.

These devices are generating a huge amount of data that can be analyzed to provide real-time clinical or medical care. The use of big data from healthcare shows promise for improving health outcomes and controlling costs.

[2] Disease Prediction using Machine Learning Algorithm

The aim of the project was to develop classifier system using machine learning algorithms to solve the health-related issues by assisting the physicians to predict and diagnose diseases at an early stage. A Sample data of 4920 patients' records diagnosed with 41 diseases was selected for analysis. A dependent variable was composed of 41 diseases. 95 of 132 independent variables(symptoms) closely related to diseases were selected and optimized. ML algorithms such as Decision Tree classifier, Random forest classifier, and Naïve Bayes classifier are used. The GUI created takes in 5 symptoms from user. The user can choose the symptoms from the list of symptoms which appears when clicked on "None" option. The user can give a maximum of 5 symptoms he is facing. Once the symptoms are given, thealgorithms are to be selected. As the algorithms are selected, the symptoms are processed, and thedisease is searched based on the rule set.

[3] Healthcare Chatbot

The idea of project 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. It 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.

In the system the user can interact with the chatbot through text and chat bot will interact using voice and text manner. With respect to the users queries, the bot identifies the disease if user chatting with the chatbot. According to the diseases of the user, bot gives suggestions for the disease and also prescribe specialist doctors. This system can be used by multiple users at a time without any lagging.

Overall Algorithm-

1. Insert user query in the chatbot window.
2. The details will be extracted from the user chat.
3. Decision Tree classifier algorithm is used to process the query.
4. The response is fetched from the chatbot like Disease Prediction and Disease Precaution and output to the user.
5. Exit.

[4] Artificial Intelligence Can Improve Patient Management at the Time of a Pandemic: The Role of Voice Technology

The paper focuses on the current clinical needs and applications of artificial intelligence–driven voice chatbots to drive operational effectiveness and improve patient experience and outcomes. How the virtual assistants have helped in overcoming the gaps that existed in health care during the pandemic and therisks and challenges that exist in using these virtual agents in the healthcare domain.

Artificial intelligence-driven voice technology deployed on mobile phones and smart speakers has the potential to improve patient management and organizational workflow. Voice chatbots have been already implemented in health care-leveraging innovative telehealth solutions during the COVID-19 pandemic. They allow for automatic acute care triaging and chronic disease management, including remote monitoring, preventive care, patient intake, and referral assistance. This paper focuses on the current clinical needs and applications of artificial intelligence-driven voice chatbots to drive operational effectiveness and improve patient experience and outcomes.

[5] Disease Prediction and Diagnosis Using Machine Learning

The aim of this project is to design a Conversational AI Powered Chatbot for Medical Diagnostics using Deep Learning which mainly focuses on rural parts as well as poor and needy people of the country. The System has the capability to understand the symptoms of the patient and communicates with patient through web-UI. NLTK (Natural Language Toolkit)is a module/ program in python which can able to perform symbolic and statistical Natural Language Processing for English written in Programming. It is used to analyze the input in the form of speech and generate responses that are similar to humans.

Initially, gather data from the dataset, which contains set of messages and their corresponding responses. Then, remove punctuations, extra symbols and other unnecessary things from this dataset. Then apply Bag of words technique to identify the class of input message. Feed the processed input query/message to Neural Network or Sequential model, which used to train chatbot. After this, predict the class and return the most appropriate response to user. This chatbot fetches the responses from dataset by matching the input with the conversations.

[6] Virtual Assistant For Health Care Services

The virtual assistant for health care services key aim is to incorporate several hospitals by providing the patients with consistent and reliable medical solutions from seasoned doctors across the internet. This initiative also removes the need for redundant medical records. The patient will be able to save time and money as a result of this initiative. Telemedicine allows health care professionals to evaluate, diagnose and treat patients at a distance using telecommunications technology.

The medical reports generated in one hospital are authorized by the representatives of other hospitals which are connected through this platform. Hence all the hospitals can use the same reports for diagnosis if the patient wishes to visit any other hospitals in the network. The patient is asked to register and authenticated to use the application assuring the data integrity in the application. The patient has to fill the 'OUT-PATIENT' form, to confirm the appointment with the doctor by paying the doctor's consultation fee. After confirmation of the appointment, the patient and the doctor will get an email reminder about the appointment for online consultation through a chat application. The laboratory personal is given an option to upload the digital medical reports into the patient's profile which are later authorized by the representatives. These reports are also sent to the doctor who will generate the prescription. A copy of the prescription is sent to the pharmacy. The pharmacy personal delivers the medicine to the patient home. Before initiation of the delivery, the patient is asked to pay the pharmacy bill through an online payment.

[7] Healthcare Virtual Assistant

In this project a virtual assistant is developed to diagnose diseases or illness in people with the help of machine learning. The concept of tress was used which gave appropriate results when specific parameters were encountered. The user gave his symptoms as an input with the help of python's speech to text library. Also, an appointment booking system is developed within the assistant to book appointment with the top-rated doctors on Google.

The Disease node acts as the root for the tree. It contains all the attributes in the form of a predefined dataset to point to a possible condition. A root node can have 2 or more nodes as its branches. To be more accurate in the diagnosing process a greater number of parameters must be defined in the input to yield accurate results. We can see the input parameters such as "Loss of Smell"

”Taste”, “Difficulty Breathing” they act as attributes which point to the target condition that is Coronavirus. In case the person does not have all the possible conditions the assistant has been programmed well to ask for more symptoms from the user for accurate results. Even if the accuracy is hindered by little with the data it is covered in the appointment system.

[8] Intelligent and Interactive Healthcare System (I2HS) Using ML

A novel architecture for an Intelligent and Interactive Healthcare System that incorporates edge/fog/cloud computing techniques and focuses on Speech Recognition and its extensive application in an interactive system is designed. The Hidden Markov Model is applied to process the proposed approach as using the probabilistic approach is more realistic for prediction purposes.

There has been a gigantic stir in the world’s healthcare sector for the past couple of years with the advent of the Covid-19 pandemic. The healthcare system has suffered a major setback and, with the lack of doctors, nurses, and healthcare facilities the need for an intelligent healthcaresystem has come to the fore more than ever before. Smart healthcare technologies and AI/ML algorithms provide encouraging and favorable solutions to the healthcare sector’s challenges. An Intelligent Human-Machine Interactive system is the need of the hour. This paper proposes a novel architecture for an Intelligent and Interactive Healthcare System that incorporates edge/fog/cloud computing techniques and focuses on Speech Recognition and its extensive application in an interactive system. The focal reason for using speech in the healthcare sector is that it is easily available and can easily predict any physical or psychological discomfort.

[9] HealthAssistantBot: A Personal Health Assistant for the Italian Language

An intelligent virtual assistant able to talk with patients in order to understand their symptoma tology, suggest doctors, and monitor treatments and health parameters. In a simple way, by exploiting a natural language-based interaction, the system allows the user to create their health profile, to describe their symptoms, to search for doctors or to simply remember a treatment to follow.

Specifically, the methodology exploits machine learning techniques to process users’ symptoms and to automatically infer her diseases. Next, the information obtained is used by our recommendation algorithm to identify the nearest doctor who can best treat the user’s condition, considering the community data.

In the experimental session we evaluated our HealthAssistantBot with both an offline and online evaluation. In the first case, we assessed the performance of our internal components, while in the second one we carried out a study involving 102 subjects who interacted with the conversational agent in a daily use scenario. Results are encouraging and showed the effectiveness of the strategy in supporting the patients in taking care of their health.

[10] Empathic Virtual Assistant for Healthcare Information with Positive Emotional Experience

This Project proposes a virtual chat agent that answers health-related questions with a patient. The virtual assistant communicates in an empathic way based on a six-step protocol presented in SPIKES[2], a well-known doctor-patient communication model. We adjust the model to satisfy the constraints of human-computer interaction because the SPIKES model was devised for face-to-face conversation.

Participants are instructed to imagine themselves experiencing symptoms that are given by us. The symptoms lead to a disease that is selected from a set of common conditions or severe diseases. The participants are asked to use our virtual healthcare assistant to discuss their symptoms as well as three existing web- or chat-based interfaces for comparison. We assess our experiment by conducting a survey about their user experience in terms of feeling overwhelmed or frightened in 7-point Likert scale.

[11] Interactive home healthcare system with integrated voice assistant

In the project, the workflow starts with the wearable ECG sensor registering the ECG scans. The mobile application communicates with the wearable ECG sensor via Bluetooth worn on the patient's body, monitors the scans and stores them on local storage and on the medical cloud. The ECG data sent to the cloud is analyzed and stored on the server. Patients can monitor and access the data sent from the sensor and receive alerts for abnormal heart functionality. The web application enables registered doctors to monitor patients heart condition and retrieve data files of ECG scans. The medical cloud has a crucial role in providing more personalized healthcare and information-based services. It collects the raw data from the sensors, processes the data to reveal relevant information, stores the information in EHRs which are easily accessible for all authorized applications and users.

The voice application takes the systems functionality one step further. It receives voice commands and information from the patient, which then communicates with the developed web service for the requested service or information.

The featured voice enabled services are: heart condition checker, sending a report of the patients heart condition, scheduling appointments and a therapy reminder. The voice application is developed for the Google assistant devices and Amazon Alexa enabled devices.

[12] Chatbot for Health Care and Oncology Applications using Artificial Intelligence and Machine Learning

This narrative review paper reports on health care components for chatbots, with a focus on cancer therapy. The rest of this paper is organized as follows: first, we introduce the developmental progress with a general overview of the architecture, design concepts, and types of chatbots; the main Results section focuses on the role that chatbots play in areas related to oncology, such as diagnosis, treatment, monitoring, support, workflow efficiency, and health promotion; and the Discussion section analyzes potential limitations and concerns for successful implementation while addressing future applications and research topics.

The screening of chatbots was guided by a systematic review process from the Botlist directory during the period of January 2021. This directory was chosen as it was open-access and categorized the chatbots under many different categories (ie, health care, communication, and entertainment) and contained many commonly used messaging services (ie, Facebook Messenger, Discord, Slack, Kik, and Skype). A total of 78 chatbots were identified for health care components and further divided according to the following criteria: diagnosis, treatment, monitoring, support, workflow, and health promotion. It should be noted that using the health filters from a web directory limits the results to the search strategy and marketing label.

[13] Analyzing the Implementation of Machine Learning in Healthcare

One of the most significant applications of ML in the healthcare sector is in identifying and diagnosing diseases and their treatments that are otherwise difficult to diagnose [11]. It can be inclusive of cancers that are difficult to identify during initial stages, as well as genetic diseases.

Currently, ML techniques are inclusive of unsupervised learning that identifies data patterns without provision of any predictions. Technologies based on ML are used by Project Hanover of Microsoft for various initiatives such as the development of AI technologies for the treatment of cancer and personalizing combination of drugs for Acute Myeloid Leukemia (AML).

The report further identified that healthcare companies need to focus on assessing their entire organizational strategy while ensuring the deployment of AI for solving specific issues likea fraud of claims or readmissions of a hospital.

[14] Disease Prediction and Diagnosis Using Machine Learning

With big data growth in biomedical and healthcare communities, accurate analysis of medical data benefits early disease detection, patient care, and community services. However, the analysis accuracy is reduced when the quality of medical data is incomplete. Moreover, different regions exhibit unique characteristics of certain regional diseases, which may weaken the prediction of disease outbreaks. Healthcare is very important to lead a good life. However, it is very difficult to obtain the consultation with the doctor for every health problem. The idea is to create a medical Chatbot using Artificial Intelligence that can 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. The Chatbot stores the data in the database to identify the sentence keywords and to make a query decision and answer the question.

[15] Voice-Controlled Intelligent Personal Assistants in Health Care

Voice-controlled intelligent personal assistants (VIPAs), such as Amazon Echo and Google Home, involve artificial intelligence–powered algorithms designed to simulate humans. Their hands- free interface and growing capabilities have a wide range of applications in health care, covering offclinic education, health monitoring, and communication. However, conflicting factors, such as patient safety and privacy concerns, make it difficult to foresee the further development of VIPAs in health care. This study aimed to develop a plausible scenario for the further development of VIPAs in health care to support decision making regarding the procurement of VIPAs in health care organizations. They have conducted a two-stage Delphi study with an internationally recruited panel consisting of voice assistant experts, medical professionals, and representatives of academia, governmental health authorities, and non- profit health associations having expertise with voice technology. Twenty projections were formulated and evaluated by the panelists. Descriptive statistics were used to derive the desired scenario.

[16] Symptoms Based Disease Prediction Using Machine Learning Techniques

Computer Aided Diagnosis (CAD) is quickly evolving, diverse field of study in medical analysis. Significant efforts have been made in recent years to develop computer-aided diagnostic applications, as failures in medical diagnosing processes can result in medical therapies that are severely deceptive. Machine learning (ML) is important in Computer Aided Diagnostic test. Object such as body-organs cannot be identified correctly after using an easy equation. Therefore, pattern recognition essentially requires training from instances. In the bio medical area, pattern detection and ML promises to improve the reliability of disease approach and detection. They also respect the dispassion of the method of decisions making. ML provides a respectable approach to make superior and automated algorithm for the study of high dimension and multi - modal bio medicals data. The relative study of various ML algorithm for the detection of various disease such as heart disease, diabetes disease is given in this survey paper. It calls focus on the collection of algorithms and techniques for ML used for disease detection and decision- making processes.

[17] The Prediction of Disease Using Machine Learning

Disease Prediction using Machine Learning is the system that is used to predict the diseases from the symptoms which are given by the patients or any user. The system processes the symptoms provided by the user as input and gives the output as the probability of the disease. Naïve Bayes classifier is used in the prediction of the disease which is a supervised machine learning algorithm. The probability of the disease is calculated by the Naïve Bayes algorithm. With an increase in biomedical and healthcare data, accurate analysis of medical data benefits early disease detection and patient care. By using linear regression and decision tree we are predicting diseases like Diabetes, Malaria, Jaundice, Dengue, and Tuberculosis. In this System, Big Data CNN Algorithm is used for Disease risk prediction. For S type data, the system is using Machine Learning algorithm i.e., K-nearest Neighbors, Decision Tree, Naïve Bayesian. The accuracy of the existing System is up to 94.8 %. In the existing paper, they streamlinemachine learning algorithms for the effective prediction of chronic disease outbreak in disease-frequent communities. They experiment with the modified prediction models over real life hospital data collected from central China. They propose a convolutional neural network-based multimodal disease risk prediction (CNN- MDRP) algorithm using structured and unstructured data from the hospital.

[18] A Chatbot for Medical Purpose using Deep Learning

The Chatbot is a software programs that is used to interact with clients using natural language Processing via text or text to speech format. Today in the present era, the major challenges that India as a country is facing is to cater good quality and affordable healthcare services to its growing population and at the same time, they are not cost efficient. Nowadays, it is becoming very difficult to provide healthcare facilities as we have seen in COVID-19 critical situations that the condition in India was getting worse because of lack of transportation, availability of doctors and hospitality. Sometimes it causes the people to postpone their treatment as well as there is an increment in death count.

The aim of this project is to design a Conversational AI Powered Chatbot for Medical Diagnostics using Deep Learning which mainly focuses on rural parts as well as poor and needy people of our country. The System has the capability to understand the symptoms of the patient and communicates with patient (End-user) through web-UI. The system tries to solve their problem with the help of the symptoms provided by patient itself and help them to give the correct antibiotics/ medicines and precautions. NLTK (Natural Language Toolkit) is a module program in python which can able to perform symbolic and statistical Natural Language Processing for English written in Programming. It is used to analyze the input in the form of speech and generate responses that are similar to humans.

Chapter 3

ANALYSIS

3.1 Problem Statement

The healthcare industry is constantly concerned with illness diagnosis, treatment, and prevention. India's population is increasing so quickly that it is difficult for people to schedule appointments and receive medical care. Database management solutions are required for information handling in all large companies. The hospital is one of those businesses. Individuals, families, and governments have all felt the impact of rising healthcare costs. Healthcare prices are out of control in many nations, which has resulted in a deterioration in the standard of care. It's crucial to figure out how to control healthcare expenses without sacrificing quality. Data processing is increasingly important in hospitals due to the high patient, doctor, and staff populations.

In a hospital, data management can be used to collect patient information, schedule medical appointments, and manage financial transactions. The majority of healthcare expenditures worldwide are related to chronic conditions including diabetes, heart disease, and cancer. Investing in preventive measures can help lessen the burden of chronic diseases on healthcare systems because these diseases are frequently preventable. In order to provide the best diagnosis and treatment for the patient, doctors need have access to the patient's records. On the other side, the patient has access to all of the information that the doctor indicates, including their lab results. The database makes it simple to manage the hospital's accounting department. Therefore, it may be inferred that a platform is required, one that guarantees the doctor's availability and offers a variety of healthcare services on a single platform. Apart from just getting an appointment there are several other services provided in the health care domain like online medicine purchases for which the user have to go for multiple platforms to get the same. If at all it is possible to get your health care services right to your doorsteps how efficient that would be! In conclusion, overcoming these healthcare difficulties necessitates a multifaceted strategy that includes stakeholder cooperation, financial support for healthcare infrastructure, and the creation of creative healthcare solutions.

3.2 Objectives

In our work, we wish to contribute to the development of health care service by suggesting an e-health strategy that incorporates an intelligent virtual assistant. Our goal is to give the users a tool to help them withhealth care activities, making it easier to monitor their health parameters and to receive treatment. We explored basing our strategy on an Intelligent Virtual Assistant (IVA), which is a technology capable ofassisting the user in completing a task more quickly and effectively than usual. The primary goal of the proposed work is to offer an integrated system that would be superior to an individual system for a variety ofneeds and jobs. The features that we are implementing in our work are as follows:

A. Symptom Checker:

Identifying the disease from the user's symptoms, which define their state, is one of our Intelligent Virtual Agent's key features. The purpose of this feature is to enable users to recommend doctors who can assist them in managing their condition. Beyond this, the Symptom Checker can assist clinicians in making a preliminary diagnosis by serving as a self-diagnostic tool.

B. Order Medicine:

Patients can order their prescription prescriptions online, saving time and travelling to a pharmacy or healthcare facility to pick them up in person. The ability to order medicine online has grown in popularity over recent years due to the expansion of e-commerce platforms and online healthcare services.

C. Recommending DIY treatments:

In the healthcare sector, chatbots that offer home treatments are a promising invention. Patients can now acquire home cures for minor illnesses and health concerns without having to physically contact a healthcare provider thanks to the growing use of chatbots in the industry. Our chatbot can provide a wide range of home remedies for conditions such as the common cold, headaches, acidity, and other minor ailments. Additionally, it can offer advice on lifestyle changes and dietary modifications that can help improve overall health and well-being.

D. User Profile:

All user data is persistently stored by the Profile module utilizing a NoSQL database. The module specifically keeps track of user treatments, demographic information, and monitoring. This essential module makes sure that user profile data may be created, read, updated, and deleted.

3.3 Limitations of Existing System

The existing systems for healthcare like Eliza, Florence, Dr. AI, Babylon Health, Melody, etc have their own peculiarities and qualities, but none of them integrates self-diagnosis, ordering medicine, online home remedies recommendation, etc.. into the same tool. An integrated system would be better compared to individual system for multiple requirements and tasks. So, our project AyushyaSiri incorporates all the functionalities and is capable of doing all the tasks together with a great user interface easy to use bynew users.

3.4 Methodology

In order to ensure the application's data integrity, the user is required to register and submit valid identification before using it. In order to analyze a user's symptoms and automatically determine their diseases, our methodology makes use of machine learning techniques. Also as discussed earlier we even have an option for scheduling an appointment with the doctor. A reminder email about the appointment for an online consultation will be sent to the patient and the doctor after the appointment has been confirmed. Also if an order is placed for the medicine the pharmacy personal delivers the medicine to the users' home. The architecture of the virtual assistant (chatbot) keeps the logical parts of the bot apart from those involved in dialogue interaction. The graphical user interface has been created so that the end user may engage with the dialogue easily. We combine textual elements (such instructions and free text) in order to accomplish this. The chatbot in this case uses JavaScript and jQuery to only forecast common diseases that can be cured, while HTML and CSS are used for the essential design.

The chatbot in our work attempts to match the phrases mentioned in the user's chat in order to anticipate certain diseases that can be treated at home, based on the match, the symptom is detected and displayed to the user. We also have a Python-based machine learning disease prediction system which will be released using Streamlit. Using machine learning, this website application may anticipate ailments including diabetes, heart disease, and Parkinson's. Super Vector Machine Model is employed as the working component for predicting diabetes and Parkinson's disease, and Logistic Regression Model is used for predicting heart disease.

3.4.1 Machine Learning Models

- **Logistic Regression Model:**

An analysis and model of the relationship between a binary or categorical dependent variable and one or more continuous or categorical independent variables is done statistically using the logistic regression technique. The dependent variable in this model is modelled using a logistic function as a function of the independent variables. The likelihood that the dependent variable will occur is represented by the logistic function's output, which ranges from 0 to 1.

According to the logistic regression model, there is a linear relationship between the dependent variable and the independent variables on the logit (log odds) scale. The dependent variable is transformed using the logit function, allowing the chance that the dependent variable will occur to be modelled. When the aim is to predict the likelihood that an event will occur and the dependent variable is binary or categorical, it is very helpful. The approach of maximum likelihood estimation is used to fit a logistic regression model. This approach calculates the model parameters that increase the chance of witnessing the suppliedcardiac data. By estimating the probability of the dependent variable based on the values of the independent variables, the model is used to make predictions on new data after being fitted.

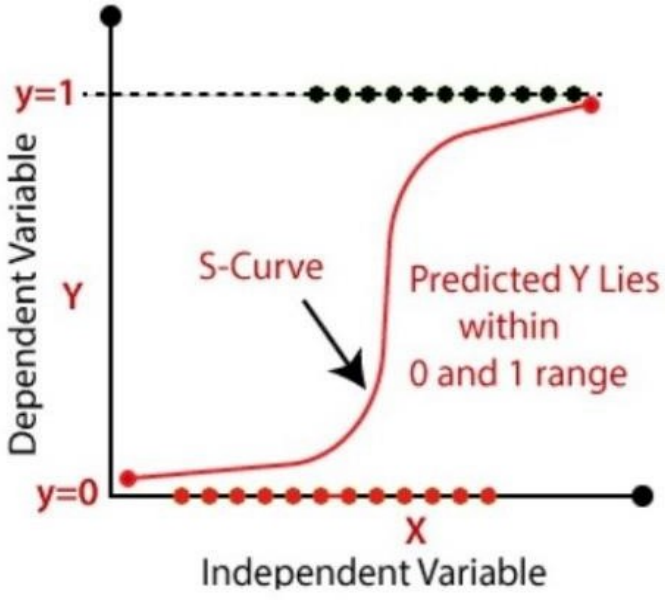

Figure 3.2: Graph depicting the Logistic Regression Model

- **Super Vector Machine Model:**

An effective supervised machine learning approach for classification and regression analysis is the Support Vector Machine (SVM). It is a strong algorithm that works well in high-dimensional areas and can handle both linear and non-linear data. The SVM model divides the data into two classes by locating a hyperplane where the margin between the hyperplane and the data points is maximized. The ”maximum-margin hyperplane” is the hyperplane that maximizes the margin.

”Support vectors” refer to the data points that are closest to the hyperplane. SVM is used for multi-class classification, which aims to split the data into more than two classes, as well as binary classification, where the goal is to divide the data into two classes. SVM employs a number of techniques, including one- vs-one and one-vs-all, to divide the data into several classes in multi-class classification. Regression analysis, where the objective is to predict a continuous output variable, also employs SVM. A hyperplane that best fits the data is found using the SVM model in regression analysis, minimizing the difference between the predicted and actual values.

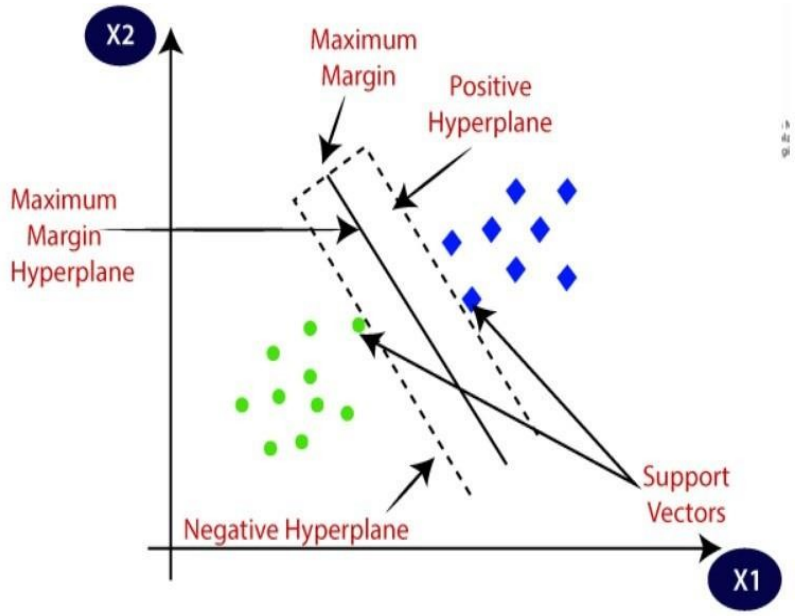

Figure 3.3: Graph depicting the SVM Model.

Chapter 4

SYSTEM DESIGN

4.1 Detailed Design

The below figure shows the architecture of the system. Specifically, by observing the interaction from left to right, the user starts the conversation by selecting one of the commands presented in the IVA interface. We organized the functionalities into four modules: Symptom Checker, Order Medicine, Recommending DIY treatments and User Profile.

Symptom Checker: The user provides the symptoms they are facing, which define their state, and this provides assistance by identifying the diseases. Beyond this, the Symptom Checker can assist clinicians in making a preliminary diagnosis by serving as a self-diagnostic tool.

Order Medicine: Patients can order their prescriptions online, without actually going to the doctors or clinics themselves. This saves their time and cost of travelling. The ability of ordering medicine online is a boon for online healthcare systems.

Recommending DIY Treatments: Chatbots can recommend some home treatments based on the diseases one can have due to their symptoms. Our chatbot can provide a wide range of home remedies for conditions such as the common cold, headaches, acidity, and other minor ailments.

User Profile: All the user data is stored in the database and can be displayed using this user profile. This essential module makes sure that user profile data may be created, read, updated, and deleted.

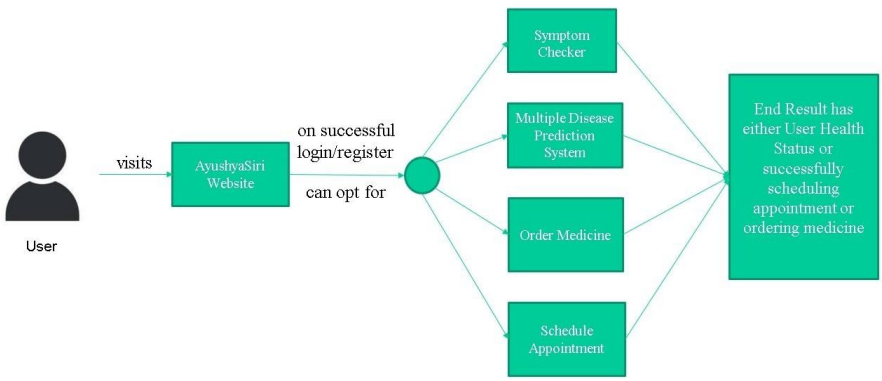

Figure 4.1: System Design

4.2 Database Design

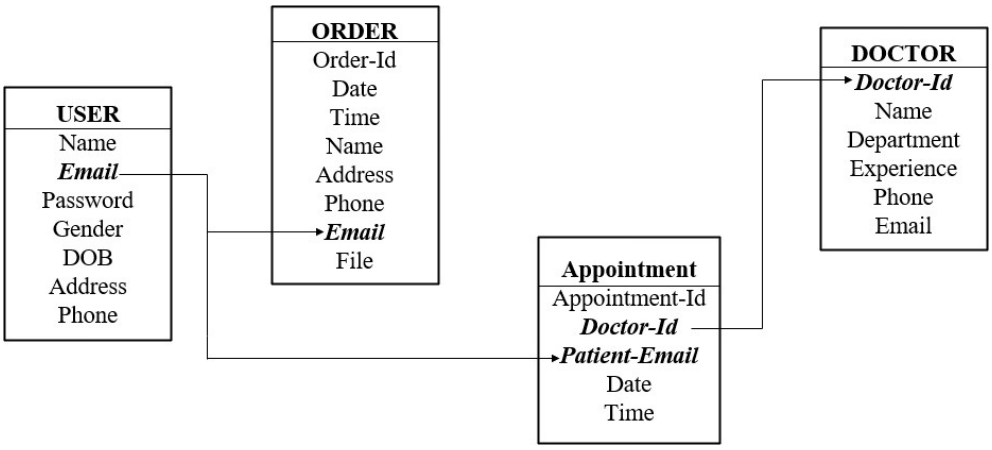

Figure 4.2: Database Design

In the backend we have the database maintained using MySQL. The design is as showed in the above figure. We can observe that the database as 4 tables namely **USER, ORDER, DOCTOR, and APPOINTMENT.**

The USER table stores all the details about the user from the data given during registration to the website. The ORDER table stores the details about the medicine ordered by each of the user using our site. The DOCTOR table stores the information about the doctors available for the consultation. The APPOINTMENT table contains the details regarding the appointment scheduled by the user with the doctor.

Here the email-id provided by the user is used as the primary key through which any combined or complex queries are being performed.

4.3 System Requirements

System requirement specifications gathered by extracting the appropriate information to implement the system. It is the elaborative conditions which the system need to attain. Moreover, the SRS delivers a complete knowledge of the system to understand what this project is going to achieve without any constraints on how to achieve this goal. This SRS not providing the information to outside characters but it hides the plan and gives little implementation details.

Hardware Requirements

- System: Intel Core i7 9750H
- Speed: 4.5 GHz
- Hard Disk: 1TB
- RAM: 8 GB

Software Requirement

- Operating system: Windows 10 or 11, MacOS
- Front end: HTML, CSS, JavaScript
- Back end: MySQL, Java, Python, Sprint tool Suite 4

4.4 Functional and Non-Functional Requirements

4.4.1 Functional Requirements

- System should automatically intimate.
- System should initiate the interaction as and when the user enters the site.

4.4.2 Non-Functional Requirements

- System should be reliable
- System should be flexible for future enhancements
- System should be Easily Implementable
- System should be Easy to Implement
- Cost of Implementation should be low

4.5 Tools Used

The following tools are used in our project AyushyaSiri

4.5.1 HTML

The Hypertext Markup Language or HTML is the standard markup language for documents designed to be displayed in a web browser. Web browsers receive HTML documents from a web server

or from local storage and render the documents into multimedia web pages. HTML describes t he structure of a web page semantically and originally included cues for its appearance. HTML elements are the building blocks of HTML pages. With HTML constructs, images and other objects such as interactive forms may be embedded into the rendered page. HTML provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes, and other items. HTML elements are delineated by tags, written using angle brackets.

4.5.2 CSS

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language such as HTML or XML. CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript. CSS is designed to enable the separation of content and presentation, including layout, colors, and fonts. This separation can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics, enable multiple web pages to share formatting by specifying the relevant CSS in a separate .css file, which reduces complexity and repetition in the structural content; and enable the .css file to be cached to improve the page load speed between the pages that share the file and its formatting.

4.5.3 JavaScript

JavaScript is a scripting or programming language that allows you to dynamically implement complex features on web pages every time a web page does more than just sit there and display static information for you to look at displaying timely content updates, interactive maps, animated 2D/3D graphics, scrolling video jukeboxes, etc. you can bet that JavaScript is probably involved. JavaScript is a scripting language that enables you to create dynamically updating content, control multimedia, animate images, and pretty much everything else.

4.5.4 Visual Studio Code

Visual Studio Code, also commonly referred to as VS Code, is a source-code editor made by Microsoft with the Electron Framework, for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git.

Users can change the theme, keyboard shortcuts, preferences, and install extensions that add functionality. Visual Studio Code also ships with IntelliSense for JavaScript, TypeScript, JSON, CSS, and HTML, as well as debugging support for Node.js. Support for additional languages can be provided by freely available extensions on the VS Code Marketplace.

4.5.5 Spring Tool Suite 4

The Spring Framework is an application framework and inversion of control container for the Java platform. The framework's core features can be used by any Java application, but there are extensions for building web applications on top of the Java EE (Enterprise Edition) platform. Although the framework does not impose any specific programming model, it has become popular in the Java community as an addition to the Enterprise JavaBeans (EJB) model. The Spring Framework is open source.

4.5.6 Java

Java is a high-level, class-based, object-oriented programming language that is designed to have as few implementation dependencies as possible. It is a general-purpose programming language intended to let programmers write once, run anywhere (WORA), meaning that compiled Java code can run on all platforms that support Java without the need to recompile. Java applications are typically compiled to bytecode that can run on any Java virtual machine (JVM) regardless of the underlying computer architecture.

4.5.7 Python

Python is an interpreted, object-oriented, high-level programming language with dynamic semantics. Its high-level built in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect existing components together. Python's simple, easy to learn syntax emphasizes readability and therefore reduces the cost of program maintenance. Python supports modules and packages, which encourages program modularity and code reuse.

4.5.8 Git

By far, the most widely used modern version control system in the world today is Git. A staggering number of software projects rely on Git for version control, including commercial projects as well as open source. Developers who have worked with Git are well represented in the pool of available software development talent and it works well on a wide range of operating systems and IDEs (Integrated Development Environments).

4.5.9 MySQL

MySQL is an open-source relational database management system (RDBMS). ”SQL” is the acronym for Structured Query Language. A relational database organizes data into one or more data tables in which data may be related to each other; these relations help structure the data. SQL is a language programmers use to create, modify and extract data from the relational database, as well as control user access to the database. An RDBMS like MySQL works with an operating system to implement a relational database in a computer’s storage system, manages users, allows for network access and facilitates testing database integrity and creation of backups.

4.5.10 RESTful API

RESTful API is an interface that two computer systems use to exchange information securely over the internet. Most business applications have to communicate with other internal and third- party applications to perform various tasks. For example, to generate monthly payslips, your internal accounts system has to share data with your customer’s banking system to automate invoicing and communicate with an internal timesheet application. RESTful APIs support this information exchange because they follow secure, reliable, and efficient software communication standards.

Chapter 5

IMPLEMENTATION

5.1 Overview Of System Implementation

5.1.1 Backend

The use of artificial intelligence (AI) to teach computers to read and learn on their own is known as machine learning. It is possible to improve the experience without expressing it directly. The development of computer systems capable of gathering and analyzing data for self-study purposes is the focus of machine learning. The learning process begins with observations or data, such as specific information or instructions, in order to study patterns in the data and make better future- based judgments in the situations that will be provided. The ultimate objective is for computers to be able to comprehend and correct actions without requiring human intervention. In contrast, standard machine learning algorithms analyze the text as a collection of keywords; a semantic analysis-based method, on the other hand, resembles a natural language.

When information training elements are separate and do not label, however, a typical machine learning techniques are applied. How the function may be used to define a hidden structure from unlabeled input in unsupervised learning lesson systems. The system does not recognize the right output, but it does verify the data and can infer hidden features from unlabeled data sets using assumptions drawn from data sets. Between monitoring and unsupervised learning, somewhat monitored machine learning algorithms slip. They train with both labelled and unlabeled data, with a small quantity of labelled and a big amount of unlabeled data.

5.1.2 Machine Learning

Machine learning (ML) is a field devoted to understanding and building methods that let machines" learn" that is, methods that leverage data to improve computer performance on some set of tasks. Machine learning algorithms build a model based on sample data, known as training data, in order to make predictions or decisions without being explicitly programmed to do so.

Machine learning algorithms are used in a wide variety of applications, such as in medicine, email filtering, speech recognition, agriculture, and computer vision, where it is difficult or unfeasible to develop conventional algorithms to perform the needed tasks.

A subset of machine learning is closely related to computational statistics, which focuses on making predictions using computers, but not all machine learning is statistical learning. The study of mathematical optimization delivers methods, theory and application domains to the field of machine learning. Data mining is a related field of study, focusing on exploratory data analysis through unsupervised learning. Some implementations of machine learning use data and neural networks in a way that mimics the working of a biological brain.

5.2 Algorithm

The algorithms used in our project **AyushyaSiri** are the machine learning algorithms including Logistic Regression and Support Vector Machine.

5.2.1 Logistic Regression

This type of statistical model (also known as logit model) is often used for classification and predictive analytics. Logistic regression estimates the probability of an event occurring, such as voted or didn't vote, based on a given dataset of independent variables. Since the outcome is a probability, the dependent variable is bounded between 0 and 1. In logistic regression, a logit transformation is applied on the odds—that is, the probability of success divided by the probability of failure. This is also commonly known as the log odds, or the natural logarithm of odds, and this logistic function is represented by the following formulas:

Logit(pi) = 1/(1+ exp(-pi))

$\ln(pi/(1-pi)) = Beta_0 + Beta_1 * X_1 + \ldots + B_k * K_k$

In this logistic regression equation, logit(pi) is the dependent or response variable and x is the independent variable. The beta parameter, or coefficient, in this model is commonly estimated via maximum likelihood estimation (MLE). This method tests different values of beta through multiple iterations to optimize for the best fit of log odds. All of these iterations produce the log likelihood function, and logistic regression seeks to maximize this function to find the best parameter estimate. Once the optimal coefficient (or coefficients ifthere is more than one independent variable) is found, the conditional probabilities for each observation can

be calculated, logged, and summed together to yield a predicted probability. For binary classification, a probability less than 0.5 will predict 0 while a probability greater than 0 will predict 1. After the model has been computed, it's best practice to evaluate the how well the model predicts the dependent variable, which is called goodness of fit.

5.2.2 Support Vector Machine

Support Vector Machine or SVM is one of the most popular Supervised Learning algorithms, which is used for Classification as well as Regression problems. However, primarily, it is used for Classification problems in Machine Learning.

The goal of the SVM algorithm is to create the best line or decision boundary that can segregate n-dimensional space into classes so that we can easily put the new data point in the correct category in the future. This best decision boundary is called a hyperplane.

SVM chooses the extreme points/vectors that help in creating the hyperplane. These extreme cases are called as support vectors, and hence algorithm is termed as Support Vector Machine.

Hyperplane:

There can be multiple lines/decision boundaries to segregate the classes in n-dimensional space, butwe need to find out the best decision boundary that helps to classify the data points. This best boundary is known as the hyperplane of SVM.

The dimensions of the hyperplane depend on the features present in the dataset, which means if there are 2 features (as shown in image), then hyperplane will be a straight line. And if there are 3 features, then hyperplane will be a 2-dimension plane.

We always create a hyperplane that has a maximum margin, which means the maximum distance between the data points.

Support Vectors:

The data points or vectors that are the closest to the hyperplane and which affect the position of the hyperplane are termed as Support Vector. Since these vectors support the hyperplane, hence called a Support vector.

5.3 Implementation Support

5.3.1 Code Snippet for firstBotMessage function

```
function firstBotMessage() {
    let firstMessage = "Hi there, I'm AyushyaSiri. I help you providing home remedies
    "Please type '/start' to begin the conversation.";
    document.getElementById("botStarterMessage").innerHTML = '<p class="botText"><spa

    let time = getTime();

    $("#chat-timestamp").append(time);
    document.getElementById("userInput").scrollIntoView(false);
}

firstBotMessage();
```

Figure 5.1: First Bot Message

A welcoming message will appear on the screen when we click on the Symptom Checker. Now the user is ready to mention all his/her symptoms by typing the '/start' command. The current time is displayed on the screen using the getTime() method.

5.3.2 Code Snippet for getResponse function

```
function getResponse() {
    let userText = $("#textInput").val();

    if (userText === "") {
        userText = "It's an empty response!!, Please type something valid";
        bot_chat(userText);
    }

    if(userText === '/start') {
        user_chat(userText);
        s_res = " Tell me how are you feeling";
        bot_chat(s_res);
    }

    else if(userText === '/exit') {
        user_chat(userText)
        e_res = "Bye, will be happy to help whenever you need us";
        bot_chat(e_res);
        exitFlag = true;
    }
```

Figure 5.2: Get Response

With the /start command, the user can tell the bot about the visible symptoms, of some mild diseases, he/she has. If without typing anything, the user presses the send button, a message will be displayed telling the user that it is an empty response, he/she needs to type something valid to be understandable by the bot. To exit chatting with the bot, user needs to type '/exit' command and send.

5.3.3 Code Snippet for regex matching

```
// Define the regular expression pattern
const fever_regex = /\b(fever|sick|unwell|not feeling well)\b/i;

const allergy_regex = /\b(itchy|rash|itchyness|rashes)\b/i;

const migraine_regex = /\b(migraine|severe headache)\b/i;

const backpain_regex = /\b(stiffness|aching pain|numb)\b/i;

const headache_regex = /\b(pain in head|headache|dizz)\b/i;

const flu_regex = /\b(high fever|sore throat)\b/i;

const cold_regex = /\b(runny nose|cough|sneezing)\b/i;

const acidity_regex = /\b(swallow|vomit)\b/i;
```

Figure 5.3: Regex Matching

In the code we can see that there are regular expressions for matching with the symptoms which the user provides in the chatbot. If any word in the sentence typed by the user matches with the above given keywords, bot will act accordingly.

5.3.4 Code Snippet for fever function

```
function Fever(callback) {
    let res1 = "Okay, along with this, do you feel anything from the below \n"+
    "Body temperature ranging from 100 to above 102°F (38.9°C)\n"+
    "Chilling and Sweats \nLoss of appetite \nHeadache\nIf so please type yes and press enter";
    bot_chat(res1);

    // Add an event listener to the text input field to listen for the user's input
    $("#textInput").on("keypress", function(e) {
        if (e.which === 13) { // Check if the enter key was pressed
            let chat1 = $("#textInput").val();
            user_chat(chat1);

            if(chat1 === "yes") {
                let res3 = 'Well based on your response. You show symptoms for a Fever.\nNothing to worry,
                'here are some home remedies that may help you:\n'+
                'Drink plenty of fluids. \n\nTake sufficient rest. \n\nTry wearing lightweight clothes. \n
                'help lower your body temperature and reduce fever symptoms.\n\n'+
                '\nPlease keep in mind that these home remedies can help you alleviate some of the symptom
                ' but it is important to remember that a fever is a symptom of an underlying condition and
                'to seek medical attention if your fever persists for more than a few days, or if your fev
                'or if you have other concerning symptoms such as difficulty breathing or severe headache.
                bot_chat(res3);
                setTimeout(() => {
                    callback();
                }, 2000)
            }
            else {
                error();
```

Figure 5.4: Fever Function

When the keywords match for any symptoms, the bot provides the user with options to select any other related symptoms too. Once they do so, our virtual assistant assists the user by providing the probable disease the user can have along with the precautions one can take and home remedies forgetting cured at home.

5.3.5 Code Snippet of repeat function

```
function repeat() {
    if (!exitFlag) {
      $("#textInput").val("");
      $("#textInput").focus();
      let res = "Do you wish to check any more symptoms?If so please type yes and press enter";
      bot_chat(res);

    $("#textInput").on("keypress", function(e) {
        if (e.which === 13) { // Check if the enter key was pressed
            let chat1 = $("#textInput").val();
            user_chat(chat1);

            if(chat1 === 'yes') {
                let res1 = "Okay tell me how are you feeling?";
                bot_chat(res1);
            }
            else {
                exit();
            }
           //Remove the event listener to prevent it from triggering again
            $("#textInput").off("keypress");
        }
    });
    }
}
```

Figure 5.5: Repeat Function

After getting response from the chatbot, the bot asks if the user wants to ask about some other symptoms too. If the user wants to do so, he/she can type ’yes’ and press enter and repeat the steps to know more. Otherwise, the user can exit.

5.3.6 Code Snippet for error and sendButton function

```
function error() {
    err_res = "Sorry, but based on your response, I am not able to find any matches in my database!!,\n"+
    "If you wish you can schedule an appointment with the doctor by moving to the home page of our websit
    bot_chat(err_res);
}

function sendButton() {
    getResponse();
}
```

Figure 5.6: Error Function

If the user text doesn’t have any word in the text which matches with the regular expression of the disease present in the database of our project, an error message will be displayed telling the user that the bot cannotunderstand what the user has typed.

Chapter 6

RESULTS AND DISCUSSIONS

The section offers illustrations of the chatbot's operation and a mechanism for predicting different diseases, along with descriptions of each.

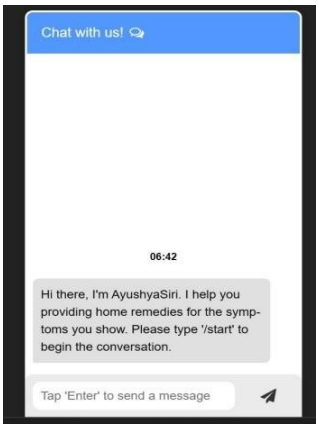

Figure 6.1: The Chatbot's home page.

The figure shows that the user may choose to use the Symptom Checker after logging in or registering on our website, which will take them to the chatbot's home page. It begins with a welcome note for the user, along with it a basic instruction about how to start the conversation.

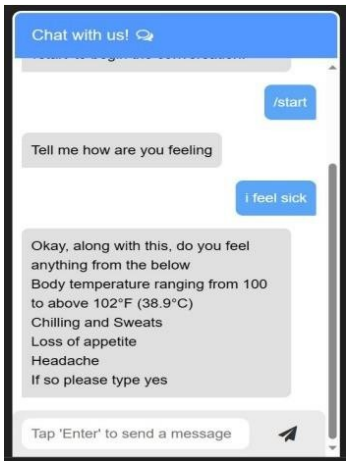

Figure 6.2: User and Chatbot interaction for diagnosing symptoms of a disease.

The figure 6.2 shows that the user describes his/her symptoms in a text message, and the systemwill reply by providing a list of other related symptoms of a disease and seeks acknowledgement from the user whether they show any other symptoms from the listed and waits for the user response to take necessary actions. The chatbot carry out this operation by matching certain keywords from the usertext message with the contents that it has. Based on the match required response is given to the user.

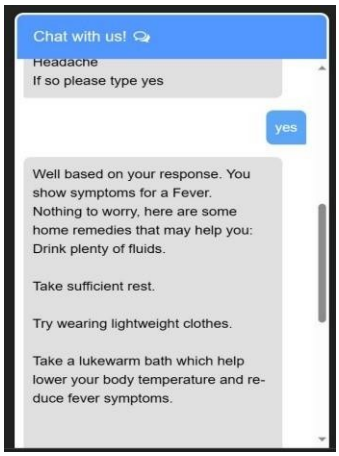

Figure 6.3: Response given by the chatbot for the user when a match for symptom is found.

As discussed in previous result, the chatbot waits for user acknowledgement. The given figure 6.3 shows that if the answer is" yes," the disease that fits the symptoms is identified. Include a list of the disease-related home treatments as well. Also, it asks the user whether they wish to continue checking for symptoms and based on the response necessary actions are taken.

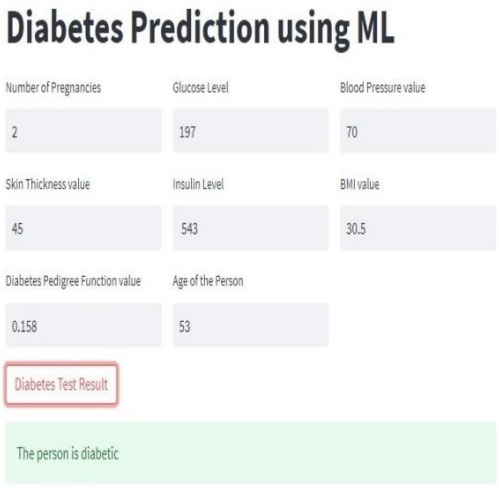

Figure 6.4: Picture depicting a person has diabetes.

Figure 6.4 is the result of one of the multiple disease prediction system which says the person is suffering from diabetes. The system takes input values for parameters like glucose value, body mass index (bmi) value, age etc.. uses Support Vector Machine model to predict the disease.

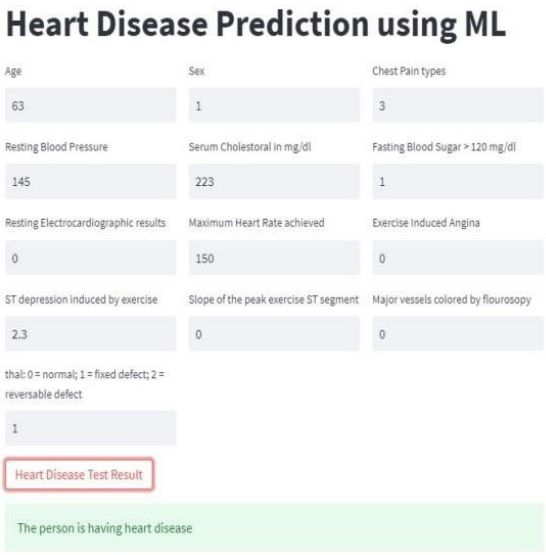

Figure 6.5: Picture depicting a person has heart disease.

Figure 6.5 is the result of one of the multiple disease prediction system which says the person is suffering from heart disease. The system takes input values for parameters like age, chest pain types,maximum heart rate etc.. uses logistic regression model to predict the disease.

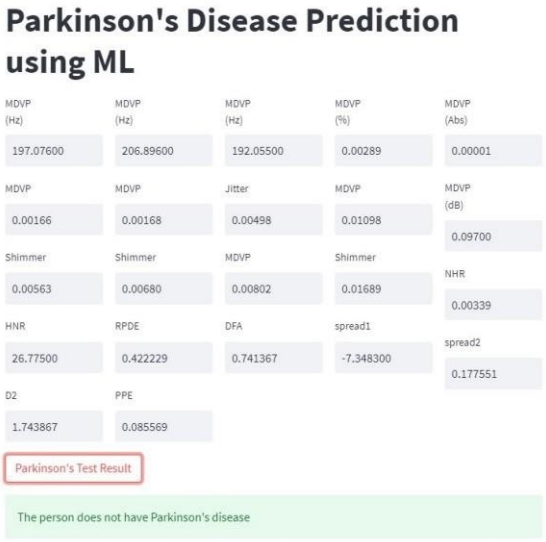

Figure 6.6: Picture depicting a person does not have a Parkinson’s disease.

The figure 6.6 is the result of one of the multiple disease prediction system which says the person is suffering from Parkinson’s disease. The system takes input values for parameters like MDVP (Multidimensional Voice Program), jitter, shimmer, DFA (Direct fluorescent antibody) etc.. and uses Support Vector Machine model to predict the disease.

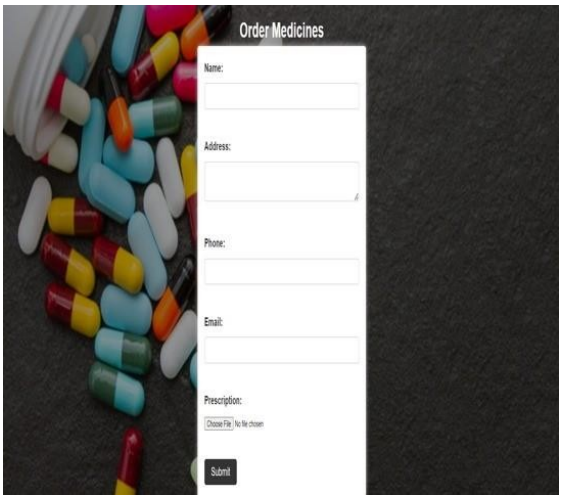

Figure 6.7: Picture depicting option for ordering medicine online

The figure 6.7 shows that the user can order medicine online through our website by giving few details in the form like name, address, phone number and email address for contact. The user can also attach the image of the prescription along with all the details.

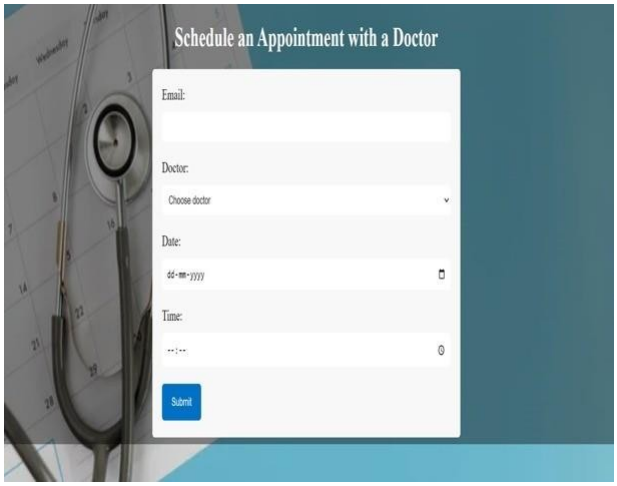

Figure 6.8: Picture depicting option for scheduling appointment with the doctor.

The figure 6.8 shows the user can schedule an appointment with any doctor online if he/she hasbeen facing any serious symptoms and need to consult a doctor. The user can do so by filling the formby giving details like email id, name of the doctor and time and date of the appointment.

Chapter 7

CONCLUSIONS AND FUTURE ENHANCEMENTS

7.1 Conclusion

We introduce the conversational agent known as AyushyaSiri, which assist users as well as patients to take care of their health. Users have the option to check their symptoms, order medications, make doctor appointments, and self-diagnose using the system's suggested home cures. The symptom checker uses the chatbot to recognize the symptoms for a disease and provide the home remedies for the same. Along with this we have tried to predict some high-level diseases like Diabetes, Heart Disease and Parkinson's disease.

The backend database is being handled using java spring boot where api is being very easily. It's been observed that the Logistic Regression Model provides best accuracy when compared to other machine learning models for the Heart Disease Dataset. Similarly, the Super Vector Machine Model serves the best accuracy for Parkinson's and diabetes dataset. While our illness prediction system and chatbot are a great tool, it should not take the place of medical advice from a qualified healthcare expert, it's crucial to remember. To confirm any diagnoses provided by the system, users should still consult a qualified medical expert.

7.2 Future Enhancements

Future improvements to our work could include speech recognition, which would enable the chatbot to comprehend both spoken and written communication. Additionally, we may integrate deep learning ideas for image identification into disease prediction systems, enabling the latter to make disease predictions based on the image input. The cell image will be presented to check the anomaly when compared to the normal cell. This includes diseases like skin disorders. Enhancing prediction accuracy and ensuring that patients receive the right care can both be accomplished by integrating your system with an EHR.

Our chatbot's reach and impact can be increased by making sure it is accessible to those with disabilities, such as those who have visual or auditory impairments. Also, adding more language support to our chatbot can make it more accessible and appealing to a larger audience. NLP technology can enhance a chatbot's comprehension and interpretation of user inputs. This will make it possible to describe symptoms in greater detail and could improve prediction accuracy.

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