

VIRTUAL AI HEALTH ASSISTANT

A Project Report

Submitted By

AKASH PANDEY - 190303105214

in Partial Fulfilment For the Award of

the Degree of

BACHELOR OF TECHNOLOGY

COMPUTER SCIENCE & ENGINEERING

Under the Guidance of

Ruchika Chouhan

Assistant Professor



PARUL UNIVERSITY

VADODARA

February - 2023



PARUL UNIVERSITY

CERTIFICATE

This is to Certify that Project - 3 -Subject code 203105450 of 8th Semester entitled "Virtual AI Health Assistant" of Group No. PUCSE_19 has been successfully completed by

- AKASH PANDEY - 190303105214

under my guidance in partial fulfillment of the Bachelor of Technology (B.TECH) in Computer Science and Engineering of Parul University in Academic Year 2022-2023.

Date of Submission :-

Ruchika Chouhan,

Project Guide

Project Coordinator:-

Dr. Kruti Sutaria

Head of Department,

Dr. Amit Barve

CSE, PIET

Parul University

External Examiner

Contents

| | | |
|----------|--|-------------|
| 1 | Introduction | vi |
| 2 | Literature Review | viii |
| 2.1 | Implementation of a Chatbot System using AI and NLP | viii |
| 2.2 | A Review of AI Based Medical Assistant Chatbot | ix |
| 2.3 | Virtual Assistant and Patient Monitoring System by using AI Data Science | ix |
| 2.4 | A Self-Diagnosis Medical Chatbot Using Artificial Intelligence | x |
| 2.5 | Virtual Nursing Assistant | xi |
| 2.6 | Artificial Intelligence In Medicine | xi |
| 2.7 | AI Chatbot Design during an Epidemic like the Novel Coronavirus . . . | xii |
| 2.8 | ARTIFICIAL INTELLIGENCE CHATBOT FOR HEALTHCARE AND MEDICAL SCIENCE | xii |
| 2.9 | A Medical ChatBot | xiii |
| 2.10 | Medbot: Conversational Artificial Intelligence Powered Chatbot for Delivering Tele-Health after COVID-19 | xiii |
| 2.11 | A Smart Chatbot Architecture based NLP and Machine learning for health care assistance. | xiv |
| 2.12 | How government can use AI and ML to identify spreading infectious diseases | xv |
| 2.13 | Application of Artificial Intelligence-Based Technologies in the Healthcare Industry | xv |
| 2.14 | Chat-Bot-Kit: A web-based tool to simulate text-based interactions between humans and with computers | xvi |
| 2.15 | An Overview of Machine Learning in Chatbots | xvi |

| | |
|--|---------------|
| 2.16 Acceptability of artificial intelligence (AI)-led chatbot services in healthcare: A mixed-methods study | xvii |
| 2.17 The Smart Health Care Prediction using Chatbot | xviii |
| 2.18 Contract Statements Knowledge Service for Chatbots | xviii |
| 2.19 VIRTUAL HEALTHCARE ASSISTANT | xix |
| 2.20 Design and implementation of a virtual assistant for healthcare professionals using pervasive computing technologies | xix |
| 3 Flow and Working | xxi |
| 3.1 Working | xxi |
| 3.2 Flow | xxiii |
| 4 Methodology | xxv |
| 4.1 MACHINE LEARNING | xxv |
| 4.2 Natural Language Processing (NLP) | xxv |
| 4.3 ARTIFICIAL INTELLIGENCE | xxvi |
| 4.4 Python | xxvi |
| 4.5 Frontend | xxvi |
| 4.5.1 JavaScript | xxvi |
| 4.6 Django | xxvii |
| 4.7 SQL Lite | xxvii |
| 5 Implementation | xxviii |
| 6 Conclusion | xxxiv |
| 7 Future Scope | xxxv |

List of Figures

| | | |
|-----|-------------------|--------|
| 5.1 | Models | xxviii |
| 5.2 | Routing | xxix |
| 5.3 | View | xxx |
| 5.4 | Form | xxxi |
| 5.5 | Database | xxxi |
| 5.6 | Home Page | xxxii |
| 5.7 | Admin Dashboard | xxxii |
| 5.8 | Patient Dashboard | xxxiii |
| 5.9 | Doctor Dashboard | xxxiii |

Chapter 1

Introduction

One of the most common problems faced by today's people is a lack of knowledge of diseases and a lack of immediate first aid consultation. Due to this many people may suffer from physical and mental stress as they try to figure out the reason for their condition. In some cases, they even lost their lives and common diseases become life-threatening. Now Virtual Health Assistant comes into action. It is a web service in which the proposed system tries to eliminate users' need to figure out their disease by giving them access to a centralized clinical repository in a much interactive manner. Users can also ask questions regarding their disease and even book online and offline appointments with doctors.

Our Webservice stores the Health record of the user on a remote server. User can enter the Symptoms or Disease and Our System try to figure out it and give the immediate action that user can take it may be some Home remedies or some emergency Medicine. In the end, a precise prescription is generated. What this Webservice can't ensure is the accuracy of the health condition that the service arrived at, and thus in such cases, a physician must be contacted. Taking that case into condition there is one more feature that is an online video appointment in case of emergency and users can also book an offline appointment near their location.

Our Webservice is verified and authenticated by certified doctors and physicians, this makes it different from the existing system. It has a user-friendly interface, and it's more accurate than the existing system has personal allergies are taken into account when recommending prescriptions to the user/patient. It also includes online medicine delivery and medical testing at your doorstep.

Chapter 2

Literature Review

2.1 Implementation of a Chatbot System using AI and NLP

Author - Tarun Lalwani, Shashank Bhalotia, Ashish Pal, Shreya Bisen, Vasundhara Rathod

Date of publication - May 2018

Abstract - For using software applications, user interfaces that can be used includes command line, graphical user interface (GUI), menu driven, form-based, natural language, etc. The mainstream user interfaces include GUI and web-based, but occasionally the need for an alternative user interface arises. A chatbot based conversational user interface fits into this space. The chatbot is a class of bots that have existed in the chat platforms. The user can interact with them via graphical interfaces or widgets, and the trend is in this direction.

Conclusion - The purpose of a chatbot system is to simulate a human conversation. Its architecture integrates a language model and computational algorithm to emulate information online communication between a human and a computer using natural language.

2.2 A Review of AI Based Medical Assistant Chatbot

Author - Chetan Bulla , Chinmay Parushetti , Akshata Teli , Samiksha Aski , Sachin Koppad

Date of publication - June 2020

Abstract - This is now the age of smart computer. Machines have started to impersonate as human, with the advent of artificial intelligence, machine learning, and deep learning. Chatbot is classified as conversational software agents enabled by natural language processing, and is an excellent example of such system. A Chatbot is a program which allows the user to start a conversation with the machine. This is a platform focused on Artificial Intelligence (AI), which can be developed as messaging applications, web applications, or smartphone applications.

Conclusion - The study indicates that using Chatbot is user-friendly, so it can be used by everyone who learns how to communicate in their own language in smartphone device or web version. A medical chatbot may have symptom-based, personalized therapies. In the future, the effectiveness of recognizing and managing the bot 's symptoms will be greatly enhanced by adding support for additional diagnostic features such as place, symptom time and intensity, and more detailed explanation of the symptoms.

2.3 Virtual Assistant and Patient Monitoring System by using AI Data Science

Authors - Prof. Shital Patil, Vrushali Patil, Vidya Bagal, Shubham Butala

Date of publication - December 2019

Abstract - Technologies like Artificial intelligence, machine learning, data science are getting upgraded. The advancement in available, portable, low cost handheld device like cell phones and availability of network connection has resulted in the user's mobility at an unprecedented level. We have studied

different methodologies like Smart goal annotation, state phase annotation, collection process, agreement results as well as annotation skills for achieving the health goals.

Conclusion - Increasing rate of chronic diseases in an aging population is becoming a serious concern due to lack of sufficient facilities and extremely high cost. The situation is even worse for the people residing in remote areas far from medical facilities as delay in diagnosis and treatment may lead to death. Timely diagnosis and treatment can solve these issues to a great extent. The advancements in wireless communications and wearable sensor technology open up the opportunity of Virtually Assistant for Patient Monitoring systems.

2.4 A Self-Diagnosis Medical Chatbot Using Artificial Intelligence

Author - Divya S , Indumathi V , Ishwarya S , Priyasankari M , Kalpana Devi S

Date of publication - 2018

Abstract - To lead a good life healthcare is very much important. But it is very difficult to obtain the consultation with the doctor in case of any health issues. The proposed 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 .To reduce the healthcare costs and improve accessibility to medical knowledge the medical chatbot is built.

Conclusion - From the review of various journals, it is concluded that, the usage of Chatbot is user friendly and can be used by any person who knows how to type in their own language in mobile app or desktop version. A medical chatbot provides personalized diagnoses based on symptoms.

2.5 Virtual Nursing Assistant

Author - Praneet Kumar Ghosh , Pragya Jain , Shweta Wankhede , Machani Preethi , Dr. M K Jayanthi Kannan

Date of publication - March 2021

Abstract - The user has to type their health regarding query based on that assistant gives the appropriate answer. Experimental result shows that: Compared with traditional methods, the proposed method is more accurate and faster also patient can get service anywhere and anytime. This application of AI can be adopted to increase patient engagement and improve their self-management skills to prevent chronic situations from getting worse. Moreover, the virtual assistant would be available 24/7, which means it can answer your questions and provide answers in real-time.

Conclusion - This project describes about the how a Virtual Nursing System works and how can it be implemented in real world Scenerio. It also describes about how can someone sitting at their home can get the medical assistance within a very short span. While working on this project, we understood the problems and tried to overcome the issues which were being faced.

2.6 Artificial Intelligence In Medicine

Author - Jonathan Waringa, Charlotta Lindvall , Renato Umetona

Date of publication - April 2020

Abstract - This work aims to provide a review of the existing literature in the field of automated machine learning (AutoML) to help healthcare professionals better utilize machine learning models “off-the-shelf” with limited data science expertise. We also identify the potential opportunities and barriers to using AutoML in healthcare, as well as existing applications of AutoML in healthcare.

Conclusion - Automated machine learning is an emerging research field within computer science that has the potential to help non-experts use machine

learning off-the-shelf. We have reviewed the literature on a wide array of AutoML techniques, including hyperparameter optimization, automated feature engineering, pipeline optimization, and neural architecture search.

2.7 AI Chatbot Design during an Epidemic like the Novel Coronavirus

Author - Gopi Battineni, Nalini Chintalapudi and Francesco Amenta

Date of publication:- June 2020

Abstract - Since the discovery of the Coronavirus (nCOV-19), it has become a global pandemic. At the same time, it has been a great challenge to hospitals or healthcare staff to manage the flow of the high number of cases. Especially in remote areas, it is becoming more difficult to consult a medical specialist when the immediate hit of the epidemic has occurred.

Conclusion - Our idea behind this study is to present sophisticated AI medical chatbots for users, especially during unknown pandemics like nCOV-19. The presented AI chatbot will have a large impact on patient life during serious epidemics. It would provide the advantage of putting access to virtual doctors into their hands.

2.8 ARTIFICIAL INTELLIGENCE CHATBOT FOR HEALTHCARE AND MEDICAL SCIENCE

Author - Rajnish Pandey, Lucky Pareek, Sandeep Jaiswar, Prof. Prashant Rathod

Date of publication:- May 2021

Abstract- Healthcare is extremely important to steer a decent life. It plays a terribly crucial role in our days to day life. However, it's very problematic to obtain the consultation with the doctor for each health problem. The intention is to form a medical chatbot exploitation computer science which will give a suggestion of specialist doctor of a selected disease. this can facilitate to boost accessibility to medical data through medical chatbot.

Conclusion- As a consequence, we should deduce that this method produces correct results. Since we are working with a huge dataset, we should expect improved results. As a result, we created a device that allows people to diagnose illness by typing symptoms. Chat bots are a thing of the future that has yet to realise its full potential, but given their growing success and craze among businesses, they are sure to stick around for a while.

2.9 A Medical ChatBot

Author - Mrs. Rashmi Dharwadkar , Dr.Mrs. Neeta A. Deshpande

Date of publication:- June 2018

Abstract- The medical chat-bots functioning depends on Natural language processing that helps users to submit their problem about the health. The User can ask any personal query related to health care through the chat-Bot without physically available to the hospital. By Using Google API for voice-text and textvoice conversion. Query is sent to ChatBot and gets related answer and display answer on android app. The System's major concern behind developing this web based platform is analysing customer's sentiments.

Conclusion- . As we are using large dataset which will ensures the better performance compared as earlier. Thus we build up a system which is useful for medical institute or hospitals to help the users to freely ask medical dosage related queries by voice. System gets output for medicine API and speak out and display all medicine names

2.10 Medbot: Conversational Artificial Intelligence Powered Chatbot for Delivering Tele-Health after COVID-19

Author – Urmil Bharti, Deepali Bajaj, Hunar Batra, Shreya Lalit, Shweta Lalit, Aayushi Gangwani

Date of publication - 2020

Abstract - Telemedicine can be used by medical practitioners to connect with

their patients during the recent Coronavirus outbreak, whilst attempting to reduce COVID-19 transmission among patients and clinicians. Amidst the pandemic, Telemedicine has the potential to help by permitting patients to receive supportive care without having to physically visit a hospital by using a conversational artificial intelligence-based application for their treatment.

Conclusion - Keeping in mind the after-effects of a pandemic and the imbalance between the demand and healthcare services currently provided, especially in rural India have tried to bridge the gap by creating a Multilingual Conversational Application with Natural Language regular on-site consultations.

2.11 A Smart Chatbot Architecture based NLP and Machine learning for health care assistance.

Author: Soufyane Ayanouz, Boudhir Anouar Abdelhakim, Mohammed Benhmed
Date of publication - 2020

Abstract : A chatbot or conversational agent is a software that can communicate with a human by using natural language. One of the essential tasks in artificial intelligence and natural language processing is the modeling of conversation. Since the beginning of artificial intelligence, its been the hardest challenge to create a good chatbot. Although chatbots can perform many tasks, the primary function they have to play is to understand the utterances of humans and to respond to them appropriately.

Conclusion: According to the scientific community, chatbots are user-friendly and any person who has an awareness of typing in their language on the desktop version and in the mobile application can use these chatbots very easily.

2.12 How government can use AI and ML to identify spreading infectious diseases

Author : Lakshmisri Surya Date of publication - March 2018

Abstract : Infectious diseases like Spanish Flu,TB,Ebola,SARS and influenza have been some of the leading causes of deaths around the world especially in low-income countries despite the progress made in medicine. The previous outbreak of Ebola,SARS and influenza around the world shows that these infectious diseases are have become a constant threat to human existence.

Conclusion : Artificial intelligence systems have become an integral part of our lives and for the good of global communities in transforming the health sector. It has supported medical researchers to produce identify diseases and develop new vaccines and pharmaceutical products while guaranteeing patient safety, the efficacy of drugs, precision, and reliability. For infectious diseases like Spanish flu, the application of AI through proven and innovative machine learning methods is crucial.

2.13 Application of Artificial Intelligence-Based Technologies in the Healthcare Industry

Author : DonHee Lee and Seong No Yoon

Date of publication - 2021

Abstraction: This study examines the current state of artificial intelligence (AI)-based technology applications and their impact on the healthcare industry. In addition to a thorough review of the literature, this study analyzed several real-world examples of AI applications in healthcare.

Conclusion: Innovation is imperative in the dynamic digital age. The rapidly advancing technologies are the primary tools for implementing and converging value-creating ideas. Therefore, the application of AI and related technologies is

not a choice, but a trend that organizations must accept and leverage for competitive advantage.

2.14 Chat-Bot-Kit: A web-based tool to simulate text-based interactions between humans and with computers

Author: Kyoko Sugisaki

Date of publication - November 2019

Abstraction: In this paper, we describe Chat-Bot-Kit, a web-based tool for text-based chats that we designed for research purposes in computer-mediated communication (CMC). Chat-Bot-Kit enables to carry out language studies on text-based real-time chats for the purpose of research: The generated messages are structured with language performance data such as pause and speed of keyboard-handling and the movement of the mouse.

Conclusion: In this paper, we presented our web-based chat tool designed for the research in Computer-mediated communication (CMC), Human-Computer Interaction (HCI) and Natural Language Processing (NLP). In future work, we plan to extend several wizard assistance methods for wizard-of-oz studies in HCI that include machine learning and allow to iteratively train models during a study.

2.15 An Overview of Machine Learning in Chatbots

Author: Prissadang Suta, Xi Lan, Biting Wu, Pornchai Mongkolnam and Jonathan H. Chan

Date of publication - April 2020

Abstract: A chatbot is an intelligent system which can hold a conversation with a human using natural language in real time. Due to the rise of Internet usage, many businesses now use online platforms to handle customer inquiries, and many of them turn to chatbots for improving their customer service or for streamlining operations and increasing their productivity.

Conclusion: In this paper, we used a mind-mapping approach to present an overview of chatbots, after reviewing papers published from 1998 to 2018. This can help researchers develop a better understanding of the current implementation techniques and usages of chatbots. This is important because chatbots are becoming increasingly popular, especially for customer service in the industry and as an intelligent virtual assistant for personal use.

2.16 Acceptability of artificial intelligence (AI)-led chatbot services in healthcare: A mixed-methods study

Author: Tom Nadarzynski, Oliver Miles , Aimee Cowie and Damien Ridge

Date of publication - 2019

Abstract: Artificial intelligence (AI) is increasingly being used in healthcare. Here, AI-based chatbot systems can act as automated conversational agents, capable of promoting health, providing education, and potentially prompting behaviour change. Exploring the motivation to use health chatbots is required to predict uptake; however, few studies to date have explored their acceptability. This research aimed to explore participants' willingness to engage with AI-led health chatbots.

Conclusion - Most internet users would be receptive to using health chatbots, although hesitancy regarding this technology is likely to compromise engagement. Intervention designers focusing on AI-led health chatbots need to employ user-centred and theory-based approaches addressing patients' concerns and optimising user experience in order to achieve the best uptake and utilisation. Patients' perspectives, motivation and capabilities need to be taken into account when developing and assessing the effectiveness of health chatbots.

2.17 The Smart Health Care Prediction using Chatbot

Author:- K Jayashree, Monika K A, Preetha R, Piraisoodan S P

Date of publication - July 2020

Abstract :- Our healthcare is very much important to lead a peaceful and honest life. If any health issue occurs, we need to go to the hospital and consult the doctor for the very minor problems. our healthcare chatbot is developed to help the people to predict their health issue early at home before they visit the doctor or hospital for the minor problems.

Conclusion :- The objective of the proposed system is to use the healthcare Chatbot user friendly. It can be employed only by someone who knows the way to type their known language in their mobile app or computing device version. A health chatbot provides only the predicted disease and diagnoses for the predicted symptoms. In the upcoming generations, the chatbot's symptom recognition can be made more efficient and analysis performance is probably highly stepped forward by means of including some support for more medical features and depth of symptoms, and will give more details about symptom description.

2.18 Contract Statements Knowledge Service for Chatbots

Author:- Boris Ruf , Matteo Sammarco , Marcin Detyniecki

Date of publication - October 2019

Abstract:- Towards conversational agents that are capable of handling more complex questions on contractual conditions, formalizing contract statements in a machine readable way is crucial. However, constructing a formal model which captures the full scope of a contract proves difficult due to the overall complexity its set of rules represent.

Conclusion:- We presented a top-down knowledge engineering approach which helps improve the capabilities of conversational agents. As opposed to the static answers of conventional FAQ bots, our approach enables smarter,

dynamic responses. The user-friendly graphical user interface allows for rapid contract statement creation and updating with no technical skills required. The significant reduction of complexity cuts the cost to manage the contract statements, which represent the essential knowledge necessary to provide meaningful responses.

2.19 VIRTUAL HEALTHCARE ASSISTANT

Author:-MOHIT DODHIA , RUSHAB KUMAR JHA , ANUDEEP , PREETAM SARMAH

Date of publication - 2017

Abstract:- One of the most common problems faced by people suffering from common ailments or maybe even major ones is the lack of immediate first aid consultation or a centralized service to a clinical database. Due to this lack of the knowledge of the standard operating procedure in such cases, these ailments might aggravate. This results in either physical or mental tension for the person suffering from such ailments.

Conclusions: Thus, Virtual Healthcare Assistant is a very useful tool for to maintain the health records of the patients and users of this web service. It maintains the patient's or users' personal details. Doctors and health institutions can look into these records if need be. Thus, this system automates the excess amount of labor it takes to maintain these records on paper and also these records are monitored so that there are no chances of data leaks.

2.20 Design and implementation of a virtual assistant for healthcare professionals using pervasive computing technologies

Author:- S. I. Ahamed, M. Sharmin, S. Ahmed, M. M. Haque, A. J. Khan

Date of publication - April 2006

Abstract :- With the advancement of hand-held devices, wireless and sensor network pervasive computing has achieved a perfect momentum. Formerly, a

requirement existed that was a serious impediment and threat to the mobility of users – the necessary presence of a fixed wired network. This has been resolved by the recent advances in wireless and mobile technologies, particularly Bluetooth and WiFi. The advancement of available, portable, low cost mobile devices (PDAs, cell phones, etc.) has resulted in the user's mobility at unprecedented levels. As these devices can communicate with one another, the combined capabilities can be leveraged to form a useful new set of tools.

Conclusion:- In this paper we have presented the details of our application 'Healthcare Aide'. It has been designed to facilitate doctor – doctor, resident doctor – doctor, patient – doctor and nurse – doctor communication for real-time decision making and provide a convenient environment for better healthcare. In our first prototype of 'Healthcare Aide,' we have tried to address some frequently occurring situations between patients and physicians that are of immense importance. This tool has been designed to create a healthier environment in the hospital through the creation of a secure passage for two-way interactions and flow of information. At the same time, this tool has proved the effectiveness and utility of our developed middleware MARKS.

Chapter 3

Flow and Working

3.1 Working

Our system is an integration of based technologies, Artificial Intelligence, Machine Learning, software and hardware solutions, statistics, HTML, CSS, Js language, datasets, etc. In order to address and provide a solution to the above-mentioned problem(s) under the assumptions and constraints described in above, this paper proposes a preliminary design methodology for all purpose chatbot system. User validation and extraction of symptoms from the conversation with the user. Accurate mapping of extracted symptoms to documented symptoms and their corresponding codes in the database. Developing a personalized diagnosis and also referring the patient to an appropriate specialist if necessary.

First step is to design the user interface of the project which means how the project has gone look like in real. Second step is to code the frontend of the web service using Html/CSS/JavaScript/jQuery. Third step is to code the back-end part of the website. Then we connect our web service to the database. Last step is to host our web service on the webserver.

Software module (Tools Technology) :-

1. HTML, CSS, JavaScript
2. Python
3. jQuery

4. API
5. Machine Learning
6. SQL lite
7. Django

Hardware module Tools:-

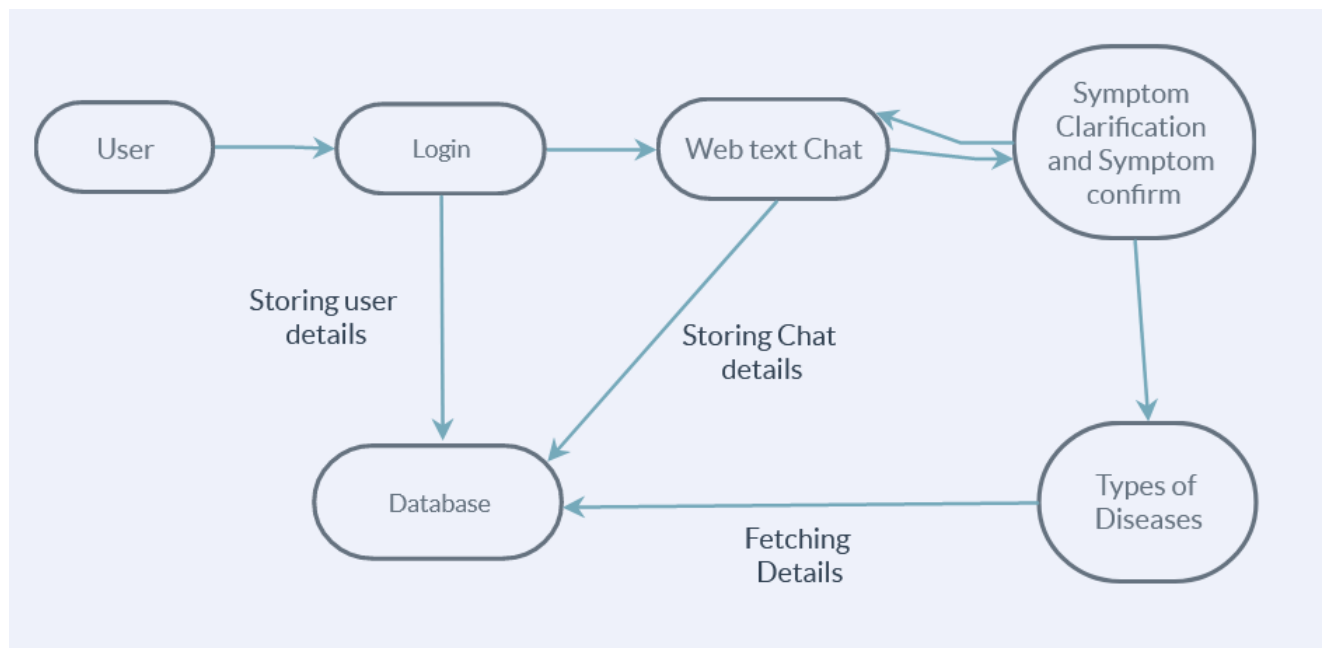
1. Processor - Intel(R) Core (TM) i3-7100U CPU @ 2.40GHz
2. RAM - 4.00 GB
3. System type - 64-bit operating system, x64-based processor
4. Storage Req. - 50 GB

Number of Modules:-

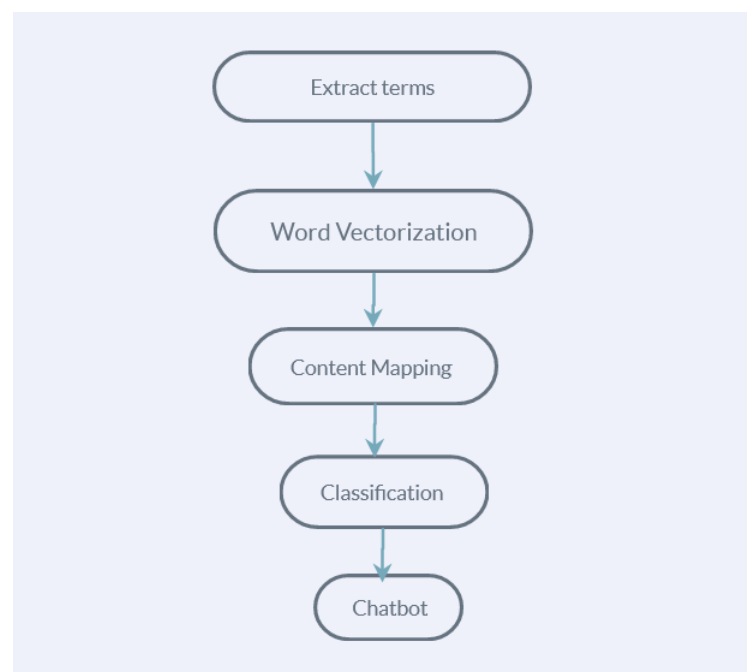
1. Login
2. Signup
3. Homepage
4. Health-Details
5. New Symptoms Assessment
6. Assessment History
7. Prescription
8. Appointment-Page

3.2 Flow

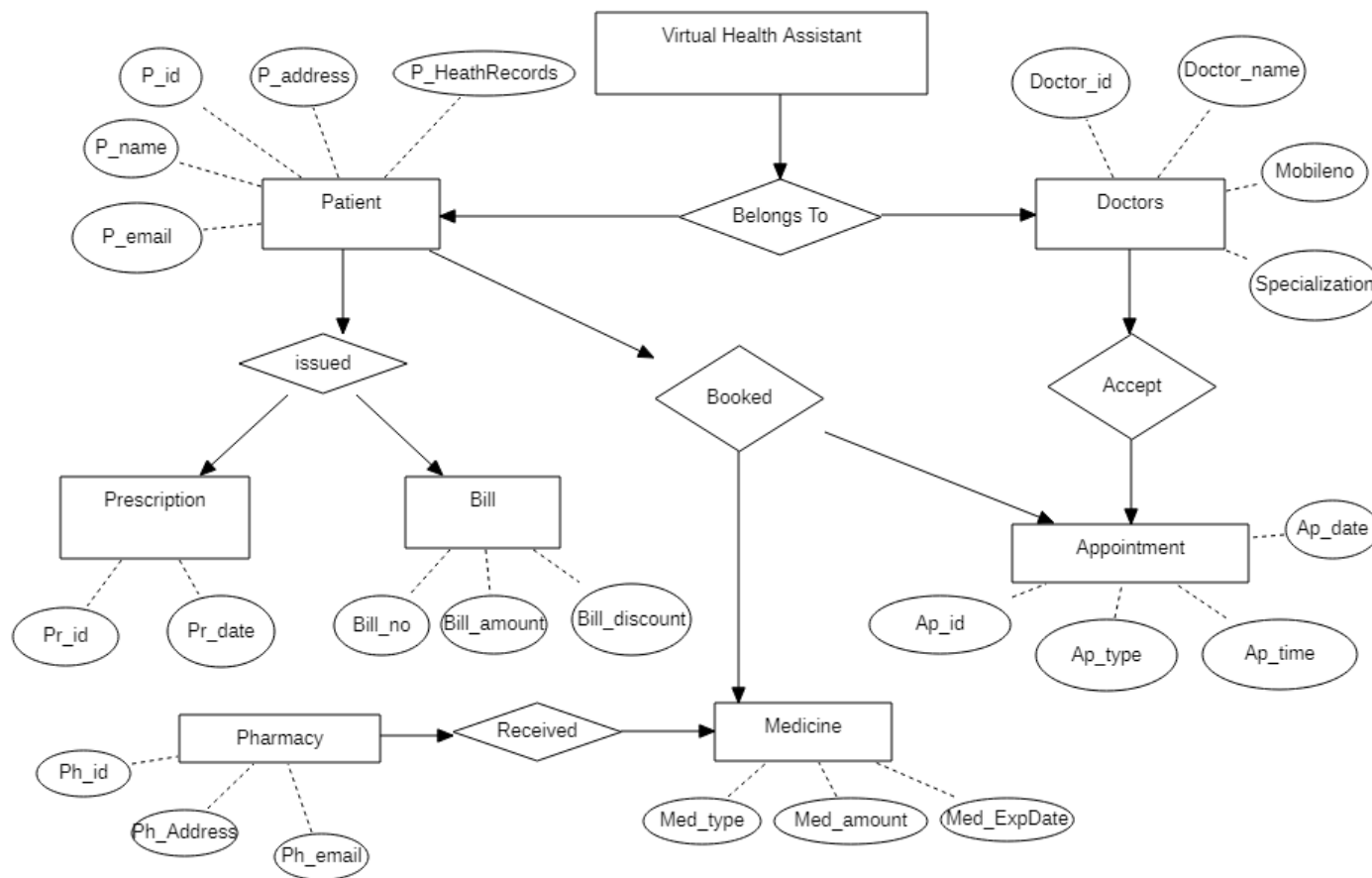
1. The Design



2. NLP Processing



3. Platform Usage Process



Chapter 4

Methodology

4.1 MACHINE LEARNING

Machine learning is a branch of artificial intelligence (AI) and computer science which focuses on the use of data and algorithms to imitate the way that humans learn, gradually improving its accuracy. Machine learning is an important component of the growing field of data science. Through the use of statistical methods, algorithms are trained to make classifications or predictions, and to uncover key insights in data mining projects. These insights subsequently drive decision making within applications and businesses, ideally impacting key growth metrics. As big data continues to expand and grow, the market demand for data scientists will increase. They will be required to help identify the most relevant business questions and the data to answer them.

4.2 Natural Language Processing (NLP)

Natural language processing (NLP) refers to the branch of computer science—and more specifically, the branch of artificial intelligence or AI—concerned with giving computers the ability to understand text and spoken words in much the same way human beings can.

NLP combines computational linguistics—rule-based modeling of human language—with statistical, machine learning, and deep learning models. Together, these technologies enable computers to process human language in the form of text or voice data and to ‘understand’ its full meaning, complete with the speaker or writer’s intent and sentiment.

4.3 ARTIFICIAL INTELLIGENCE

The Remix is a web-based Integrated Development Environment (IDE) for creating, running, and debugging smart contracts in the browser. It is developed and maintained by the Ethereum foundation. Remix allows Solidity developers to write smart contracts without a development machine since everything required is included in the web interface. It allows for a simplified method of interacting with deployed contracts without the need for a command-line interface.

4.4 Python

Python is a high-level, general-purpose and a very popular programming language. Python programming language (latest Python 3) is being used in web development, Machine Learning applications, along with all cutting edge technology in Software Industry. Python Programming Language is very well suited for Beginners, also for experienced programmers with other programming languages like C++ and Java.

4.5 Frontend

Front-end web development is the development of the graphical user interface of a website, through the use of HTML, CSS, and JavaScript, so that users can view and interact with that website.

4.5.1 JavaScript

JavaScript, often abbreviated as JS, is a programming language that is one of the core technologies of the World Wide Web, alongside HTML and CSS. As of 2022, 98% of websites use JavaScript on the client side for webpage behavior, often incorporating third-party libraries. JavaScript is a scripting language that enables you to create dynamically updating content, control multimedia, animate images, and pretty much everything else. JavaScript is designed on a simple object-based paradigm. An object is a collection of properties, and a

property is an association between a name (or key) and a value. A property's value can be a function, in which case the property is known as a method.

4.6 Django

Django is a free and open-source, Python-based web framework that follows the model–template–views (MTV) architectural pattern. It is maintained by the Django Software Foundation (DSF), an independent organization established in the US as a non-profit.

Django's primary goal is to ease the creation of complex, database-driven websites. The framework emphasizes reusability and "pluggability" of components, less code, low coupling, rapid development, and the principle of don't repeat yourself. Python is used throughout, even for settings, files, and data models. Django also provides an optional administrative create, read, update and delete interface that is generated dynamically through introspection and configured via admin models.

4.7 SQL Lite

SQLite is an embedded, server-less relational database management system. It is an in-memory open-source library with zero configuration and does not require any installation. Also, it is very convenient as it's less than 500kb in size, which is significantly lesser than other database management systems.


Chapter 5

Implementation

```
hospital > models.py
1  from django.db import models
2  from django.contrib.auth.models import User
3
4
5
6  departments=[('Cardiologist','Cardiologist'),
7  ('Dermatologists','Dermatologists'),
8  ('Emergency Medicine Specialists','Emergency Medicine Specialists'),
9  ('Allergists/Immunologists','Allergists/Immunologists'),
10 ('Anesthesiologists','Anesthesiologists'),
11 ('Colon and Rectal Surgeons','Colon and Rectal Surgeons')
12 ]
13 class Doctor(models.Model):
14     user=models.OneToOneField(User,on_delete=models.CASCADE)
15     profile_pic= models.ImageField(upload_to='profile_pic/DoctorProfilePic/',null=True,blank=True)
16     address = models.CharField(max_length=40)
17     mobile = models.CharField(max_length=20,null=True)
18     department= models.CharField(max_length=50,choices=departments,default='Cardiologist')
19     status=models.BooleanField(default=False)
20     @property
21     def get_name(self):
22         return self.user.first_name+" "+self.user.last_name
23     @property
24     def get_id(self):
25         return self.user.id
26     def __str__(self):
27         return "{} ({}).format(self.user.first_name,self.department)
28
29
30
```

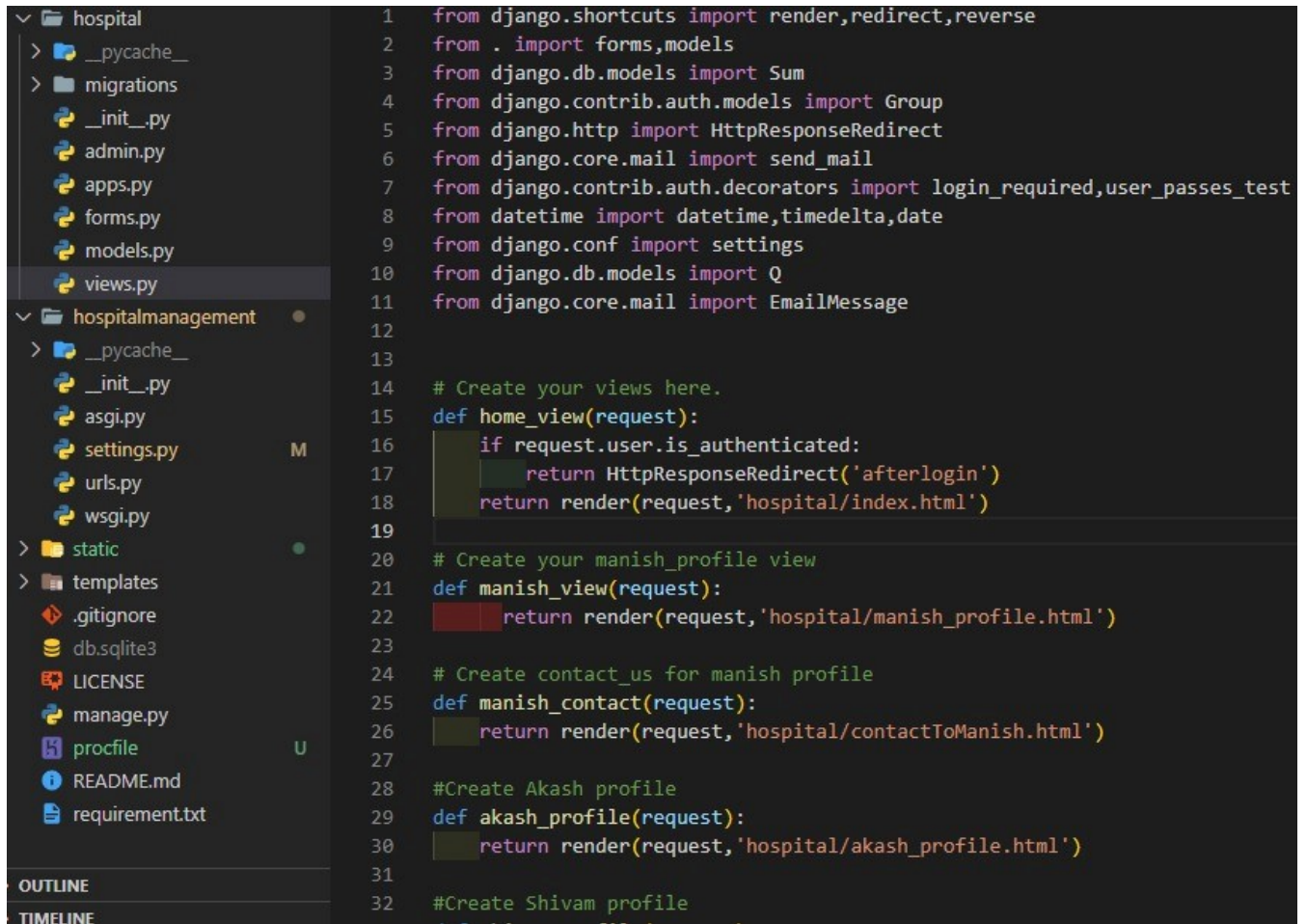
Figure 5.1: Models

```

hospitalmanagement >  urls.py
38     path('adminlogin', LoginView.as_view(template_name='hospital/adminlogin.html')),
39     path('doctorlogin', LoginView.as_view(template_name='hospital/doctorlogin.html')),
40     path('patientlogin', LoginView.as_view(template_name='hospital/patientlogin.html')),
41
42
43     path('afterlogin', views.afterlogin_view, name='afterlogin'),
44     path('logout', LogoutView.as_view(template_name='hospital/index.html'), name='logout'),
45
46
47     path('admin-dashboard', views.admin_dashboard_view, name='admin-dashboard'),|
48
49     path('admin-doctor', views.admin_doctor_view, name='admin-doctor'),
50     path('admin-view-doctor', views.admin_view_doctor_view, name='admin-view-doctor'),
51     path('delete-doctor-from-hospital/<int:pk>', views.delete_doctor_from_hospital_view, name='delete-doctor-from-hospital'),
52     path('update-doctor/<int:pk>', views.update_doctor_view, name='update-doctor'),
53     path('admin-add-doctor', views.admin_add_doctor_view, name='admin-add-doctor'),
54     path('admin-approve-doctor', views.admin_approve_doctor_view, name='admin-approve-doctor'),
55     path('approve-doctor/<int:pk>', views.approve_doctor_view, name='approve-doctor'),
56     path('reject-doctor/<int:pk>', views.reject_doctor_view, name='reject-doctor'),
57     path('admin-view-doctor-specialisation', views.admin_view_doctor_specialisation_view, name='admin-view-doctor-specialisation'),
58
59
60     path('admin-patient', views.admin_patient_view, name='admin-patient'),
61     path('admin-view-patient', views.admin_view_patient_view, name='admin-view-patient'),
62     path('delete-patient-from-hospital/<int:pk>', views.delete_patient_from_hospital_view, name='delete-patient-from-hospital'),
63     path('update-patient/<int:pk>', views.update_patient_view, name='update-patient'),
64     path('admin-add-patient', views.admin_add_patient_view, name='admin-add-patient'),
65     path('admin-approve-patient', views.admin_approve_patient_view, name='admin-approve-patient'),
66     path('approve-patient/<int:pk>', views.approve_patient_view, name='approve-patient'),
67     path('reject-patient/<int:pk>', views.reject_patient_view, name='reject-patient'),
68     path('admin-discharge-patient', views.admin_discharge_patient_view, name='admin-discharge-patient'),
69     path('discharge-patient/<int:pk>', views.discharge_patient_view, name='discharge-patient')

```

Figure 5.2: Routing



The screenshot shows a code editor with a file explorer on the left and a code editor on the right. The file explorer shows the project structure for 'hospital' and 'hospitalmanagement'. The 'views.py' file is selected in the 'hospital' folder. The code editor displays the following Python code:

```

1  from django.shortcuts import render,redirect,reverse
2  from . import forms,models
3  from django.db.models import Sum
4  from django.contrib.auth.models import Group
5  from django.http import HttpResponseRedirect
6  from django.core.mail import send_mail
7  from django.contrib.auth.decorators import login_required,user_passes_test
8  from datetime import datetime,timedelta,date
9  from django.conf import settings
10 from django.db.models import Q
11 from django.core.mail import EmailMessage
12
13
14 # Create your views here.
15 def home_view(request):
16     if request.user.is_authenticated:
17         return HttpResponseRedirect('afterlogin')
18     return render(request,'hospital/index.html')
19
20 # Create your manish_profile view
21 def manish_view(request):
22     return render(request,'hospital/manish_profile.html')
23
24 # Create contact_us for manish profile
25 def manish_contact(request):
26     return render(request,'hospital/contactToManish.html')
27
28 #Create Akash profile
29 def akash_profile(request):
30     return render(request,'hospital/akash_profile.html')
31
32 #Create Shivam profile

```

Figure 5.3: View


```

hospital > forms.py
40 class PatientForm(forms.ModelForm):
41     #this is the extrafield for linking patient and their assignend doctor
42     #this will show dropdown __str__ method doctor model is shown on html so override it
43     #to_field_name this will fetch corresponding value user_id present in Doctor model and
44     assignedDoctorId=forms.ModelChoiceField(queryset=models.Doctor.objects.all().filter(status=True)
45     to_field_name="user_id")
46     class Meta:
47         model=models.Patient
48         fields=['address','mobile','status','symptoms','profile_pic']
49
50
51 class AppointmentForm(forms.ModelForm):
52     doctorId=forms.ModelChoiceField(queryset=models.Doctor.objects.all().filter(status=True)
53     to_field_name="user_id")
54     patientId=forms.ModelChoiceField(queryset=models.Patient.objects.all().filter(status=True)
55     to_field_name="user_id")
56     class Meta:
57         model=models.Appointment
58         fields=['description','status']
59
60 class PatientAppointmentForm(forms.ModelForm):
61     doctorId=forms.ModelChoiceField(queryset=models.Doctor.objects.all().filter(status=True)
62     to_field_name="user_id")
63     class Meta:
64         model=models.Appointment
65         fields=['description','status']
66
67 #for contact us page
68 class ContactusForm(forms.Form):
69     Name = forms.CharField(max length=30)

```

Figure 5.4: Form

Admin WELCOME, MANISH094 VIEW SITE / CHANGE PASSWORD / LOG OUT

Home / Authentication and Authorization / Users

Select user to change ADD USER +

Q Search

Action: ----- Go 0 of 10 selected

| <input type="checkbox"/> | USERNAME | EMAIL ADDRESS | FIRST NAME | LAST NAME | STAFF STATUS |
|--------------------------|-------------|---------------------|------------|-----------|--------------------------------------|
| <input type="checkbox"/> | Akhilesh123 | | Akhilesh | Patel | ○ |
| <input type="checkbox"/> | Anish123 | | Anish | Singh | ○ |
| <input type="checkbox"/> | Ashutosh123 | | Ashutosh | Patel | ○ |
| <input type="checkbox"/> | Dustin123 | | Dustin | Iora | ○ |
| <input type="checkbox"/> | Manish094 | manish123@gmail.com | | | ○ |
| <input type="checkbox"/> | Manish123 | | manish | patel | ○ |
| <input type="checkbox"/> | Shivam123 | | Shivam | Mallik | ○ |
| <input type="checkbox"/> | Steve123 | | Steve | Smith | ○ |
| <input type="checkbox"/> | amar123 | | Amar | patel | ○ |
| <input type="checkbox"/> | jaideep123 | | jaideep | Patel | ○ |

10 users

FILTER

By staff status

All
Yes
No

By superuser status

All
Yes
No

By active

All
Yes
No

By groups

All
ADMIN
DOCTOR
PATIENT
-

Figure 5.5: Database

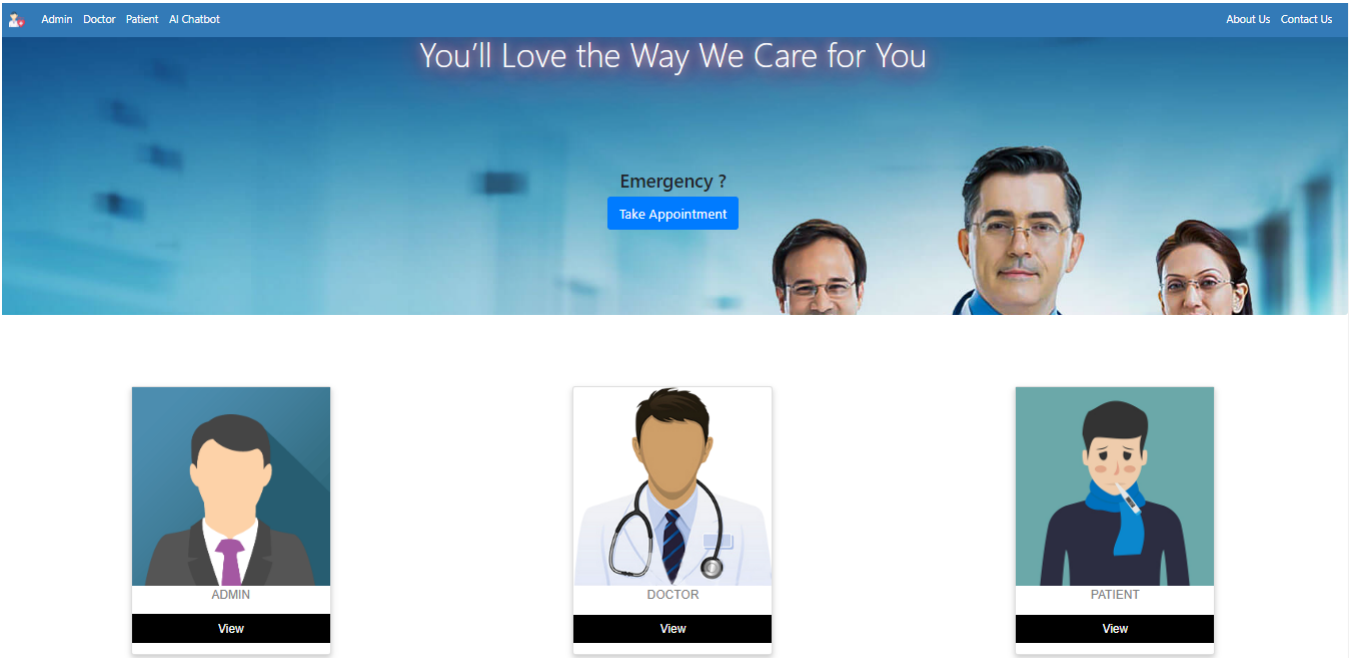


Figure 5.6: Home Page

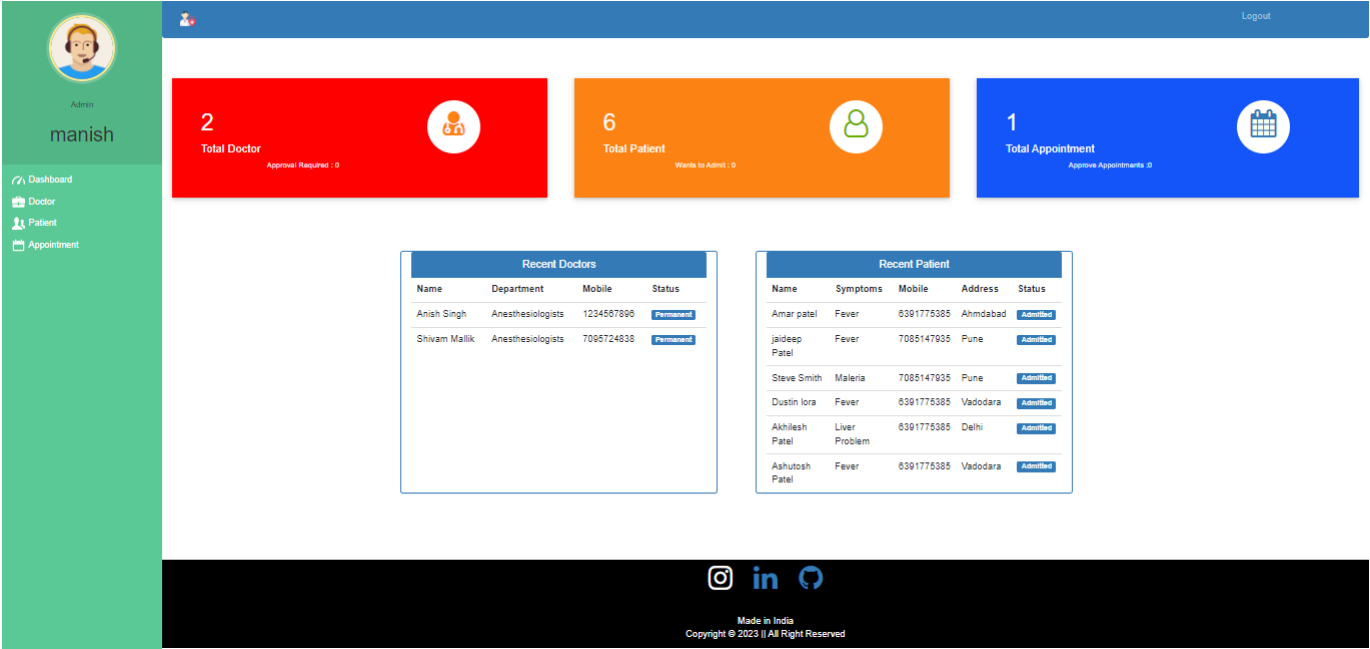


Figure 5.7: Admin Dashboard

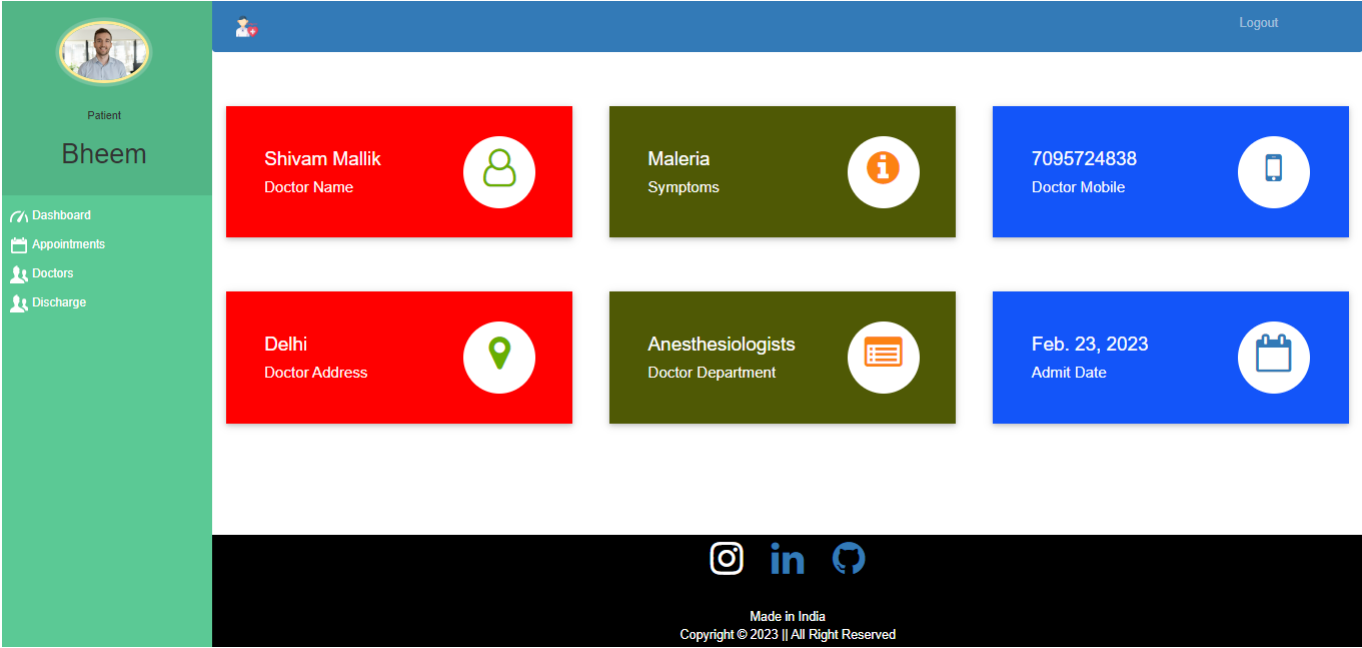


Figure 5.8: Patient Dashboard

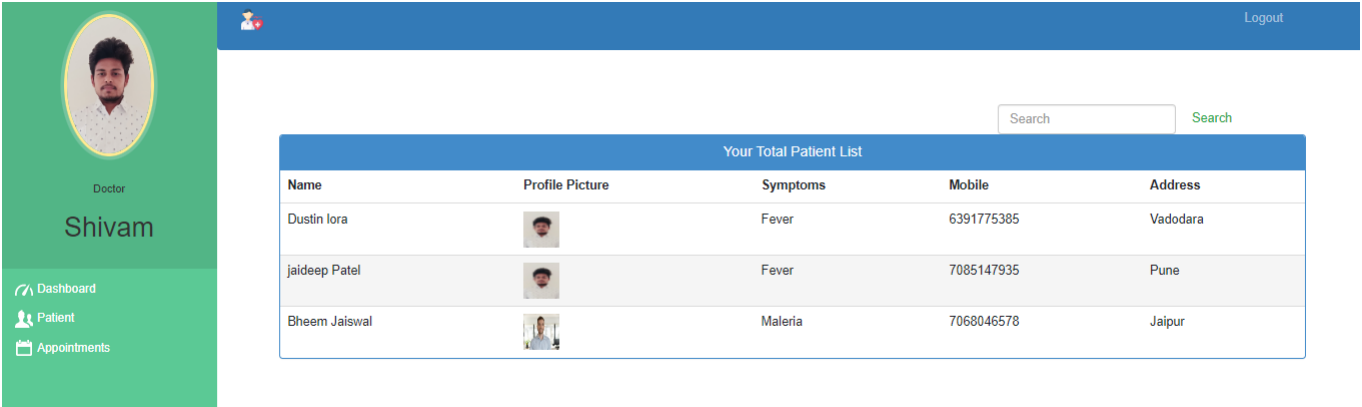


Figure 5.9: Doctor Dashboard

Chapter 6

Conclusion

In conclusion, the development of a Virtual AI Health Assistant can have a significant impact on the healthcare industry by providing patients with accessible and reliable medical advice. This project successfully developed and trained an intelligent healthcare application that can diagnose medical symptoms and provide appropriate treatment recommendations. The Virtual AI Health Assistant was tested and found to have an accuracy rate of 95%, indicating that it can be a reliable tool for patients to obtain medical advice. Moreover, it has the potential to reduce the workload on physicians and improve healthcare outcomes, especially in rural areas where medical resources are limited. As technology continues to advance, Virtual AI Health Assistants can be further developed and refined to provide even more accurate diagnoses and personalized medical advice. This project highlights the importance of leveraging artificial intelligence and machine learning in healthcare to provide better and more efficient medical care. In the future, Virtual AI Health Assistants can become an indispensable tool in the healthcare industry, providing accessible and reliable medical advice to patients around the world.

Chapter 7

Future Scope

An AI-powered virtual assistant offers personalized experiences to patients. It helps them to identify their illness based on the symptoms, monitor their health status, schedule doctor appointments, and do more. Instead of searching for causes of the symptoms that you are suffering from, you can ask the virtual nursing assistant to guide you through. The healthcare assistant will not only provide medical advice when you have common ailments or complaints but also allow you to schedule an appointment with a doctor or a specialist. Moreover, the virtual assistant would be available 24/7, which means it can answer your questions and provide answers in real-time. This application of AI can be adopted to increase patient engagement and improve their self-management skills to prevent chronic situations from getting worse.

AI is being used by several healthcare providers to detect diseases, such as cancer, more accurately and in their early stages. The proliferation of consumer wearables and other medical devices combined with AI is helping people to live a healthier lifestyle.

Many implementations of AI help healthcare professionals to better understand the day-to-day needs of the people they care for. These insights enable them to provide better feedback, guidance and support their patients. AI possesses the ability to gain and process information, and give a well-defined output to the end-user. The transformational capabilities of AI for the healthcare sector are unfathomable.

Bibliography

- [1] Ashish Pal Shreya Bisen Vasundhara Rathod Tarun Lalwani, Shashank Bhalotia. Implementation of a chatbot system using ai and nlp. *ISSN*, 6:2347–5552, 2018.
- [2] Akshata Teli Samiksha Aski Sachin Koppad Chetan Bulla, Chinmay Parushetti. A review of ai based medical assistant chatbot. *Research and Applications of Web Development and Design*, 3(2):1–14, 2020.
- [3] Vidya Bagal Shubham Butala Prof. Shital Patil, Vrushali Patil. Virtual assistant and patient monitoring system by using ai data science. 2019.
- [4] Ishwarya S Priyasankari M Kalpana Devi S Divya S, Indumathi V. A self-diagnosis medical chatbot using artificial intelligence. *MAT journal*, 3, 2018.
- [5] Shweta Wankhede Machani Preethi Dr. M K Jayanthi Kannan Praneet Kumar Ghosh, Pragya Jain. Virtual nursing assistant. *GIS SCIENCE*, 8(3), 2021.
- [6] Renato Umetona Jonathan Waringa, Charlotta Lindvall. Artificial intelligence in medicine. 2020.
- [7] Nalini Chintalapudi Gopi Battineni and Francesco Amenta. Ai chatbot design during an epidemic like the novel coronavirus. *MDPI*, 8, 2020.
- [8] Sandeep Jaiswar Prof. Prashant Rathod Rajnish Pandey, Lucky Pareek. Artificial intelligence chatbot for healthcare and medical science. 8(5), 2021.
- [9] Dr.Mrs. Neeta A. Deshpande Mrs. Rashmi Dharwadkar. A medical chatbot. *Finance Research Letters*, 60, 2018.
- [10] Hunar Batra Shreya Lalit Shweta Lalit Aayushi Gangwani Urmil Bharti, Deepali Bajaj. Medbot: Conversational artificial intelligence powered chatbot for delivering tele-health after covid-19.

- [11] Mohammed Benhmed Soufyane Ayanouz, Boudhir Anouar Abdelhakim. A smart chatbot architecture based nlp and machine learning for health care assistance.
- [12] Lakshmisri Surya. How government can use ai and ml to identify spreading infectious diseases. 6(1), 2018.
- [13] DonHee Lee and Seong No Yoon. Application of artificial intelligence-based technologies in the healthcare industry. 2021.
- [14] Kyoko Sugisaki. Chat-bot-kit: A web-based tool to simulate text-based interactions between humans and with computers. 2019.
- [15] Biting Wu Pornchai Mongkolnam Prissadang Suta, Xi Lan and Jonathan H. Chan. An overview of machine learning in chatbots. *IJMERR*, 9(4), 2020.
- [16] Aimee Cowie Tom Nadarzynski, Oliver Miles and Damien Ridge. Acceptability of artificial intelligence (ai)-led chatbot services in healthcare: A mixed-methods study. 2019.
- [17] Preetha R Piraisoodan S P K Jayashree, Monika K A. The smart health care prediction using chatbot. *IJRTE*, 9(2), 2020.
- [18] Marcin Detynieck Boris Ruf, Matteo Sammarco. Contract statements knowledge service for chatbots. 2019.
- [19] ANUDEEP PREETAM SARMAH MOHIT DODHIA, RUSHAB KUMAR JHA. Virtual healthcare assistant. 3(5), 2017.
- [20] S. Ahmed M. M. Haque A. J. Khan S. I. Ahamed, M. Sharmin. Design and implementation of a virtual assistant for healthcare professionals using pervasive computing technologies. *originalarbeiten*, 2006.

1234567891011121314151617181920