A

DSBDA Mini Project Report submitted to Savitribai Phule Pune University, Pune

AI Doctor Assistant

In partial Fulfillment for the awards of Degree of Engineering in Computer Engineering

Submitted by

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CERTIFICATE

This is to certify that,

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have successfully completed the Mini project entitled " **AI Doctor Assistant** " under my guidance in partial fulfillment of the requirements for the Third Year of Engineering in Computer Engineering under the Savitribai Phule Pune University during the academic year 2024-2025

Date : …….

Place:…….

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Abstract

The Disease Prediction AI Doctor Assistant is an AI-enabled healthcare application that predicts diseases from symptoms of patients. Based on a structured dataset of 132 symptoms and 41 categories of diseases, the project employs three strong classifiers—Support Vector Machine (SVM), Gaussian Naive Bayes, and Random Forest—to provide high accuracy and model reliability. The dataset is pre-processed and balanced to facilitate efficient training and evaluation using cross-validation to attain 100% accuracy in models.

The system transforms user-provided symptoms into binary and predicts the disease based on the analysis of outputs from all three models. The ultimate prediction is made through majority voting. An easy-to-use function takes comma-delimited symptoms and provides consistent predictions, even when it encounters unknown symptom inputs.

This assistant can facilitate early diagnosis and initial consultation, particularly in areas with poor access to healthcare providers, and hence is a useful tool in telemedicine and AI-based healthcare delivery.

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List of Abbreviations

- **API:** Application Programming Interface
- **GUI** – Graphical User Interface
- **JSON:** JavaScript Object Notation
- **BMI** – Body Mass Index
- **HIPAA:** Health Insurance Portability and Accountability Act (US)

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Chapter 1

Introduction

1.1 Overview

The rapid advancements in Artificial Intelligence (AI) have opened up innovative possibilities in the healthcare sector. One such application is an AI-based Doctor Assistant for disease prediction, which helps in identifying potential illnesses based on user-reported symptoms. This project uses machine learning algorithms trained on a comprehensive medical dataset to classify diseases accurately. By automating preliminary diagnoses, the system can assist both patients and healthcare providers, reducing the dependency on immediate human intervention for common symptoms.

1.2 Aim/Motivation

The main aim of this project is to create an intelligent system that can predict diseases by analysing patient symptoms, thereby assisting users in understanding potential health issues early. The motivation comes from the increasing need for accessible, affordable, and fast preliminary medical support, especially in remote or underdeveloped areas where professional healthcare is not readily available.

1.3 Objective

- To build a machine learning model that can predict diseases with high accuracy based on input symptoms.
- To compare different classification algorithms (SVM, Naive Bayes, and Random Forest) for performance.
- To develop a user-interactive system that provides a predicted diagnosis using multiple models and majority voting.
- To handle symptom input flexibility and provide reliable outputs even when partial or inconsistent data is entered.

1.4 Organization of Report

This report is organized into several sections:

- **Introduction**: Describes the background, aim, and structure of the project.
- **Literature Review**: Discusses related works and existing systems in AI-based disease prediction.
- **Methodology**: Details the dataset used, preprocessing steps, machine learning models applied, and evaluation metrics.
- **Results and Discussion**: Presents model performances, comparisons, confusion matrices, and accuracy scores.
- **System Implementation**: Explains the prediction function, interface, and symptom-handling process.
- **Conclusion and Future Work**: Summarizes the achievements and outlines possible improvements and extensions.

Chapter II

Literature Survey

Sr. No.	Paper Title / Source	Authors / Organization	Year	Key Findings / Contribution
1	A Review of Telemedicine Applications in the Pandemic Era	Smith et al., *Journal of Medical Systems*	2021	Discusses the growth of telemedicine due to COVID-19 and evaluates system performance, usability, and access.
2	Telemedicine for Diabetes Care: Use and Evaluation in Real-World Settings	American Diabetes Association	2020	Shows improved patient monitoring, reduced hospital visits, and better chronic disease management.
3	mHealth and Telemedicine: Innovative Strategies for Remote Patient Monitoring	WHO – World Health Organization	2019	Emphasizes mobile-based healthcare and benefits for rural or remote populations.
4	Implementation Challenges in Telemedicine Systems	Kaur & Sharma, IEEE Access	2020	Analyzes technical challenges such as data privacy, poor connectivity, and need for user training.
5	A Cloud-Based Telemedicine Framework for Remote Healthcare	Patel & Mehta, Springer Health Informatics Journal	2018	Proposes a cloud-integrated telehealth solution with real-time data access and secure communication.

Chapter III
Problem Statement

Access to timely and accurate medical diagnosis is a major challenge, especially in rural or under-resourced areas where healthcare professionals may not be readily available. Patients often rely on self-diagnosis or delayed consultations, which can lead to incorrect treatment or worsening of health conditions. There is a growing need for an intelligent system that can assist users in identifying possible diseases based on their symptoms, reducing dependence on immediate medical intervention.

This project aims to develop an AI-based Doctor Assistant that leverages machine learning algorithms to predict diseases from symptoms entered by users. By analysing a dataset containing various symptoms and corresponding diagnoses, the system provides accurate, fast, and consistent predictions, serving as a preliminary diagnostic tool to support patients and healthcare systems alike.

Chapter IV

Software Requirements Specification

4.1 Hardware Requirements

- Processor: Intel i5 or higher
- RAM: 8 GB
- Storage: 256 GB SSD

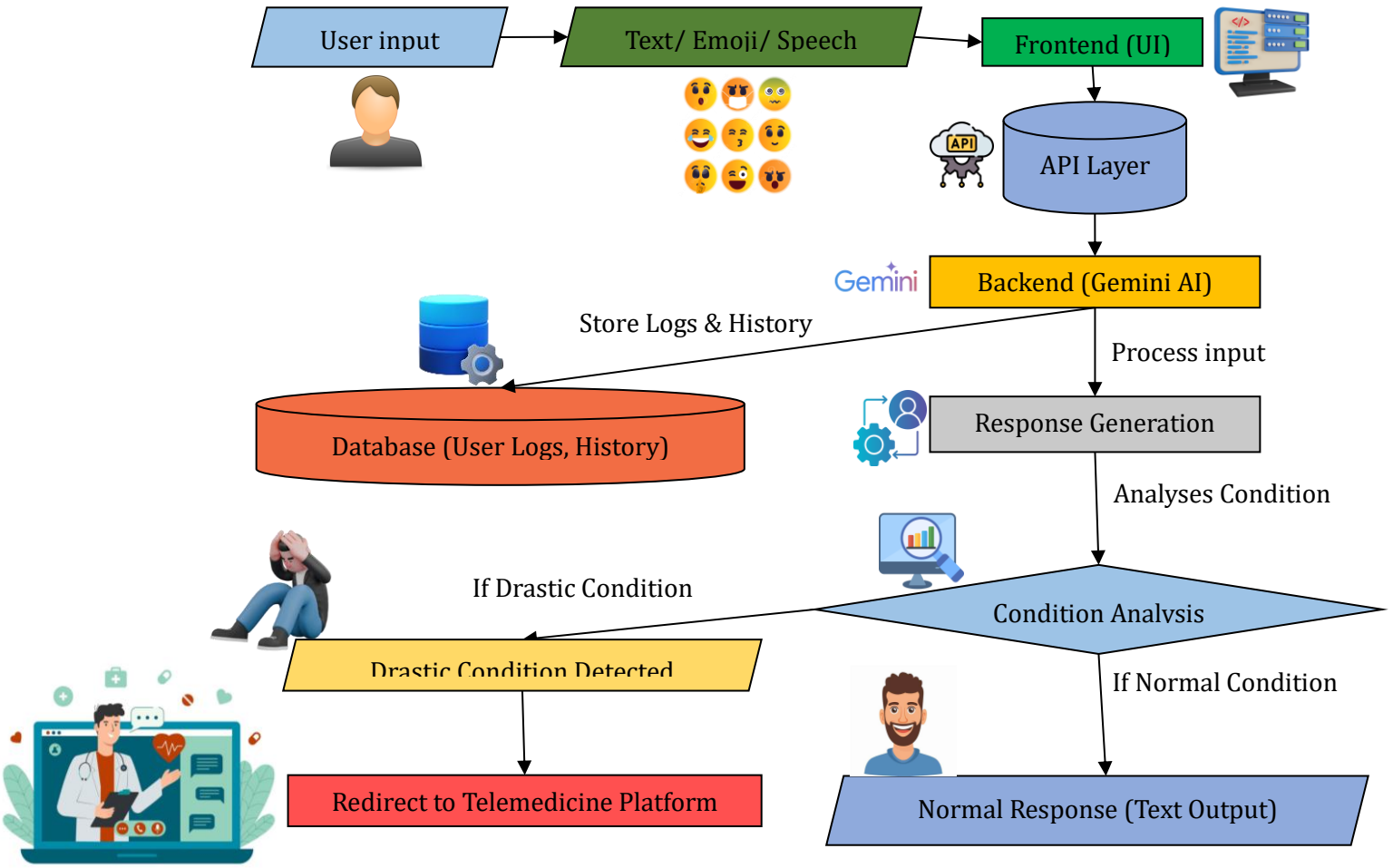
4.2 Software Requirements

- Backend: NodeJS, Express JS, MongoDB, Python.
- IDE: VS Code
- OS: Windows / Linux
- Deployment: Vercel (for MediHub UI)

Chapter V

System Design and Result

5.1 Project Block Diagram



1 Chatbot Architecture Diagram

Chapter VI

Conclusion and Future Scope

4.1 Conclusion :

The AI Doctor Assistant developed in this project successfully predicts diseases based on symptoms using machine learning algorithms like Support Vector Machine, Naive Bayes, and Random Forest. The system demonstrates high accuracy in disease classification by training on a well-balanced medical dataset. It helps users get quick and reliable predictions, especially useful in early diagnosis and areas with limited healthcare access.

The model not only provides predictions from individual classifiers but also uses majority voting to increase the reliability of the final output. This ensures that the system remains consistent and robust even when symptoms are ambiguously entered. Overall, the project proves that AI can be a powerful tool in enhancing medical support systems.

4.2 Future Scope:

- **Integration with Chatbots or Virtual Assistants**: The system can be integrated into a conversational interface for better user interaction and accessibility.
- **Real-Time Web or Mobile App Deployment**: Creating a user-friendly mobile or web application to make the prediction system more widely usable.
- **Inclusion of Severity and Recommendation**: Future versions can suggest the severity level of the disease and recommend whether to visit a doctor immediately.
- **Multilingual Support**: Adding language support for regional users to make the system inclusive and accessible to non-English speakers.
- **Addition of Patient History & Demographics**: Enhancing prediction accuracy by considering age, gender, and past medical records.
- **Integration with IoT Devices**: For advanced features like real-time health monitoring and automatic symptom tracking using wearable devices.

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