Winger IT Solutions: Project 1

Project Name: MedInsight – AI-Powered Symptom Analyzer & Patient Management System

1. Introduction

1.1 Project Overview

MedInsight is a web-based healthcare solution that assists patients in identifying potential diseases based on their symptoms while providing essential medical guidance. It also features an administrative dashboard for managing doctors, patients, and medical records efficiently.

1.2 Purpose

- Enable users to input symptoms and receive predictive medical insights.
- Provide structured guidance on precautions, medications, workouts, and diet.
- Facilitate efficient patient-doctor management through an admin portal.
- Maintain a comprehensive medical history of patients.

1.3 Scope

- AI-based symptom analysis and disease prediction.
- Web-based graphical user interface (GUI).
- Role-based access: Patients and Admins (Doctors).
- Patient history tracking with timestamps and doctor comments.

2. Functional Requirements

2.1 Patient Interface

The system should allow patients to:

1. **Enter Symptoms:** Patients should be able to input the symptoms they are experiencing.
2. **Receive Predictive Analysis**
    - Disease Name
    - Description of the Disease
    - Precautions to take
    - Suggested Medications
    - Recommended Workouts
    - Dietary Recommendations

2.2 Admin/Doctor Interface

The system should provide an admin portal with the following functionalities:

1. **Manage Doctors**
    - Add a new doctor with details (Name, Email, Mobile Number, Specialization).
    - View all registered doctors with their details.
2. **Manage Patients**
    - Add a new patient (Name, Email, Mobile Number, Blood Group, etc.).
    - View a list of all patients with their details.
3. **Assign Doctor to Patient**
    - Link a patient with a specific doctor.
    - Allow doctors to add comments on a patient's record.
4. **View Patient Medical History**
    - Search for a patient using their Unique ID (UID).
    - Display complete patient history, including assigned doctors, past comments, and timestamps.

3. Non-Functional Requirements

1. **User-Friendly Interface:** The system should have an intuitive, responsive, and accessible web-based GUI.
2. **Security & Privacy:**
    - Role-based authentication (Patients & Admins/Doctors).
    - Secure patient data storage.

4. Model Selection & Performance Analysis

To ensure the best disease prediction accuracy, the dataset should be trained using multiple machine learning models:

- **Support Vector Classifier (SVC)**
- **Random Forest Classifier**
- **K-Nearest Neighbors (KNN)**
- **Logistic Regression**
- **Gradient Boosting Classifier**
- **Neural Networks (if applicable)**

Steps:

1. Train the dataset on multiple models.
2. Evaluate model performance using metrics such as **accuracy, precision, recall, F1-score, and confusion matrix**.
3. Visualize model comparison using **graphs and performance plots**.
4. Select the model with the highest accuracy and best generalization for deployment.

5. Deliverables

1. Fully functional web-based GUI for patient and admin interactions.
2. AI-driven symptom-to-disease prediction module.
3. Secure admin portal for managing doctors and patients.
4. Patient history tracking with doctor comments and timestamps.
5. **Comprehensive model evaluation report with performance visualization.**