Phase-1SubmissionTemplate

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Transforming Healthcare with AI-Powered Disease Prediction Based on Patient Data

1. Problem Statement

Healthcare systems face significant challenges in early disease detection due to delayed diagnosis, manual data interpretation, and limited accessibility to specialized care. This project addresses the need for an AI-driven solution that analyzes patient data to accurately predict diseases in their early stages, thereby enhancing treatment outcomes, reducing healthcare costs, and improving patient quality of life.

2. Objectives of the Project

- To develop a predictive model that can accurately forecast potential diseases based on patient historical and clinical data.

- To enhance early diagnosis and reduce diagnostic errors using machine learning.

- To create a user-friendly interface for medical professionals and patients to input data and receive predictions.

- To support healthcare professionals

3. Scope of the Project

In Scope:

- Collection and preprocessing of patient data (symptoms, medical history, lab results).

- Development of machine learning models for disease prediction (e.g., diabetes, heart disease).

- Evaluation of model accuracy, precision, and recall.

- Basic frontend for user interaction (optional).

Out of Scope:

- Real-time integration with hospital systems or medical devices.

- Diagnosis or treatment recommendation (beyond prediction).

4. Data Sources

- Public datasets from sources such as:

  - Kaggle (e.g., Heart Disease, Diabetes, Breast Cancer datasets)

  - UCI Machine Learning Repository

  - Open Government Health Data portals

  - WHO and CDC databases

5. High-Level Methodology

1. Data Collection: Acquire relevant patient datasets.

2. Data Preprocessing: Handle missing values, encode categorical data, normalize features.

3. Exploratory Data Analysis (EDA): Understand patterns and correlations.

4. Model Development: Train various ML models (Logistic Regression, Random Forest, SVM, etc.).

5. Evaluation: Use metrics like accuracy, F1 score, AUC-ROC for model comparison.

6. Tools and Technologies

- Programming Language: Python

- Libraries: Pandas, NumPy, Scikit-learn, TensorFlow/Keras (if deep learning is needed), Matplotlib/Seaborn

- Data Storage: CSV files, SQLite (optional)

- IDE/Environment: Jupyter Notebook, Google Colab, VS Code

- Deployment (Optional): Streamlit or Flask for frontend

7. Team Members and Roles

NAME	ROLES	WORK
ISWARYA.A	Project coordinator	Overseas the entire project timeline,task assignment and reporting
HARINI.M	Data engineer	Handles data collection, cleaning and preprocessing
MALAVIKA.C	Machine learning engineer	Designs, trains and tunes predictive models
KARTHIKA.S	Frontend developer	Creates a user interface for the model