Phase-2 Submission Template

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Github Repository Link: https://github.com/iswaryaisha1608/Iswarya.git

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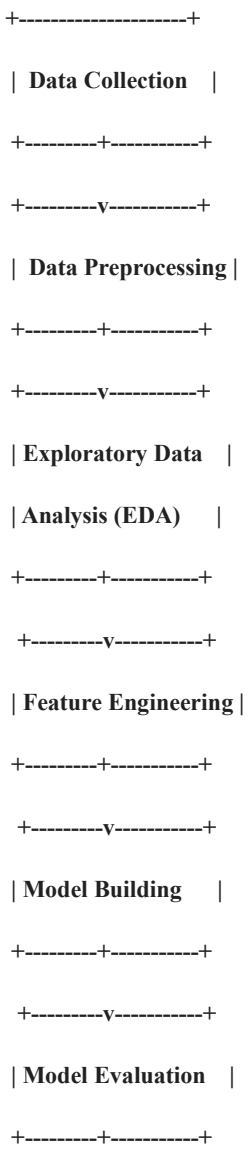
1. Problem Statement

The healthcare industry faces challenges in early and accurate disease diagnosis, leading to delayed treatments and increased healthcare costs. Traditional diagnostic methods are often time-consuming and prone to human error. The problem is to develop an AI-powered system that can predict potential diseases using patient data (like symptoms, medical history, demographics, and lab results) to enhance early diagnosis, treatment planning, and overall patient care.

2. Project Objectives

* To collect and preprocess patient health data for predictive modeling.
* To explore and identify patterns and correlations within the data.
* To develop and evaluate AI/ML models for disease prediction.
* To interpret model results and provide actionable insights.
* To visualize predictions and trends for clinical decision support.

3. Flowchart of the Project Workflow



4. Data Description

The dataset includes the following fields

* Patient ID

* Age

* Gender

* Symptoms

* Medical History

* Lab Test Results

* Diagnosed Diseases (Target Variable)

5. Data Preprocessing

* Handling missing values.
* Converting categorical variables into numerical (e.g., one-hot encoding).
* Normalization/Standardization of numerical data.
* Removing duplicates.
* Balancing the dataset (e.g., using SMOTE for imbalanced classes).

6. Explor

* Visualizing age and gender distribution.

* Analyzing disease prevalence.

* Correlation heatmaps of features.

* Distribution plots of symptoms and lab results.atory Data Analaysis (EDA)

7. Feature Engineering

* Creating symptom clusters.
* Aggregating lab test metrics.
* Feature selection using correlation and importance scores.
* Dimensionality reduction techniques (e.g., PCA)

8. Model Building*

* Algorithms used: Logistic Regression, Random Forest, XGBoost, Neural Networks.
* Train-test split.
* Hyperparameter tuning using Grid Search/Cross Validation.
* Evaluation Metrics: Accuracy, Precision, Recall, F1 Score, AUC-ROC.

9. Visualization of Results & Model Insights

* Confusion matrix heatmap.
* ROC curve and AUC score.
* Feature importance plots.
* SHAP values for explainable AI.

10. Tools and Technologies Used

* Python
* Pandas, NumPy
* Scikit-learn, XGBoost
* TensorFlow/Keras
* Matplotlib, Seaborn
* Jupyter Notebook/Google Colab
* Git/GitHub

11. Team Members and Contributions

* *M.Harini* : Data collection, preprocessing, and EDA
* *A.Iswarya* : Feature engineering and model building
* *S.Karthika*: Model evaluation and visualization
* *C.Malavika*: Documentation and presentation