Disease Prediction System

TEAM MEMBERS

ABHISHEH H
CHIRAG V
DHANUSH GS
MAHESH REDDY

GUIDE

Asst.Prof :SATHYA VIJAYKUMAR

Introduction

01 Early detection of chronic diseases improves treatment outcomes

02 Focus on Heart Disease, Diabetes, Parkinson’s

03 Machine Learning + Explainable AI (SHAP) for prediction

04 Web-based Flask interface for user interaction

Data Preprocessing

- Handling missing/invalid values (e.g., 0 values in diabetes dataset replaced with median)data_preprocessing
- Scaling features using StandardScaler
- Dropping non-numeric columns (e.g., Parkinson’s “name” column)
- Splitting into train/test sets (80/20)train_models

Models Used

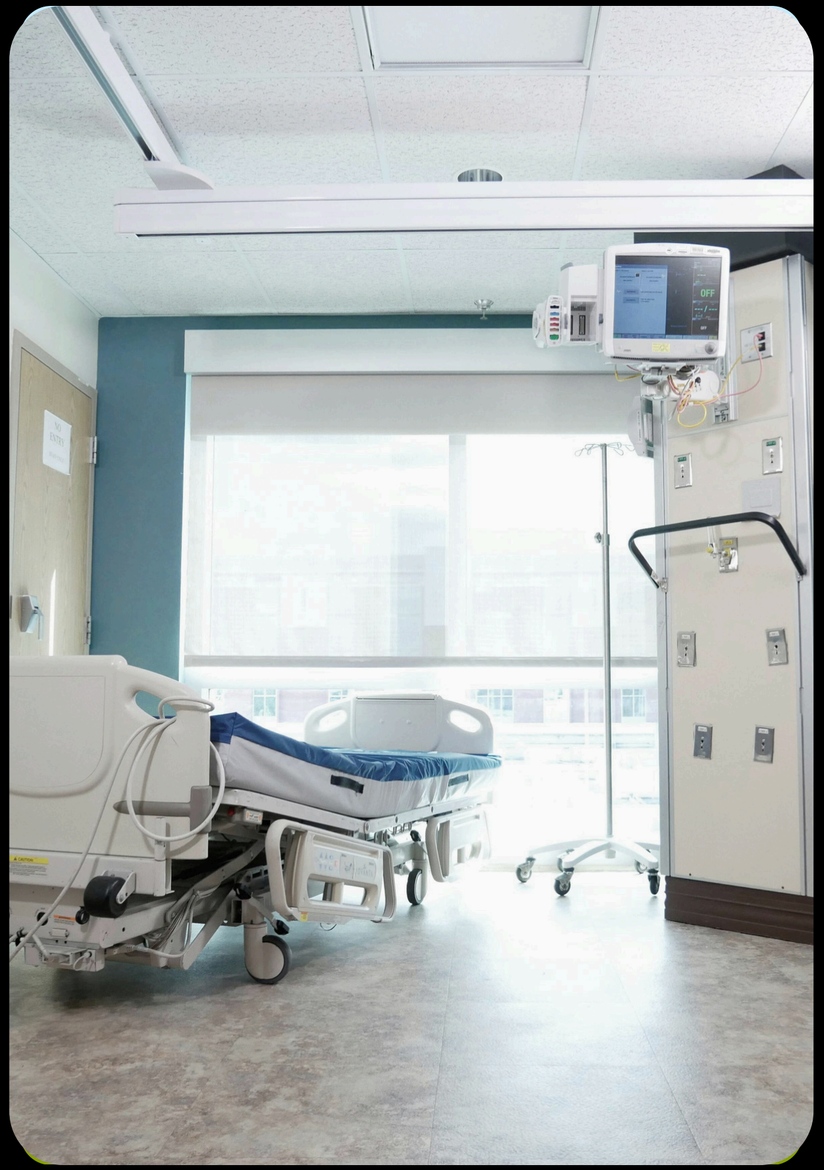
Classification (Diabetes, Heart):train_models

- Logistic Regression
- Random Forest Classifier
- Support Vector Machine (SVM)

Regression (Parkinson’s):train_models

- Linear Regression
- Random Forest Regressor

Best model auto-selected based on accuracy (classification) / MSE (regression)



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Prediction System (App Flow)

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- Flask web app with disease-specific pages
- User enters health parameters
- Model scales input + predicts outcome
- Results returned as:
- Positive / Negative likelihood
- SHAP explanation plot (feature impact visualization)

Example Features

Different diseases rely on distinct health indicators — diabetes uses glucose, BMI, insulin; heart disease uses cholesterol, blood pressure, ECG; Parkinson's uses vocal features like jitter, shimmer, and PPE.
These features enable the models to learn disease-specific patterns for accurate prediction.

Diabetes:

- Glucose, BMI, Age, Insulin, Blood Pressure

Heart Disease:

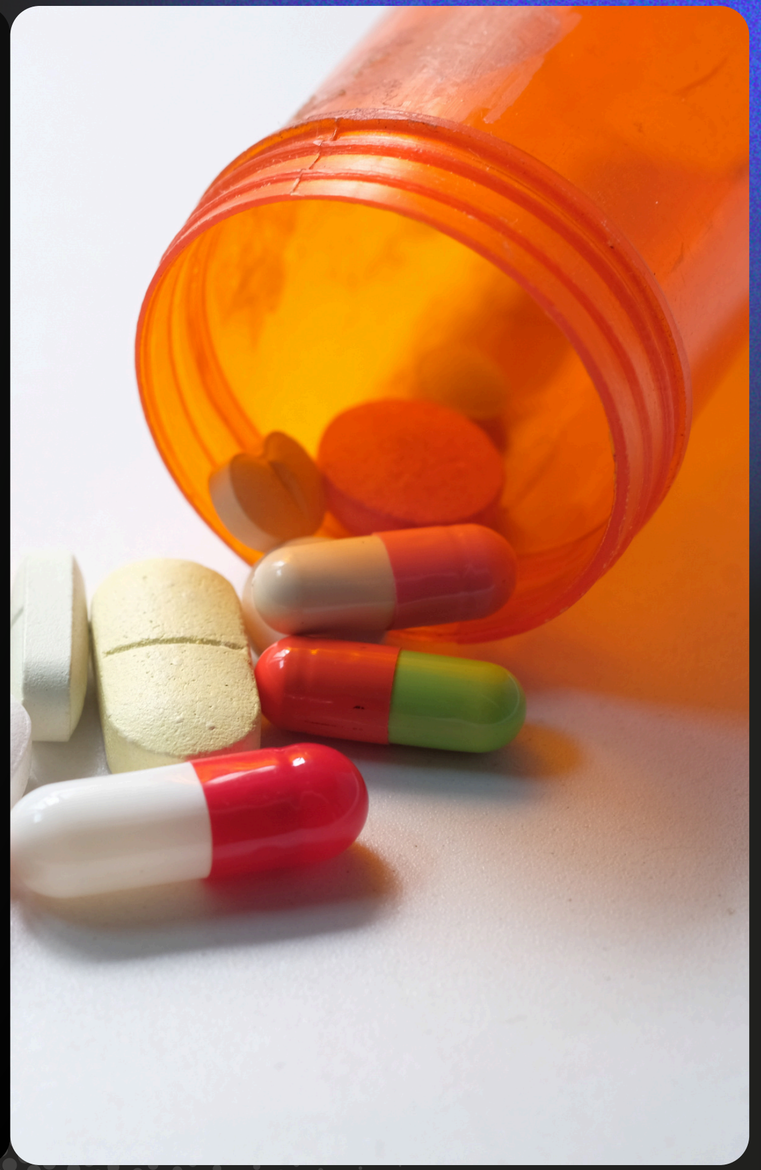
- Cholesterol, Resting BP, Max HR, Oldpeak, Chest Pain type

Parkinson's:

- Voice frequency, Jitter, Shimmer, PPE, Spread1/2

Explainability with SHAP

- Feature-wise contribution to prediction
- Visual plots for transparency
- Improves trust in system



Advancements & Future Scope

01.

Individual User Interface & Tracking

- Personalized dashboards
- Longitudinal health data tracking
- Alerts for abnormal trends

02.

ntegration with iPPG (Imaging Photoplethysmography)

- Contactless health monitoring via camera sensors
- Detect pulse, heart rate variability
- Can be combined with predictive models for continuous monitoring

03.

Cloud + Mobile Integration

- Access predictions via mobile apps
- Cloud storage for multi-user health records

04.

Multi-modal AI

Combine speech, image, and wearable data for Parkinson's and heart monitoring

Conclusion

Accurate ML models for Diabetes, Heart Disease, Parkinson’s

Explainable predictions with SHAP

Potential for personalized, real-time healthcare monitoring

Future integration with iPPG technology and smart devices

Thank You.