# ❤️ Heart Disease Prediction using Machine Learning

This project presents a \*\*Heart Disease Prediction System\*\* that leverages a classification model (Logistic Regression) to predict whether an individual is at risk of heart disease based on medical attributes.

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## 📌 Overview

The model is trained on a real-world dataset containing information like age, sex, blood pressure, cholesterol levels, and more. The system analyzes these inputs and predicts the likelihood of heart disease.

### 🎯 Goal:

To build a machine learning classification model that can:

- Help in early detection of heart disease

- Serve as a foundation for healthcare analytics tools

- Improve predictive accuracy using proper preprocessing and evaluation

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## 📊 Dataset

- Dataset Source: [Kaggle Heart Disease Dataset](https://www.kaggle.com/datasets/fedesoriano/heart-failure-prediction)

- Shape: 1025 rows × 14 features

- Target variable: `target` (1 = presence of heart disease, 0 = no disease)

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## 🔍 Workflow

1. \*\*Data Cleaning\*\*

Checked for null values, datatypes, and basic stats

2. \*\*Exploratory Data Analysis (EDA)\*\*

- Histograms for distribution

- Value counts for target class

3. \*\*Feature Selection & Splitting\*\*

- Features: All except `target`

- Target: `target`

- Split: 80% training, 20% testing

4. \*\*Model Training\*\*

- Algorithm: `Logistic Regression`

- Accuracy (Train): \*\*85%\*\*

- Accuracy (Test): \*\*90%\*\*

5. \*\*Prediction Function\*\*

- User-defined function to input medical data and return prediction (heart disease or not)

6. \*\*Evaluation Metrics\*\*

- Confusion Matrix

- Precision, Recall

- ROC Curve & AUC Score

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## 📈 Results

- ✅ \*\*Train Accuracy:\*\* 85%

- ✅ \*\*Test Accuracy:\*\* 90%

- ✅ \*\*AUC Score:\*\* High (ROC curve shows good separation)

- ✅ Built an interactive prediction function

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## 🧠 Tech Stack

- Python

- Pandas, NumPy

- Scikit-learn

- Matplotlib, Seaborn

- Jupyter Notebook

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## 🚀 How to Use

1. Clone this repo:

```bash

git clone <https://github.com/Mihir-techie/Heart-Disease-Prediction>

```

2. Install dependencies:

```bash

pip install -r requirements.txt

```

3. Run the notebook in Jupyter:

```bash

jupyter notebook

```

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## 📌 Author

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## 🏁 Future Improvements

- Add Streamlit or Flask UI for live prediction

- Use ensemble models for better accuracy

- Connect with a healthcare database

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## 📃 License

This project is open source under the [MIT License](LICENSE).