

HEART DISEASE PREDICTION

USING MACHINE LEARNING

Health Prediction Project

BY SURAJIT GIRI

April 2024

BY SURAJIT GIRI
April 2024

OBJECTIVE

- Predict the risk of heart disease in patients.
- Aid in **early detection** & prevention.
- Utilize **Machine Learning** algorithms to analyse patient data.

A decorative graphic in the bottom right corner featuring a red heart and a red ECG line on a light red background.

-


[illegible]

- | Year | Time | Source | Time | Year | Percent Correct | Dist | Reliability |
|------|------|--------|------|------|-----------------|------|-------------|
| 1 | 3 | 19 | 19 | 0 | 3 | 13 | 13 |
| 1 | 3 | 2 | 13 | 1 | 2 | 13 | 13 |
| 1 | 13 | 17 | 19 | 2 | 13 | 13 | 13 |
| 1 | 10 | 21 | 13 | 3 | 13 | 13 | 13 |
| 1 | 10 | 1 | 3 | 3 | 13 | 13 | 17 |
| 2 | 13 | 13 | 9 | 3 | 5 | 30 | 13 |

Feature	Description
Age	Heart patient's age
Sex	Male or female
Chest Pain Type	Phonetic representation
Cholesterol	Max. front cholesterol
Blood Pressure	Max. diastolic pressure
Max Heart Rate	Max. heart rate
Thal	Exercise test results


ALGORITHMS USED

- Logistic Regression
- Decision Tree
- Random Forest (**Best Performance**)
- Support Vector Machine (SVM)
- K-Nearest Neighbors (KNN)



-

MODEL WORKFLOW




```
graph LR; A[Diagnostic Value] --> B[Modelnet]; B --> C[Train Testset]; C --> D[Model Testing]; D --> E[Meanless Results];
```

The diagram illustrates a five-step model workflow process. It begins with 'Diagnostic Value', followed by 'Modelnet' (which includes a logo), 'Train Testset', 'Model Testing', and finally 'Meanless Results'. The steps are connected by arrows pointing from left to right. Below the 'Train Testset' step, there is a blue arrow pointing down to a graphic of two overlapping red hearts with a white ECG line passing through them.




RESULTS

- Random Forest: Accuracy = 87%
- Effective prediction of heart disease
- Early warning for patients.




**HEART DISEASE
DETECTED**



-
- HEART DISEASE DETECTED**

DEPLOYMENT

- Deployed using **Streamlit** / Flask
- User inputs health data online
- Instant prediction result.
- Instant prediction result.



- amlit / Flask
data online
result.
result.
- 
- A laptop is shown from a slightly elevated angle, displaying a web application. The application has a sidebar on the left with a red header and a main content area with a table. The table has several rows of data. The laptop is silver and has a black keyboard. The background is a light blue gradient.

CHALLENGES & SOLUTIONS

- **Challenges:**
 - Missing Data
 - Imbalanced Data
 - Model Selection



- 

MODEL EVALUATION

- **Accuracy**
- **Precision**
- **Recall**
- **F1-Score**

Good result	Bad result
58	9%
90	30
30	36

- | Durée (min) | Durée (secondes) |
|-------------|------------------|
| 58 | 9% |
| 90 | 30% |
| 10 | 36% |

MODEL TRAINING

