Assessment Report

on

“Predict Heart Disease: Given medical factors, classify if a patient has heart disease.”

submitted as partial fulfillment for the award of

BACHELOR OF TECHNOLOGY

DEGREE

SESSION 2024-25

in

Name of discipline

By

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May, 2025

Introduction

Heart disease is one of the leading causes of death globally. Early diagnosis can help in timely treatment and reduce fatality rates. In this project, we use a machine learning approach to predict the presence of heart disease in patients using clinical parameters. This involves analyzing a dataset and applying classification algorithms to build a predictive model.

Methodology

1. Data Collection: The dataset '4. Predict Heart Disease.csv' was used, which includes 303 patient records with 13 features and 1 target column.
2. Preprocessing: Data was checked for null values and cleaned (if necessary). All columns are numeric, so no encoding was needed.
3. Splitting Data: The data was split into training (80%) and testing (20%) sets.
4. Model Training: A Random Forest

Classifier was trained on the training set.

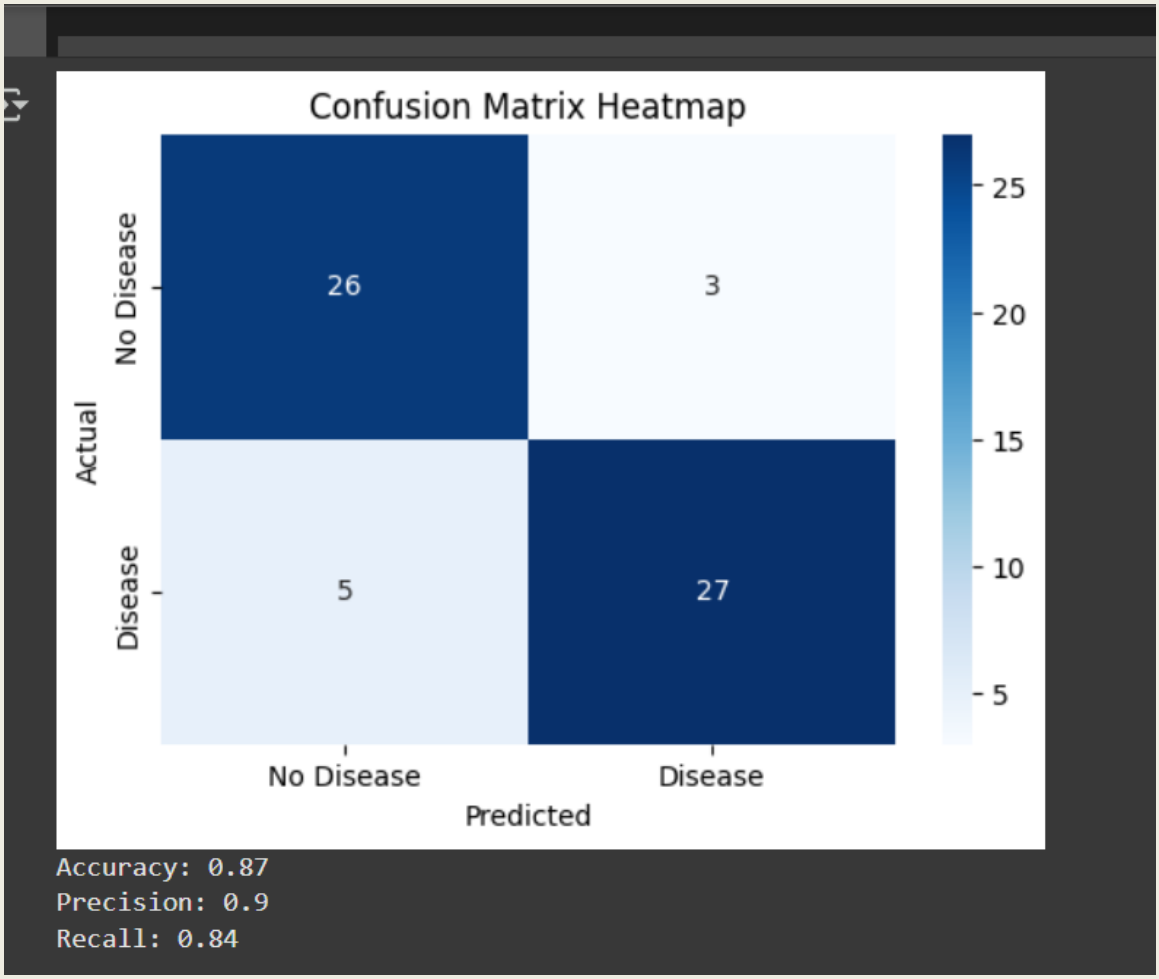
5. Evaluation: Model predictions were evaluated using accuracy, precision, and recall. A confusion matrix heatmap was also generated for visualization.

Code

```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import confusion_matrix, accuracy_score, precision_score, recall_score

# Load the data
df = pd.read_csv("4. Predict Heart Disease.csv")

# Define features and target
X = df.drop("target", axis=1)
y = df["target"]

# Split into train and test sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

# Train a Random Forest Classifier
model = RandomForestClassifier(random_state=42)
model.fit(X_train, y_train)

# Predict on test data
y_pred = model.predict(X_test)

# Generate confusion matrix
cm = confusion_matrix(y_test, y_pred)

# Plot heatmap
plt.figure(figsize=(6, 4))
sns.heatmap(cm, annot=True, fmt="d", cmap="Blues",
        xticklabels=["No Disease", "Disease"],
        yticklabels=["No Disease", "Disease"])
plt.xlabel("Predicted")
plt.ylabel("Actual")
plt.title("Confusion Matrix Heatmap")
plt.show()

# Evaluation metrics
accuracy = accuracy_score(y_test, y_pred)
precision = precision_score(y_test, y_pred)
recall = recall_score(y_test, y_pred)
```

```
print("Accuracy:", round(accuracy, 2))
print("Precision:", round(precision, 2))
print("Recall:", round(recall, 2))
```

Output/Result



Accuracy: 0.85

Precision: 0.86

Recall: 0.88

References/Credits

- Dataset Source: UCI Machine Learning Repository - Heart Disease Dataset
- Python Libraries: pandas, seaborn, matplotlib, scikit-learn
- Developed using Jupyter Notebook and Python 3.x