HEART DISEASE PREDICTION USING MACHINE LEARNING

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Final Year Project Report

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Abstract

Heart disease remains one of the leading causes of death globally. Early and accurate prediction can help save lives. This project leverages machine learning algorithms to predict the likelihood of heart disease based on patient medical attributes. It compares multiple algorithms and integrates them into a Flask web application for user-friendly prediction, visualization, and report generation.

Introduction

The purpose of this project is to develop a machine learning model that predicts heart disease presence using medical data. This integrates backend data science with a user-facing web interface built on Flask.

Objectives

- To implement multiple ML models for disease prediction.
- To evaluate models using performance metrics.
- To design a user-friendly web interface for real-time prediction.
- To provide a downloadable patient report in PDF format.

Dataset Description

Dataset: UCI Heart Disease dataset (cleaned to 302 records, 14 attributes). Features include age, sex, chest pain type, resting blood pressure, cholesterol, etc.

Algorithms Used

- Logistic Regression
- Random Forest
- Support Vector Machine (RBF)
- K-Nearest Neighbors
- Gradient Boosting
- Gaussian Naive Bayes

Model Evaluation

Each model was evaluated using Accuracy, Precision, Recall, F1-score, and ROC-AUC metrics. Results show that Gradient Boosting and Random Forest achieved the highest accuracy.

Results

The system achieved an overall accuracy above 90% with the best-performing models. Users can interact with the Flask web app to test predictions and visualize algorithm performance.

Conclusion

This project demonstrates that machine learning models can effectively predict heart disease. Integrating these models into a web app bridges the gap between data analytics and real-world medical decision support.

Future Scope

- Integration with hospital management systems.

- Cloud deployment for scalability.

- Real-time monitoring and alerts.

- Explainable AI for medical transparency.

References

[1] UCI Machine Learning Repository - Heart Disease Dataset

[2] scikit-learn Documentation

[3] Flask Framework Documentation

[4] Matplotlib and ReportLab Documentation

Project Repository

GitHub Repository Link:

https://github.com/Vishnu3118-MB/Final_Heart_Disease_Prediction