Heart Disease Analysis and Performance Testing

Heart Disease Analysis focuses on evaluating patient medical data to predict the likelihood of heart disease using machine learning techniques. Early detection through predictive modeling can significantly improve treatment outcomes and reduce mortality rates.

Key Health Indicators Used in Analysis

- Age – Risk increases with age.
- Sex – Males show slightly higher risk statistically.
- Chest Pain Type – Certain types strongly indicate heart disease.
- Resting Blood Pressure – High BP increases cardiovascular risk.
- Cholesterol Level – High cholesterol is a major factor.
- Maximum Heart Rate – Lower rates may indicate risk.
- Exercise Induced Angina – Chest pain during exercise is significant.
- ST Depression – Indicates heart stress levels.

Performance Testing and Model Evaluation

Performance testing involves evaluating different machine learning models to determine which provides the most accurate heart disease prediction. Models tested include Logistic Regression, Decision Tree, Random Forest, and K-Nearest Neighbors.

- Accuracy Score – Measures overall correctness.
- Precision – Measures correct positive predictions.
- Recall – Measures ability to detect actual heart disease cases.
- F1-Score – Balance between precision and recall.

Conclusion

The performance analysis shows that the Random Forest model achieved the highest accuracy among all tested algorithms. The study demonstrates that machine learning techniques can effectively support healthcare professionals in early diagnosis and preventive care strategies.