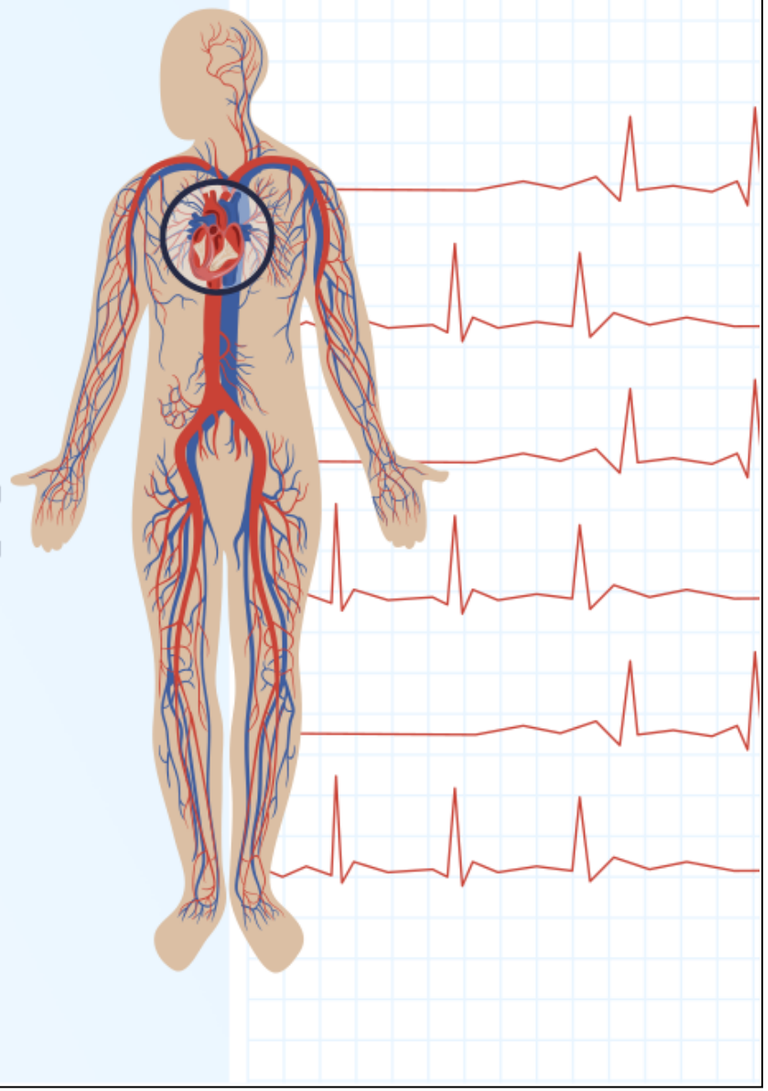
Assignment-1

by MANOJ PAUDEL .

Submission date: 29-Jan-2024 12:33AM (UTC+0800)
Submission ID: 2280154346
File name: 220172_MANOJ_PAUDEL_._Assignment-1_491589_1310862720.pdf (891.86K)
Word count: 658
Character count: 3880

Case Study:

Predictive Modelling for Heart Disease



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Introduction:

- Heart disease is major problem worldwide. According to WHO report, around **20.5 million** people were dead in 2021 from cardiovascular disease which is ⅓ of all global death.
- Heart disease often considered **silent killers**, by the time its symptoms manifest, person is already in advance stage of this disease.
- Predicting disease early is super important, where data mining comes, help to predict the likelihood of getting heart disease beforehand.

Importance of Predictive Modeling:

Early Detection

- Prevent progression of the disease which result to minimize damage to heart.
- Early treatment can reduce risk such as heart attacks, strokes, sudden heart failure.
- Reduce healthcare cost

Resource Efficiency:

- More focus on high-risk individuals.
- Reduce efficiency and cost

Dataset Overview:

- Dataset contain 1025 rows and 14 column
- **Key Features:**

Age	Age of the patient [29-70]
Sex	Male [M] | Female [F]
Cp	Chest Pain type
Trestbps	Resting blood pressure in mmHg.
chol	Cholesterol level
restecg	Resting electrocardiographic result
fbs	Fasting blood sugar [1: > 120 mg/dl, 0: otherwise]
thalach	Attained maximum heart rate
exang	Exercise Angina
Oldpeak	ST depression compare to rest
Slope	ST curve of the peak activity
ca	Fluoroscopy coloration of major vessel (0-3)
thal	Normal, fixed, reversible defect.
target	1: heart disease, 0: Normal

Literature Review:

Title and Author	Findings	Accuracy
Heart Disease Prediction Using Machine Learning Chaimaa Boukhatem, H. Youssef	This paper demonstrated four classification SVM, Naive Bayes, Multilayer Perceptron, Random Forest to build prediction model.	Best performed model is SVM with 91.67%.
An Analysis of Heart Disease Prediction using Machine Learning	The study compares six machine learning algorithms, including KNN, Decision Tree, Random Forest, Support Vector Machines, Logistic Regression, and Neural Network.	Best performed model is Random Forest with 80.16%

Title and Author	Findings	Accuracy
Heart Disease Prediction based on Machine learning Technique Abdul Hafiz, Narinder Kaur	Used machine learning models, Logistic Regression, Decision Tree, Random Forest, and XGBoost Classifier models.	Best performed model is Random Forest and XGBoost with 92.20% and 95.61%.
Prediction of heart disease using machine learning algorithms. 2019 Santhana Krishnan J. and Geetha S.	Used two supervised classifier Naive Bayes and Decision Tree classifier.	Decision Tree model with 91 % and Naive Bayes with 87 %.

Model Selection:

Random Forest

- I proposed a Random Forest as the prediction model, as it provide one of the highest accuracies in multiple studies, with accuracy up to 92%.
- As, random forest construct multiple decision trees during training and take the prediction from each trees and based on the majority votes of prediction it predict the output.

Conclusion:

- Heart disease is a life-threatening disease, hence early prediction of heart disease is crucial for improving patient outcome and reducing cost on healthcare.

- We review several techniques like SVM, Naive Bayes, Decision Tree among them we choose Random Forest to build predictive machine learning model.
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References

Abdar, M., Kalhori, S.R., Sutikno, T., Subroto, I., & Arji, G. (2015). Comparing Performance of Data Mining Algorithms in Prediction Heart Diseases. International Journal of Electrical and Computer Engineering, 5, 1569-1576.

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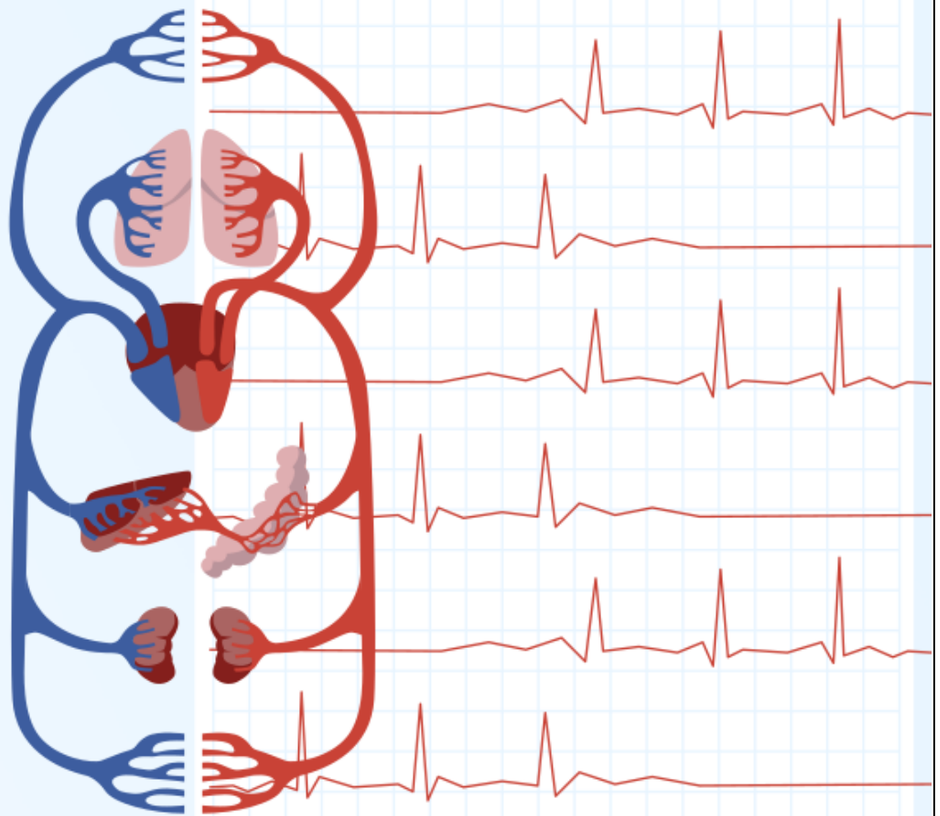
Thank You

Do you have any questions?



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