Heart Disease Detection

A Performance comparison using different Neural Network Algorithms.

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*Abstract* — This project utilizes various Neural Network algorithms to predict the occurrence of Coronary Heart Disease (CHD) in a patient with relatively high accuracy. The data for training the networks is taken from the UCI database. This project also aims at comparing the performance of the various algorithms used, namely, K-Nearest Neighbor (KNN), Backpropagation, Radial Basis Network (RBN) and Decision Trees. Pre-processing is done using Principal Component Analysis (PCA) which enables feature reduction. The work done has led to conclusion that RBN provides the maximum accuracy for the UCI database.

*Index Terms* — Neural Network, K-Nearest Neighbor, Backpropagation, Radial Basis Network, Decision Tree, Coronary Heart Disease.

# Introduction

The process of Heart Disease detection through conventional ECG data have been the thing from the past. This was usually done through the use of diagnosis skill of the medical representative. Now with the highly efficient and fast computing platform a complex disease like Coronary Heart Disease can be detected early and easily by the use of various Machine Learning Algorithms.

Thus the use of Machine Learning algorithms is becoming more and more prevalent in various prediction and detection jobs. The database used for this module is the UCI Heart Disease Model with data samples from four major health institutions. The use of preprocessing is very much required as it helps in reduction of features though the use of Principal Component Analysis with the use SVD. The orthogonal projection on the principal axis gives the components. Now the various MI algorithms used are Backpropagation, Radial Basis Function, decision tree, k-nearest neighbor. The accuracy of the predicted data is pretty higher and useable in practical applications.

# Pre-Processing

The technique used is Principal Component Analysis. This is used for projecting a noisy data on the most paramount basis to eliminate the noise and reveal abstract data structure. PCA makes an orthogonal transformation to convert correlated features to linearly uncorrelated variables. This helps in feature reduction and is very important step before feeding the extracted feature dataset to various machine learning algorithms.

# Algorithms

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## K-Nearest Neighbour

Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE and SI do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

## Backpropagation

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## Some Common Mistakes

* The word “data” is plural, not singular.
* The subscript for the permeability of vacuum **0, and other common scientific constants, is zero with subscript formatting, not a lowercase letter “o”.
* In American English, commas, semi-/colons, periods, question and exclamation marks are located within quotation marks only when a complete thought or name is cited, such as a title or full quotation. When quotation marks are used, instead of a bold or italic typeface, to highlight a word or phrase, punctuation should appear outside of the quotation marks. A parenthetical phrase or statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.)
* A graph within a graph is an “inset”, not an “insert”. The word alternatively is preferred to the word “alternately” (unless you really mean something that alternates).
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* There is no period after the “et” in the Latin abbreviation “et al.”.
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An excellent style manual for science writers is given by Young [7].

# Results

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Component heads identify the different components of your paper and are not topically subordinate to each other. Examples include Acknowledgments and References and, for these, the correct style to use is *“Heading 5”*. Use *“figure caption”* for your Figure captions, and *“table head”* for your table title. Run-in heads, such as “Abstract”, will require you to apply a style (in this case, italic) in addition to the style provided by the drop down menu to differentiate the head from the text.

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1. Table Type Styles

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# Conclusion

The project goal is achieved with relatively high accuracy rate. The proposed machine learning techniques worked almost equally well and gave expected results. A faster algorithm can be developed with the existing framework to increase the efficiency. A faster detection and early prediction of Coronary Heart Disease will be pivotal for the present generation where the onset of various wearables with high computing power and connectivity is becoming more and more prevalent. Thus development of a CHD detection app is a great solution.

# Acknowledgment

The preferred spelling of the word “acknowledgment” in America is without an “e” after the “g”. Avoid the stilted expression, “One of us (R. B. G.) thanks . . .” Instead, try   
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# References

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For papers published in translation journals, please give the English citation first, followed by the original foreign-language citation [6].

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