

A Comparative Study on Machine Learning and Artificial Neural Networking Algorithms

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Abstract—The diagnosis of heart disease by classical medical approach takes huge amount of time. Besides blood tests and X-ray this approach includes multiple tests like MRI, Echocardiogram and whose results are prone to misdiagnosis. Our proposed model can predict whether a patient with given health parameters and certain test results is affected by a heart disease. The proposed model uses AI approach with several ML algorithms like KNN, SVM, Decision Tree, Random forest classifiers and also with deep neural networks. This prediction is done based on the historical data collected from different medical Institutes in Central Europe.

keywords:(KNN Classifier, Decision Tree, Support Vector Machine, Random Forest, Artificial Neural Network)

I. INTRODUCTION

Diabetes, Blood Pressure, Cholesterol level and Pulse rate are the several risk factors used for the identification of heart disease and it causes the premature death. Heart Failure is the major cause of heart disease. Sweating, high level of fatigue, fast heart beat, breathing and chest pain are the symptoms of heart disease and these symptoms matches for a person older than 13 years. The algorithms are classified as K Nearest Neighbour (KNN), Decision tress, Random forest, Support Vector Machine (SVM) and Back propagation. In this method, 13 parameters. The dataset consists of age, sex and medical reports such as blood glucose level, type of the pain in chest area, heart rate analysis etc., These parameters figures out the predict the nature of the heart disease with maximum accuracy.

II. BLOCK DIAGRAM

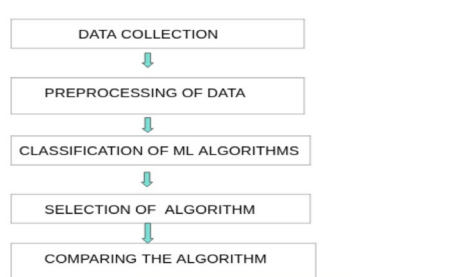


Fig 1 block diagram for the proposed model

III LITERATURE SURVEY

Sanjay Singh and Poornima Singh suggested the prediction methodology of various Heart disease by use of techniques of the

data mining methodologies in 2018. Multilayer Perceptron Neural Network Algorithm and the Back-Propagation algorithm were used for prediction.

Sellappan Palaniappan had proposed the Intelligence heart disease finding out methods using data mining algorithm in 2008. He used the CRISP-DM method to build the model and DMX-an SQL language for an building and accessing the models.

Chala Bayen has used J48, Naive bayes and Support Vector Machine algorithm for Prediction and analysis is the occurrence of heart disease using data mining. It gives the short time results and also it helps in QoS.

P.Sai Chakravarthy Reddy has used the Artificial Neural Networks for the predicting the various heart diseases using the ANN techniques and he had proved his accuracy in the JAVA.

Shreya Kalta and Keshava Kishore had proposed the model for an heart disease data set analysis using the data mining classification techniques and they worked in Back propagation and the perceptron models.

Rumelhart DE, Hinton GE and Williams RJ used Back Propagation network and the Perceptron Convergence procedure for the Learning representations by Back propagating errors in 2010. They had used with 12 datas for an prediction.

R,Sharmila proposed the model for a Conceptual method to enhance the prediction of disease of heart organ using the data mining techniques. She worked in SVM parallel fashion. It gives better accuracy than the sequential SVM.

Saran Monica.L had suggested the J48, Naive bayes and the simple CART for an Analysis of a CardioVascular Disease prediction using data mining. This uses less number of attributes for prediction.

Marimuthu Muthuvel had a review on the Heart Disease prediction using the Machine Learning and the data analytics approach. They used ML algorithms to determine the type of heart diseases.

IV. METHOD AND ALGORITHMS

The ML algorithms used for the prediction are as follows

- A. KNN Classifier
- B. Support vector Machine
- C. Decision Tree Classifier
- D. Random forest classifier
- E. Back Propagation Network

Table : 1 : Data Set

age	sex	cp	trestbps	chol	fbs	restecg
63	1	1	145	233	1	2
67	1	4	160	286	0	2
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thalach	exang	oldpeak	slope	ca	thal	num
150	0	2.3	3	0	6	0
108	1	1.5	2	6	3	2
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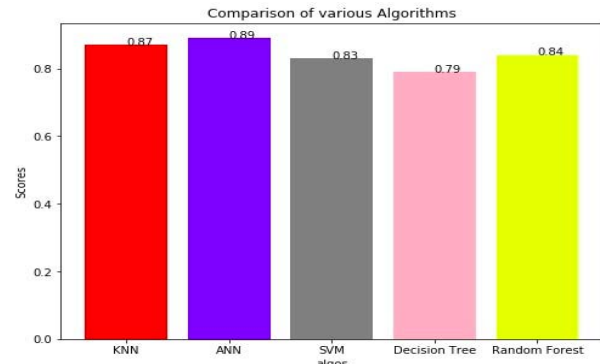


Fig 2 Comparison of algorithms

V. CONCLUSION

This paper is proposed for Heart disease prediction using the several Machine Learning algorithms and the neural networks. This model supports the suitable treatment developed using the certain characteristics. All the models are trained and tested with the proper data processing and data analysing. The final comparisons prove to be more efficient for Back Propagation Algorithm of Artificial Neural Networks, with 89% accuracy and speed.

VI. REFERENCES

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A.KNN Classifier

It is the supervised learning model used for classification and regression analysis.This method points the class K-neighbours and the dataset points the greater classes and number of neighbours varied from 1 to 20 and test score is calculated for all the case.

B.Support Vector Machine

SVM is the also a most powerful model for classification as well as regression. The hyperplane is drawn between the classes for classification problems. This will be updated iteratively minimising the loss.Hyperplane is subspace with one dimension lesser than the original space.

C.Decision Tree Classifier

Basically, It is the recurring subtrees of different choices. It works well for a classification problems with two class. An appropriate value is chosen as a threshold between two choices. This value is called Gini index. Mathematically, It is chosen between 0 and 0.5 in accordance with correlation factor between the parameters chosen for branching.

D.Random Forest Classifier

This is ensemble learning used for classification and regression.This is habit for overfitting to the training set and providing the output of the class which is the mode of mean prediction.

E.Back Propagation Network

This network uses the 13 attributes of the data.The output is indicated in terms of an binary values.If the person with no heart disease is indicated by 0 and the person with heart disease is indicated by 1.