HEART DISEASE PREDICTION USING MACHINE LEARNING TECHNIQUES

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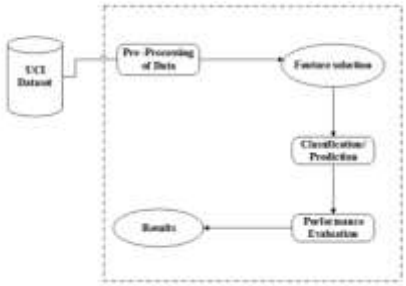
Abstract:

Heart disease is very dangerous to human life if it is not identified in the early stages. Several health factors impact heart diseases in various persons. Data mining (DM) is most widely used by many researchers to detect heart diseases in the early stages. Various risk factors show the impact on heart diseases such as diabetes, abnormal blood pressure, cholesterol with high levels, etc. To predict heart diseases in the early stages, ML algorithms are used based on the health condition and other types of habits of the person. In this paper, a novel machine learning approach is developed to predict heart disease in the early stages. Performance is analyzed by showing the parameters such as sensitivity, specificity, and accuracy.

INTRODUCTION

Heart disease is one of the most dangerous diseases in the present world. It is a very challenging task to predict heart disease in the early stages. Based on the severity of the heart disease the classification is done with several ML algorithms such as K-Nearest Neighbor Algorithm (KNN), Decision Trees (DT), Genetic algorithm (GA), and Naive Bayes (NB) [11], [13]. Generally, heart disease is one of the complex and this should be handled very carefully. Early detection of heart disease may prevent premature death. The integration of medical sciences and mining of data is utilized to find several sorts such as metabolic syndromes. Data mining and ML approaches play a major role in detecting heart diseases very efficiently.



PROBLEM STATEMENT

In this paper, various existing approaches are discussed to several health conditions. ANN is one of the approaches which improve accuracy in the medical field [6]. In this back propagation multilayer perception (MLP) with ANN is

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utilized to detect heart disease. According to the author, several existing approaches are compared with a same domain that shows the improved results.

MODULE DESCRIPTION

Dataset Setup: In this module, the dataset is arranged according to the requirement.

Pre-process: In this module, large datasets are used to process the data. This process mainly removes the noise from the dataset and also analyzes the missing values. The dataset consists of training and testing set that uses the classifiers to train the model. This will improve the accuracy of the heart disease prediction.

SVM is the ML approach used to design the model for training and simultaneously used for testing the data. Especially SVM is most widely used to get accurate results with improved accuracy.

1) Naive Bayes(NB) This will design the training model that compute the testing data that will test the data.

2) Logistic Retrogression (LR): This model is trained for accurate prediction of heart disease by using the LR measures.

3) ANN: This is one of the DL approach used to increase the accuracy of predicting the heart disease from the real-time dataset.

4) HRFLM Proposes a mongrel Algorithm that's a blend of Linear model and Random Forest computation. A crossover model will be created by exercising the two computations and subsequently, the Voting classifier will be employed to pick the stylish performing computation.

5) Improved ML Process: In this process, the advanced ML approach is most widely used to predict the heart disease accurately. Extreme Learning Machine (ELM) is one of the approaches that is used to classify the data based on method approximation. This approach is mainly followed the single FFNN and this contains the one layer of hidden nodes, in this approach the weights are assigned randomly to the hidden nodes that are remained at the time of training and testing phases. These weights are connected with hidden nodes and these are trained very fastly. Experiments shows that the proposed approach shows the huge accuracy compare with existing algorithms.

6) Graph: In this module, the comparative results are shown with the graph representation.

PROPOSED SYSTEM

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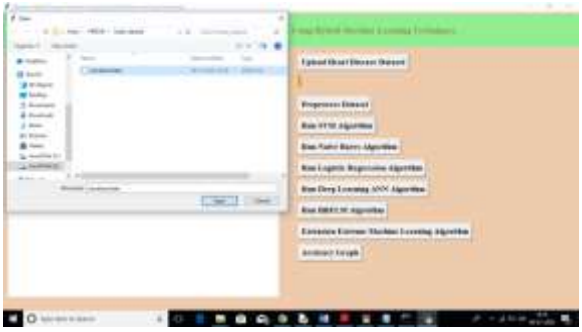
In this paper, the proposed approach performed the classification and prediction by using the patient health conditions. The comparison between various algorithms such as SVM, NB, and LR is used to predict heart disease. The existing algorithms are not efficient based on the accuracy of prediction. To increase the better results and accuracy, the combination of two algorithms is required and this is called a hybrid approach. The proposed approach is a combination of RF and LR which improved the detection of heart disease. This algorithm uses the Voting classifier for the prediction of accurate classification of heart diseases.

SAMPLE RESULTS



CONCLUSION & FUTURE WORK

In this paper, a novel approach called as hybrid HRFLM approach. This approach is a combination of the Random Forest (RF) and Linear Method (LM). The proposed approach improves the detection of heart disease very efficiently. RF is one of the ML approaches that detect heart disease based on the health conditions of the patients. With the integration of the Linear Method (LM) with RF, better predictions are done with the feature selection. The proposed approach improved the high accuracy of detecting heart diseases. In the future, a DL-based approach is introduced to detect heart diseases in the early stages.

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REFERENCES:

[1] A. S. Abdullah and R. R. Rajalaxmi, ‘‘A data mining model for predicting the coronary heart disease using random forest classifier,’’ in Proc. Int. Conf.Recent Trends Comput.Methods, Commun. Controls, Apr. 2012, pp. 22–25.

[2] A. H. Alkeshuosh, M. Z. Moghadam, I. Al Mansoori, and M. Abdar, ‘‘Using PSO algorithm for producing best rules in diagnosis of heart disease,’’ in Proc. Int. Conf. Comput. Appl. (ICCA), Sep. 2017, pp. 306– 311.

[3] N. Al-milli, ‘‘Backpropogation neural network for prediction of heart disease,’’ J. Theor. Appl.Inf. Technol., vol. 56, no. 1, pp. 131–135, 2013.

[4] C. A. Devi, S. P. Rajamhoana, K. Umamaheswari, R. Kiruba, K. Karunya, and R. Deepika, ‘‘Analysis of neural networks based heart disease prediction system,’’ in Proc. 11th Int. Conf. Hum. Syst. Interact. (HSI), Gdansk, Poland, Jul. 2018, pp. 233–239.

[5] P. K. Anooj, ‘‘Clinical decision support system: Risk level prediction of heart disease using weighted fuzzy rules,’’ J. King Saud Univ.-Comput. Inf. Sci., vol. 24, no. 1, pp. 27–40, Jan. 2012. doi: 10.1016/j.jksuci.2011.09.002.

[6] L. Baccour, ‘‘Amended fused TOPSIS-VIKOR for classification (ATOVIC) applied to some UCI data sets,’’ Expert Syst. Appl., vol. 99, pp. 115–125, Jun. 2018. doi: 10.1016/j.eswa.2018.01.025.

[7] M. Durairaj and V. Revathi, ‘‘Prediction of heart disease using back propagation MLP algorithm,’’ Int. J. Sci. Technol. Res., vol. 4, no. 8, pp. 235–239, 2015.

[8] B. S. S. Rathnayakc and G. U. Ganegoda, ‘‘Heart diseases prediction with data mining and neural network techniques,’’ in Proc. 3rd Int. Conf. Converg. Technol. (I2CT), Apr. 2018

[9] C.-A. Cheng and H.-W. Chiu, ‘‘An artificial neural network model for the evaluation of carotid artery stenting prognosis using a national-widedatabase,’’ in Proc. 39th Annu. Int. Conf. IEEE Eng. Med. Biol. Soc. (EMBC), Jul. 2017, pp. 2566–2569.

[10] H. A. Esfahani and M. Ghazanfari, ‘‘Cardiovascular disease detection using a new ensemble classifier,’’ in Proc. IEEE 4th Int. Conf. Knowl.- Based Eng. Innov. (KBEI), Dec. 2017, pp. 1011–1014.

[11] F. Dammak, L. Baccour, and A. M. Alimi, ‘‘The impact of criterion weights techniques in TOPSIS method of multi-criteria decision making in crisp and intuitionistic fuzzy domains,’’ in Proc. IEEE Int. Conf. Fuzzy Syst. (FUZZ-IEEE), vol. 9, Aug. 2015, pp. 1–8.

[12] R. Das, I. Turkoglu, and A. Sengur, ‘‘Effective diagnosis of heart disease through

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neural networks ensembles,'' Expert Syst. Appl., vol. 36, no. 4, pp. 7675–7680, May 2009.

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