

# Cardio vascular disease classification optimization using neural networks

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**ABSTRACT: The inspection of disease is a dynamic work in medicine field. The medical business gathers enormous volume of healthcare information as well as at that time they are extracted to determine hidden data intended for active decision making.**

## I. INTRODUCTION

Cardiovascular sickness is a type of severe health endangering in addition to recurrent happening disease. Cardiovascular diseases allude to any kind of disease which probably disturbs the cardiovascular structure. Medical analysis is well thought-out as a quiet noteworthy task which probably requires to be approved out specifically as well as proficiently. The computerization of the equivalent would probably be very much advantageous. The WHO (world health organization) has expected that approximately 12 million demises take place all over the world, per annum which attributable to the possible cardiovascular disease [1].

Developments in medicine during the earlier few eras which usually facilitated the identification of risk factors which may perhaps under write in the direction of the cardiovascular diseases. This is entitled as coronary artery disease besides it ensues slowly. The aforementioned is most important reason that human being have attacks in heart. For the duration of about 30 out of a hundred of the heart attacks, many people usually shows no indications. The medical analysis is an utmost significant then again very problematical job which ought to be accomplished precisely as well as resourcefully and also its computerization would be quiet helpful. Every doctor is unluckily not just as skilled in each sub area as well as in various places of short supply. A structure for medical analysis would probably improve medical care as well as to diminish prices. Through so many aspects to investigate intended for an analysis of heart attacks, medical doctor normally create an analysis by means of appraising a patient's existing test outcomes.

Aforementioned diagnoses prepared on for some other patients by way of the similar findings are studied through physicians [2]. These difficult measures are not very easy. For that reason, a doctor need to be proficient in addition to extremely skilled to make a diagnosis of several kind of heart attacks occur in a patient's life. As a consequence the determination to make use of information and also the experience of various experts as well as clinical screening statistics of people composed in particular data to aid the medical procedure is deliberated as a valued structure which is the amalgamation of clinical decision support system using computer related patient accounts which probably lessen the medical errors, augment patient safety, lessen in gun desirable practice dissimilarity, and also progress patient outcome

## II. RELATED WORK

The principal signs of the heart disease consists of heart palpitation, syncope, dyspnea, chest pain or discomfort, in

addition to Fatigue, Lethargy or else Daytime Sleepiness [10]. occasionally syncope designates a risky or even severe condition, so as soon as syncope occurs it is important to figure out the cause [11].

## III. FRAMEWORK

The main purpose of this research work is to classify the dataset of this disease using Fuzzy logic, and the Neural Network. It is done on the basis of the image and the features extracted of the image to be tested. The subsequent steps demonstrate the variety of phases that need to be accomplished:

Step-1: Upload given dataset for 30 samples.

Step-2: Feature extraction using GA.

Step-3: Optimize Fitness Function based on fuzzy logic and get russification of dataset.

Step-4: Implement neural network for classification purpose. It has basically two steps:

- Training phase and
- Testing Phase

Step-5: Diseases Classification

Step-6: Calculate performance metrics like Accuracy and error rate.

## IV. IMPLEMENTATION

In this section of our research we followed few steps mentioned below:

### A. Dataset acquisition

Data set acquisition is the first step of our proposed technique. Dataset in the form of. mat file has been taken.

### B. Feature extraction

Feature reduction has been done using GA on separated signal dataset then feature count and feature values are plotted. After that Fitness function will be optimized as below:

$$F_s = \text{seperated\_signa}(1, ii);$$

$$F_t = \text{mean}(\text{seperated\_signal});$$

$$\text{FitnessFunction} = @(e)\text{fitness\_fn}(e, F_s, F_t);$$

$$\text{numberOfVariables} = 1;$$

$$[xfval] = \text{ga}(\text{FitnessFunction}, \text{numberOfVariables}, \text{options});$$

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reduced_index = round(x);
ifreduced_index == 1
GareducedFeatures(j, p) = Fs;
p = p + 1;
    
```

**C. Classification**

Then classification of trained data will be done using Neural network which is a network of “neuron like” units. This evaluating method is utilized in areas of optimization, classification, and for solving problems related to regression.

**D. Training Using Neural Networks**

The training process includes the conjugating the neural network then train them about data features. Training procedure benefits in creation of information base. Later it is used in matching and decision level.

**E. Testing using Neural Networks**

The testing phase include the retrieving the trained dataset. The trained network system is displayed by means of trained features. The network, acting as selectively recovers top-matched, a classifier, related, alike data values as per that of dataset from the database and are presented to user.

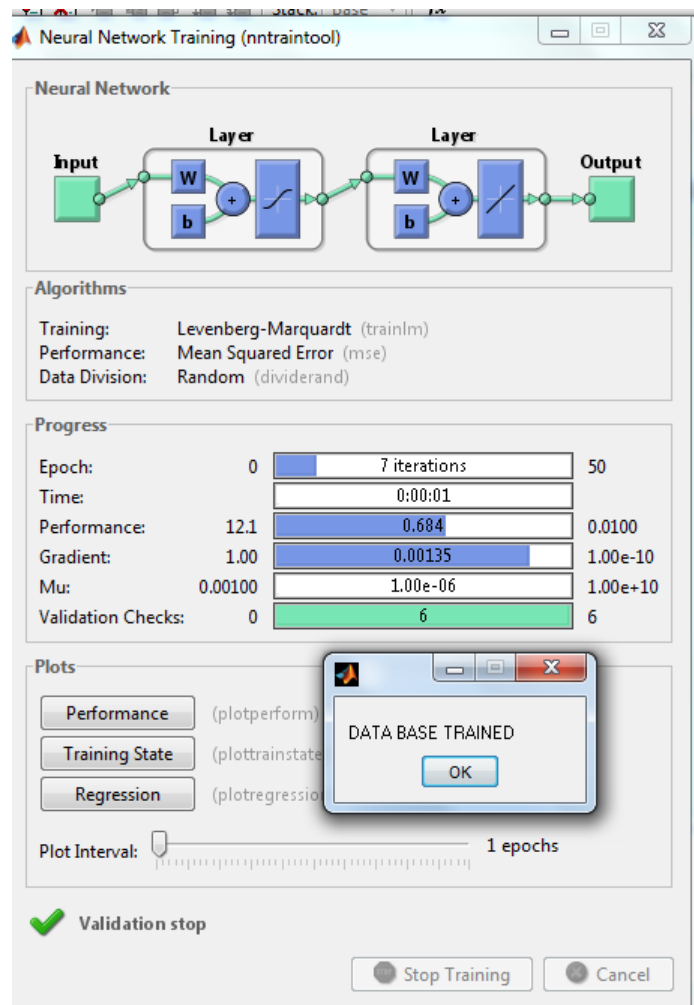
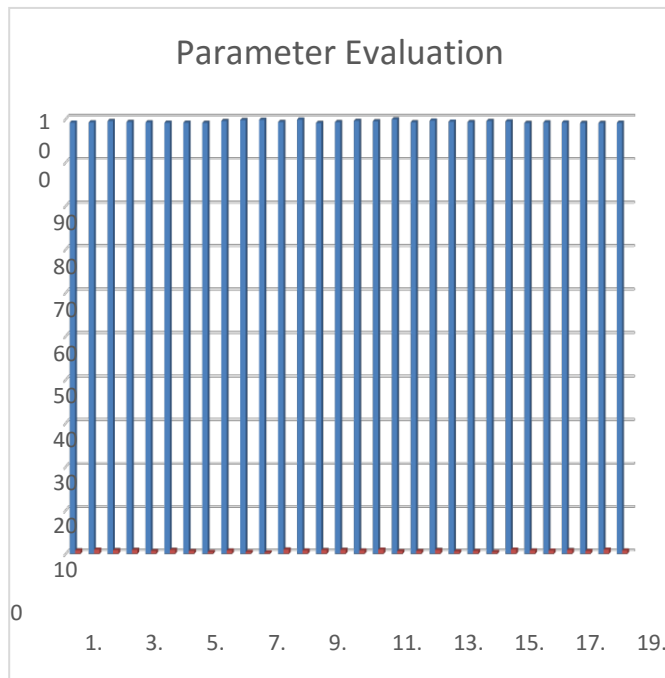


Figure 5.1: Training using Neural Network

**v. EXPERIMENTAL EVALUATION**

The acronym for MATLAB is Matrix Laboratory. MATLAB was used to give easy access to matrix software. It combines different aspects like visualization, programming and computational environment. It has data structures, built-in editing and debugging tools, and it also supports C++. MATLAB is very useful as compared to other programming languages in solving technical problems.



**Figure 5.2** Parameter Evaluation

## VI. CONCLUSION

This thesis presented the ECG Disease Detection System based on Fuzzy logic, Neural Network, where detection is calculated on two parameters accuracy and error rate. When classification has been done the simulation results shows the values of error rate and accuracy for the tested image .The error rate is 98.7 % and accuracy = 99.97%. SVMs has an advantage which is compared to Neural Networks, having multiple solutions linked with local minima .

## REFERENCES

- [1].Rajkumar A, Reena GS. Diagnosis of heart disease using datamining algorithm. Global Journal of Computer Science and Technology 2010;10:38-43.
- [2].Anbarasi M, Anupriya E, Iyengar NCHSN. Enhanced prediction of heart Disease with feature subset selection using genetic algorithm. International Journal of Engineering Science and Technology 2010;2:5370-76.
- [3].Palaniappan S, Awang R. Intelligent heart disease prediction system using data mining techniques. International Journal of Computer Science and Network Security 2008;8:343-50.
- [4].Baxt WG. Application of artificial neural networks to clinical medicine. Lancet 1995;346:1135-38.
- [5].P.K. Anooj, "Clinical Decision Support System: Risk Level Prediction of Heart Disease Using Decision Tree Fuzzy Rule, IJRRCS, Vol. 3, No. 3, pp. 1659-1667, June 2012
- [6].Diagnosis, Prediction and Treatment of Heart Disease" International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 2, Issue 1, January 2013
- [7].Yan, H.-M., Jiang, Y.-T., Zheng, J., Peng, C.-L., & Li, Q.-H. A multilayer perceptron-based medical decision support system for heart disease diagnosis. (2006).
- [8].G. Narasimha Rao, et al. "An Automated Advanced Clustering Algorithm For Text Classification", In International Journal of Computer Science and Technology, Vol.3, June, 2012.
- [9].Awang, R. & Palaniappan, S., "Intelligent heart disease prediction system using data mining technique". IJCSNS International Journal of Computer Science and Network Security. Vol. 8, No. 8, 2008.
- [10]. Shamsheer Bahadur Patel 1, Pramod Kumar Yadav2, Dr. D. P.Shukla, "Predict the Diagnosis of Heart Disease Patients Using Classification Mining Techniques" IOSR Journal of

Agriculture and Veterinary Science, Volume 4, Issue 2 (Jul. - Aug. 2013),

[11].Boleslaw Szymanski, et al. (2006): Using Efficient Supanova Kernel For Heart Disease Diagnosis, proc. ANNIE 06, intelligent engineering systems through artificial neural networks, vol. 16, pp. 305-310.

[12].Sellappan Palaniappan and Rafiah Awang (2008): Intelligent Heart Disease Prediction System Using Data Mining Techniques, 978-1-4244- 968- 5/08/ IEEE.

[13].Anchana Khemphila and Veera Boonjing (2011), "Heart Disease Classification Using Neural Network And Feature Selection", in Proc. 21st International Conference on Systems Engineering,IEEE,vol.3 pp. 406-409.

[14].Minas A. Karaolis, Joseph A. Moutiris, Demetra Hadjipanayi,and Constantinos S. Pattichis(2010),"Assessment of the Risk Factors of Coronary Heart Events Based on Data Mining With Decision Trees", IEEE Transactions On Information Technology In Biomedicine, Vol. 14, No. 3.pp.559-566.