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A BPN BASED HEART ATTACK PREDICTION SYSTEM USING ULK(Unified Learning Kit)

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Abstract — The diagnosis [3] of heart attack in most cases depends on a complex combination of clinical and pathological data of patient. Because of this complexity, there exists a significant amount of interest among clinical professionals and Researchers regarding the efficient and accurate prediction of heart attack. In this Paper Back Propagation Network is adopted for prediction of heart attack that can assist the patients and their fellowships in predicting heart attack status of the patient based on their daily ECG records , Blood pressure values , Blood sugar values , Cholesterol values and general parameter such as age , sex of the patient and the system is implemented in C Platform and trained using UTLP (Unified Technology Learning Platform) also known as ULK (Unified Learning Kit) in which the prediction is classified into Mild attack , Minor attack and Severe attack otherwise exists the Normal State.

Keywords—Unified Learning Kit (ULK), Electro Cardio Gram (ECG), Global System for Mobile (GSM), Heart attack prediction, Back Propagation Network (BPN), Genetic Algorithm (GA)

I. INTRODUCTION

The Survey says that 12 million deaths occur worldwide every year due to the Heart diseases. Heart Attack remains the biggest cause of deaths for the last two decades .There are number of factors which increases risk of Heart disease some of the important factors are Blood pressure , Blood Sugar , Cholesterol and also due to the Family history of heart disease , Obesity , Lack of physical exercise and also due to poor clinical decisions . Because not only human intelligence is enough for proper diagnosis and number of difficulties will arrive during diagnosis of heart disease such as result will be less accurate, and it take more time for prediction . Hence to overcome this problem , now a day's many computer related technology and machine learning technology are used to develop software to assist the doctors in making decision of heart attack in the early stage and it is very useful for the health care industries. The diagnosis of heart attack depends on clinical and pathological data called as data sets (i.e.) the set of data or information which contains the patient reports. In this paper , Experiments have been performed using UTLP (Unified Technology Learning Platform) or ULK (Unified Learning Kit).The remaining of the paper is structured as Section II describes the existing system of Heart attack prediction system. Section III illustrates the proposed system of BPN Based Heart attack prediction system. Section IV illustrates the experimental analysis of existing and proposed system and finally conclusion is demonstrated in section V.

II. EXISTING SYSTEM

Most of the business and research problems are solved using genetic algorithm. It was developed by John Holland in 1960's and 1970's.Genetic algorithm provides a framework for studying the effects of such biologically inspired factors such as selection, crossover, mutation are also genetic information. In the world of genetic algorithm, by comparing various potential solutions, the fittest potential solutions evolve to produce ever more optimal solutions. Genetic algorithm works on discrete data (enum, integer range, etc…) Genetic algorithm [2] has borrowed heavily from

genomic terminology. For example, the same set of chromosomes is present in each cell of our body; each chromosome is partitioned into genes, strings of DNA that functions as a blueprint for making one of us. [1] In the field of genetic algorithm, a chromosome is referred by one of the candidate solutions to the problem; a gene is a single bit or digit of that candidate solution. Three operators are used in genetic algorithms:

1. Selection- The selection operators performs a selection of chromosomes that will fit for reproducing. This is done by the fitness function f (x).
2. Crossover-The crossover operator performs recombination. For example in binary representation, two strings 11111100 and 00000011 could be crossed over at sixth locus in each to generate two new strings 11111011 and 00000100.
3. .Mutation-The mutation operator randomly changes the bits or digits at a particular locus in a chromosome.

FITNESS FUNCTION:

Represented as f (x) is a real-valued function that operates on the chromosome (potential solution). At the time of Fitness Evaluation, the chromosome takes a numeric value, x in f (x).

USING GENETIC ALGORITHMS TO TRAIN A NEURAL NETWORK:

A Neural network consists of a layered, feed forward, completely connected network with collection of nodes also called as neurons. The Neural network is composed of two or more layers; most of the neural networks consist of three layers: An input layer followed by a hidden layer, and finally an output layer. The neural network is connected completely, that is every node in a given layer is connected to every node in next layer although not to other nodes in the same layer. The output value from the output node is compared to the actual value of the target variable and error is calculated with weight adjustment. Most neural network models use a sum of squared errors:

$SSE=\sum (records) \sum (output\ nodes) [actual-output]^2$

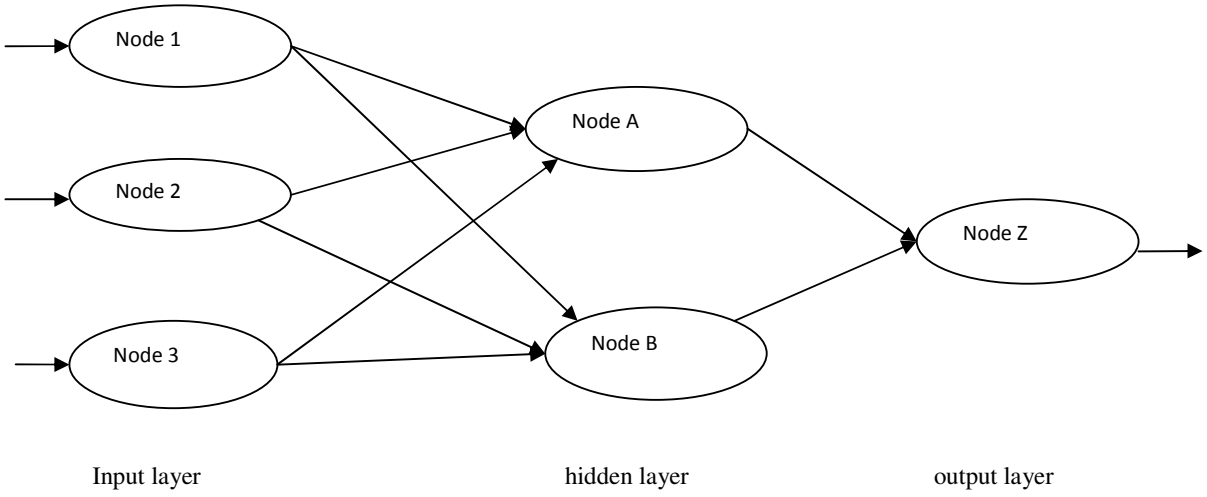

Fig 2.1 Simple Neural Network

In the above diagram the simple neural network is represented with three layers Input layer, Hidden layer and finally the Output layer, every nodes in each layer are connected to the other nodes in other layers.

III. PROPOSED SYSTEM

In order to overcome the disadvantage of existing system, we provide back propagation network for the heart attack prediction. While comparing with Genetic algorithm the BPN supports both discrete and float values whereas the Genetic algorithm supports only discrete algorithm. Fig 3.1 illustrates the architecture of the proposed system for A BPN based heart attack prediction system.

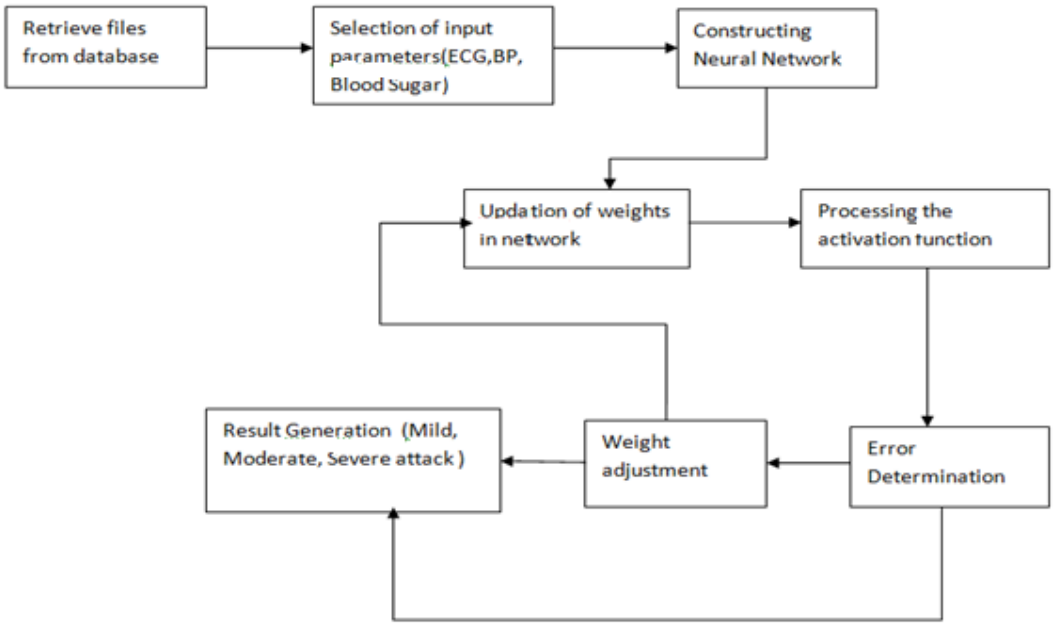

Fig 3.1: Proposed system architecture.

III (a): BACK PROPAGATION NETWORK:

The most widely used training algorithm for multilayer and feed forward network is Back propagation [6]. The name give is back propagation because, it calculates the difference between actual and predicated values is propagated from Output nodes backwards to nodes in previous layer. This is done to improve weights during processing.
The working of Back propagation algorithm is summarized in steps as follows:

Steps:
1. Provide input or training data to the network (Back propagation network).
2. Compare the computed value and target value.
3. Calculate the error in each node.
4. Calculate what output should be for each nodes and how much lower or higher output values must be adjusted for getting the target output values.
5. Then adjust the weights and continue the adjustment process.

The Working function of the BPN algorithm is explained as follows in fig 3(a).1:

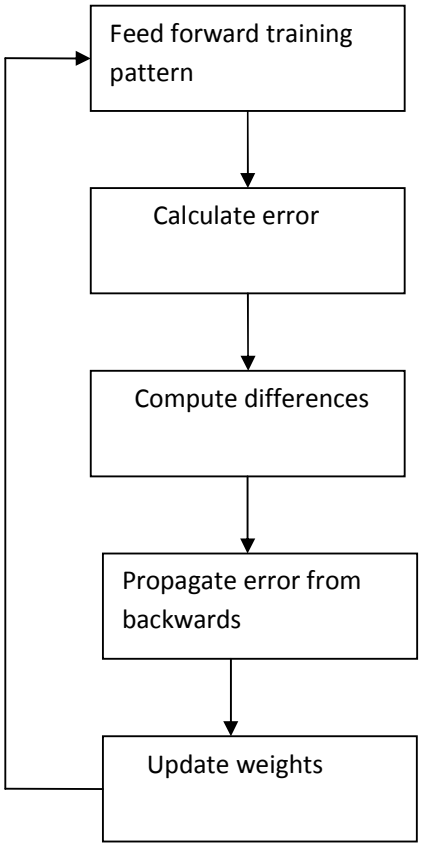

Fig 3.2 BPN algorithm working Function

In this paper the design of BPN model for Heart Attack Prediction System is represented in Fig 3.3. The major factors for predicting the heart attack such as ECG [5], Blood pressure, Blood sugar, cholesterol values are given as the input to the input layer of the Neural Network with the weights for every link and then the output of the input layer is given as the input for the hidden layer were the sigmoid function, $f(x) = 1/(1+e^{-x})$ is applied on the hidden layer. The output of the hidden layer is passed as input for the output layer where it performs the sigmoid function. The difference between the target output and computed output is evaluated and the error is rectified and corrected by adjusting the weights. The generated output is implemented using ULK (refer fig 3.3) and the classification of the heart attack is determined by enlightening the led, displaying characters on the kit and sending a text message to the patients relatives with the help of Global System for Mobile (GSM) [4] in the case of mild, minor and severe attack respectively.

The GSM technique is used for sending message for the patient relatives if the prediction status represents severe attack in ULK. In this paper we use GSM/GPRS port interface, Character Display and LED's of the ULK for implementing the result.

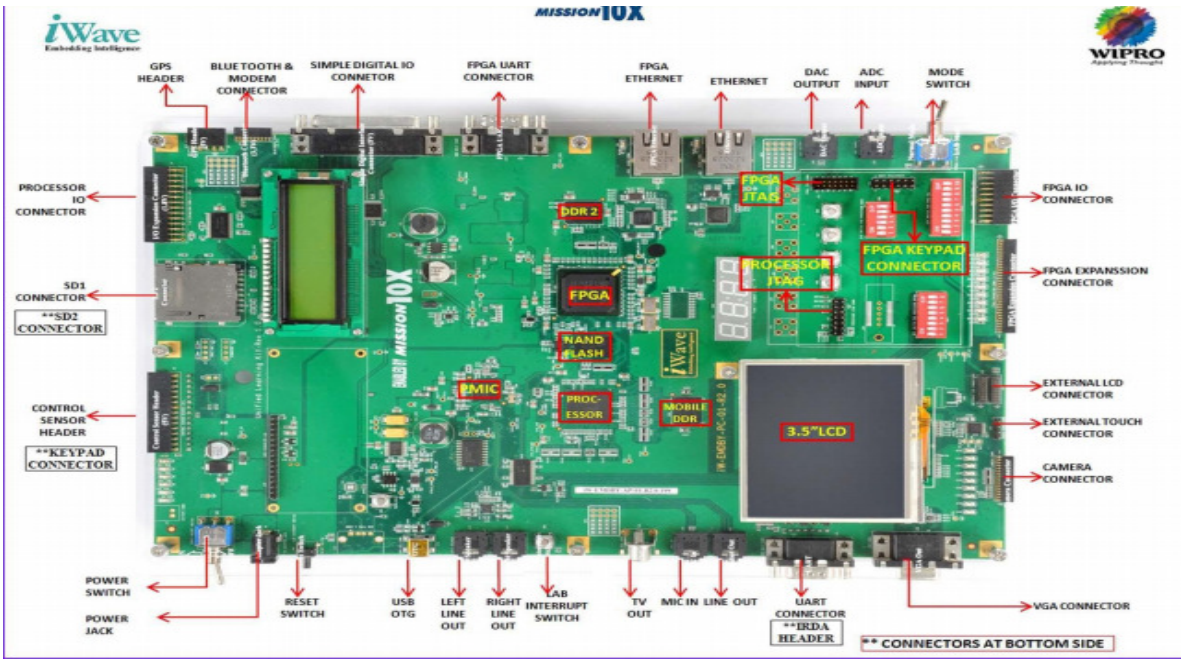

Fig 3.2 Pictorial representation of unified learning kit (ULK)

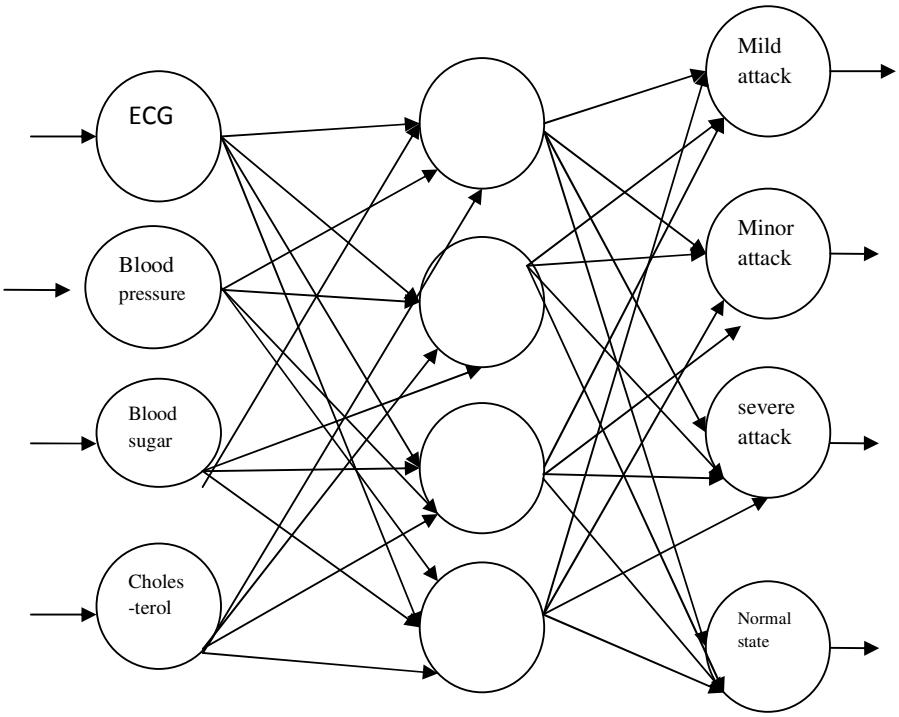

Fig3.4 a BPN model for heart attack prediction System

IV. EXPERIMENTAL ANALYSIS

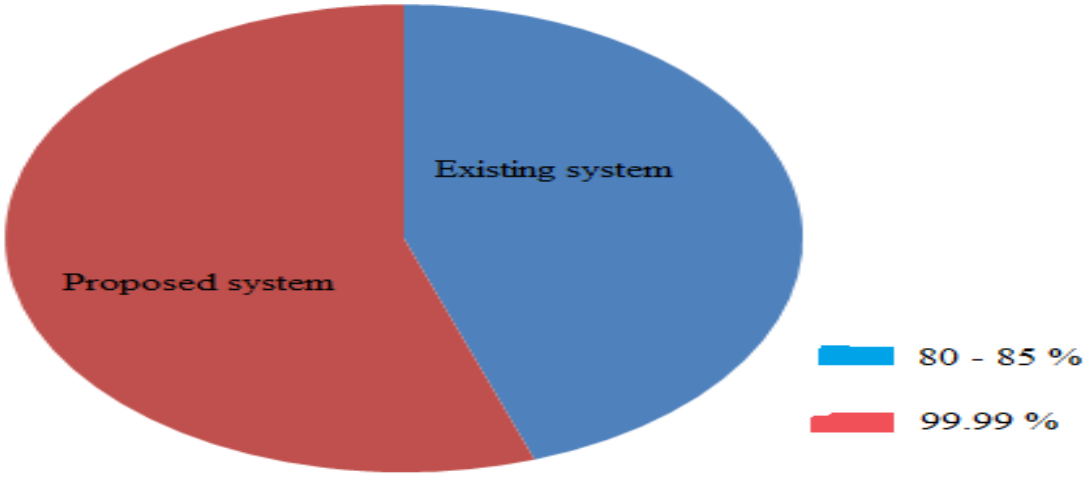

Fig 4.1 Pie chart representation of prediction range of Existing and Proposed System

V. CONCLUSION

In this research paper, we have presented Heart disease prediction system using Back propagation network algorithm with computer aided technique which helps the physician as a tool for predicting the heart attack. The execution is implemented with the ULK; it plays a major role in classifying the heart attack such as normal state, mild, minor or severe attacks. The experimental result shows that using Back propagation network algorithm the system predicts Heart disease with nearly 99.99 % accuracy whereas in existing system using genetic algorithm predicts Heart disease with nearly 80 to 85 % accuracy.

REFERENCE

[1] Daniel Larose, Discovering Knowledge in Data: An Introduction to Data Mining, Wiley, Hoboken, NJ, 2005.
[2]MA.Jabbar, B.L.Deekshatulu and Priti Chandra.: An evolutionary algorithm for heart disease prediction, ICIP, CCIS 292 PP 378- 389, Springer-Verlag (2012).
[3]M.Anbarasi, E.Anupriya, N.CH.S.N.Iyengar, "Enhanced Prediction of Heart Disease with Feature Subset Selection using Genetic Algorithm", International Journal of Engineering Science and Technology, Vol.2, No.10, pp.5370-5376, 2010.
[4]B.Jyosthna, R.GiriPrasad, "Medical Emergency Assistance System using GSM", International Journal of Scientific Engineering and Research (IJSER) SN (Online): 2347-3878, Volume 1, Issue 1, September 2013.
[5]Ketaki N.Patil, P.C.Bhaskar, "Transmission of Arm Based Real Time ECG for Monitoring Remotely Located Patient "international journal of Research in Engineering and Technology eISSN: 2319-1163, pISSN: 2321-7308, Volume: 03 Issue: 04, Apr-2014.
[6] Comparative Study of Back Propagation Learning Algorithms for Neural Networks Saduf, Mohd Arif Wani Dept.of Computer Sciences University of Kashmir Srinagar, j&k, India.