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Diagnosis And Forecast Of Diabetes Mellitus Using Neural Network

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Abstract

One among the chronic disease that is estimated in the year of 2015 is Diabetes. It projects 415 million people was affected with diabetes and estimated to have the death rate of 5 million each and every decade. The tool forecasted and utilized to determine the person is having diabetes or not. The proposed method is used for accurate detection with the technique of deep learning. There is particularly an important technique for exact prediction such as neural network using Back propagation. The input layer has eight parameters as a first layer, hidden layer with 10 neurons & 1 output layer is used to display the accurate outcome. An interactive tool is implemented by graphical user interface for getting exact outcome when the absence of medical expert. The medical expert will get the patients reports within a second and it will be used for saving the time for the patients to get further treatment. In this paper, MATLAB is used for implementing and developing the results of the identification of diabetic patients. This can easily predict that the patient is having diabetes or not. The accuracy of the given dataset is predicted as 85% by using the deep learning technique, which is the improvement of the existing work.

Keywords— MATLAB; Deep Learning; neural network; Diabetes mellitus; Graphic user interface (GUI).

I INTRODUCTION

Diabetes mellitus is a group of diabetes mellitus that has a high blood sugar level for a long time. Diabetes mellitus occurs in two ways: 1) Juvenile diabetes, one in which the pancreas fails to produce enough insulin and the other fails to respond properly to adult insulin If left untreated, it can lead to serious complications such as diabetic ketoacidosis, nonketotic hypersmolar, cardiovascular disease, and heart attack. More than 80 percent of people die from diabetes. Therefore, the diagnosis should be made as early as possible.

A. Disadvantages of Existing System

• In the existing system, only a small number of patients are stored and used as a data set.
• More noisy errors are found in the existing system.

There are many methods to diagnose diabetes, such as fingersticking with the help of the device and laboratory testing, but these methods are much more painful when used. As such, the software tool based on the artificial neural network has an accuracy of 81 percent. The first layer known as the input layer, which has 8 input parameters, is a similar intermediate layer containing a hidden layer of 10 neurons and having an output layer. The GUI is developed to load the .csv input file that contains a reading of different parameters and trains with the help of BPNN and the screen output.

This article describes in modular format and a summary of its structure is presented below. Section II presents a brief description of previous methods used in the detection of diabetes. Section III describes the advantages of the proposed system and overcoming the drawbacks of the previous system. Section IV proposed a system that includes the simulation and development of the software tool in MATLAB for the detection and prediction of diabetes mellitus using the advanced architecture of BPNN. Section V shows the results. Finally, section VI ends with some conclusions.

II LITERATURE SURVEY

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TJ Ayalakshmi [6,7] proposed the Levenberg MAQQURT method for the detection of diabetes. The main approach pursued in this paper was to compare the results of various missing value analysis strategies. From the results of this paper, we can conclude that more accuracy is achieved with less training time. To achieve better results, this paper shows the motivation of using [1] a combination of lost values and pre-processing techniques.

The architecture of the multi-layer feed-forward neural network proposed by Rajeeb Dey and Vaibhav Bajpai [2] demonstrates 2 concepts. 6- 10-1 (single hidden layer with 10 neurons) and second 6-14- 14-1 (double hidden layer with 14 neurons) architecture first concept. Input and hidden neurons are processed by applying two different functions individually, including the smooth linear activation function of the digit [2] input neuron and the linear log sigmoid function of the cell [2] in the hidden neurons. The hidden and output layer provided a constant bias. In the input layer process, only a few parameters, including blood sugar levels, random blood sugar levels, post-plasma blood sugar levels, SX, age, and labor status are used [2].

III PROPOSED SYSTEM

The proposed system is a user-friendly heart software tool built on MATLAB. This device has a GUI, which acts as a medium between the patient, the doctor, or the professionals handling this software. The result of whether or not the patient has diabetes has proved to be a blessing to the doctor in a matter of minutes. Before the patient is given treatment for any illness he is experiencing, he initially checks for diabetes, and the software is very helpful for doctors in such situations[8][9][10]. Training neural networks of neurons in the previous papers were hidden palikalumulla a very simple architecture, but this paper markvard levanberg-back campaign launched by the algorithm, this algorithm is the Quick-back campaign marrlab tulbeaksile, it is highly recommended that the nest is being supervised by the algorithm, To be used neurons[11][12][13]. This algorithm shows better curve fitting and better classification performance. Figure 1 shows the GUI developed using Matlab 2015 software, and Figure 2 depicts the neural network used for training and testing.[14][15]

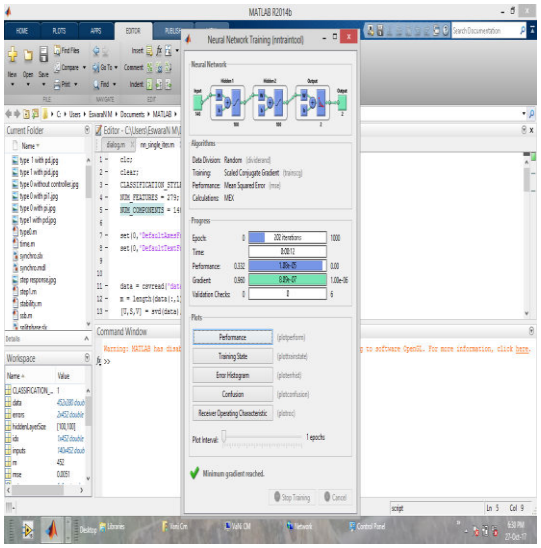

Figure 4 Snapshot of neural network used for training and testing

In the above figure(4) the samples are automatically divided into training, validation and datasets where now the network is ready to train.

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IV OVERVIEW AND RESULT OF IMPLEMENTATION

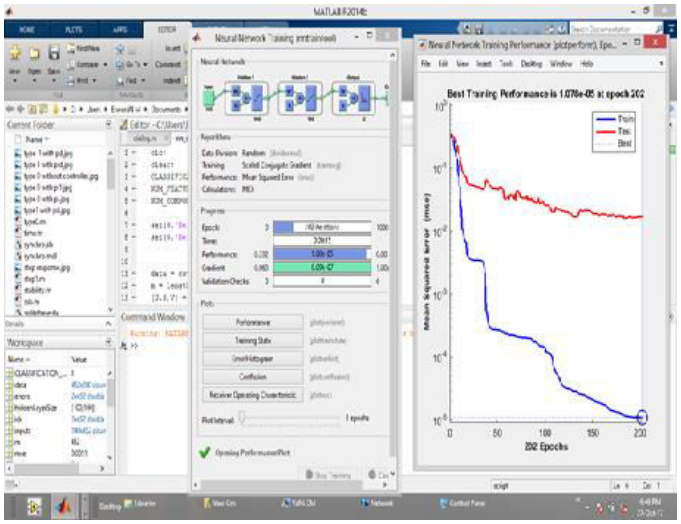

Figure 4.1 IMPLEMENTATION SCENARIO

In the above figure(4.1) each validation plot indicates the iteration at which the performance is maximum and error reached to minimum value. Practice continues up to 9 repetitions, but 3 minimum error during repetition. The above figure shows the lower values of the era, which results in better results compared to previous papers

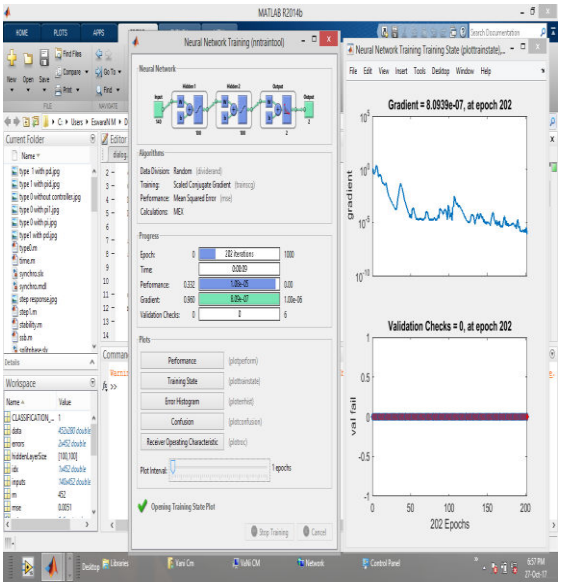

Figure 4.2 graph plotted against

In figure (4.2) the graph represents the result of the training state of smaples (instances)

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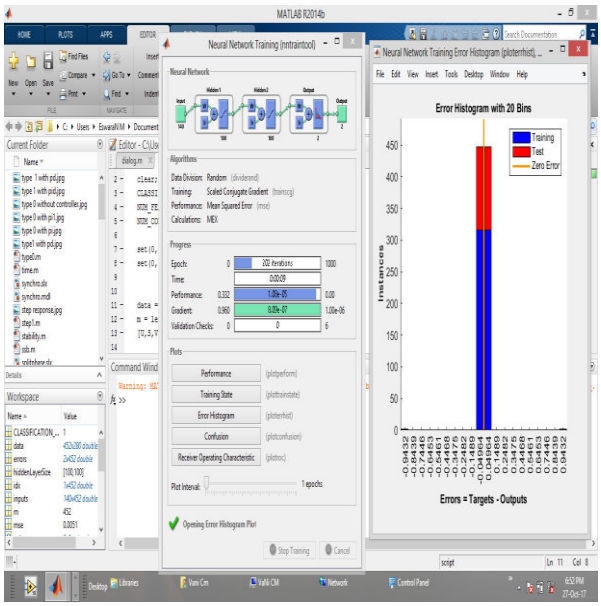

Figure 4.3 RSS plot

In this figure (4.3), RSS are plotted against time.

LTE occupies a large area, WiMAX occupies a smaller area, and overlaps the LTE range. The LTE appears to be in the area until the mobile node enters the WiMAX range. Beyond WiMAX, the mobile node transmits to LTE.

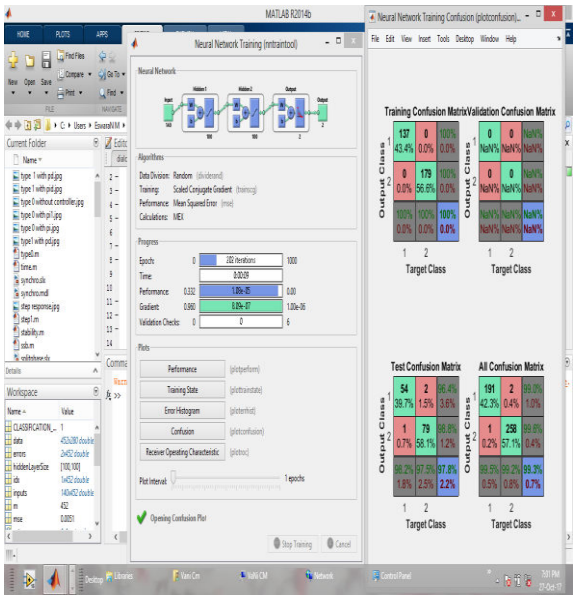

Figure 4.4 Mark of Network

This figure (4.4) shows the state of the mobile station in LTE and WiMax region. In this ,LTE is denoted as zero and WiMax is denoted as one. Dotted lines are used to denote the range of the reach networks with increase in time.

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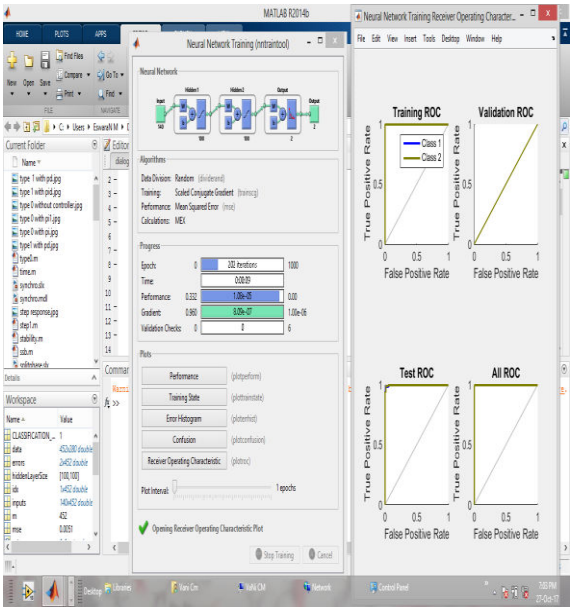

Figure 4.5 The call dropped percentage

With increase in the hysteresis range, the call dro

V CONCLUSION

In this paper deep learning based Neural Network Architecture [8-10-1] is developed. This re-propagating neural network [8-10-1] and it has structure. The binary classification used by this structure as the problem is the invisible layer of 10 neurons with a hidden layer, 8 input nodes as an output node. The output could be 0 or 1, which shows 0 as usual Patient 1 has diabetes. The results as screened in Diabetes and Non-Diabetes. The GUI is developed so that the physician can read and apply the load input parameter. There is also option for provided single and multiple patients. There is a text box on the GUI. Result Any patient entering by a patient serial number. A small positive or negative value ranging from 0 to 1 uses randomly to train the network to input-hidden to hiddenoutput layers. The performance plot shows the mean square error (MSE) of 0.107 3rd age which is very close to zero. The real value of these objective value approaches. The regression is plotted. Best fit at 0.5. Iterations with less than 81% accuracy. As iteration is required. Less time consuming is reduced than previous papers.

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