Learning Quality and Speed in Networks of Neurons and Knowledge of Behavior Problems

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ABSTRACT

This paper introduced to the basic tasks to increase the speed networks and neurons and important way for optimal training and focus on solving problems and improving the quality and increasing efficiency .

And focusing on the self-sufficiency of the work leads us to know the mistakes and determined and do analyzed through neurons and know all the characteristics to be able to do corrected and revised and regroup properly in order to be recognized through the software to get reliable results and high quality.

Key words :artificial neural networks, , learning algorithms, networks training;

INTRODUCTION

Networks of neurons is a artificial neural networks based in their work and run on software programs and to the analysis and give reliable results for the microprocessor in order to be able to determine the advantages and disadvantages In networks which are different from the human mind

In this case raised the input and output and the flow of data and information and all signals and devices that provide cells with artificial neural networks'' and communication networks all the requirements needed to reach the desired goals without delay against packages that will emerge fixed and determinable And that leads to cell activation and revitalization of permanently fixed.

Composed infrastructure of neurons from 3 types of layers: input, hidden, and layer output and flow signals generally input to and output devices accurately in the direction front stretch alone artificial neural networks or on multiple units but can not return communications and telecommunications networks repeated contain nutrition relapsing Contrary to feed forward networks, the dynamical properties of the network are important. In some cases, the activation values of the units undergo are laxation process such that the network will evolve to a stable state in which these activations do not change any more. In other applications, the changes of the activation values of the output neurons are very big , such that the dynamical behavior constitutes the output of the network. There are several other neural network architectures, depending on the properties and requirement of the application. for an extensive overview of the different neural network architectures and learning algorithms . neural network has to be configured such that the application of a set of inputs produces the desired set of outputs. Various methods to set the strengths of the connections exist. One way is to set the weights explicitly, using a priori knowledge. Another way is to train the neural net work by feeding it teaching patterns and letting it change its weights according to some learning rule. r

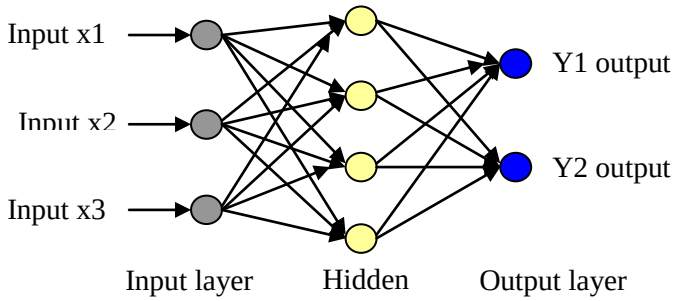


Fig (1) Architecture of artificial neural networks

APPROACH

1 - artificial neural networks training:

How an ANN operates it is now possible to discuss how it is trained. network learns by adjusting the biases and weights that link its neurons However, before training can begin, a network's weights and biases must be set to small random value The basis of the backpropagation algorithm is that a training pair is from the training set and applied to the network. The network calculates what it thinks" the output should be based on the inputs provided in this training pair. The resultant outputs from the network are then compared with the expected outputs identified by the training pair. The weights and biases of each neuron Figure (2) provides an example where only one weight is adjusted in order to reduce a network's error in Fig. 2 highlights the concept of local minima in which a network become trapped during training if the learning parameter is too small. In this case the adjustment cannot lift the weight over the "hills" on either side of Wl and the network stabilizes with this error. Ideally the network would like to stabilize at W2 but unless the learning parameter is increased this is impossible. One way around this problem

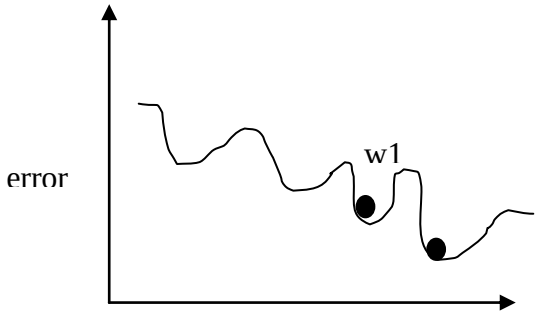


Fig (2) showing relation between error and weight

2 - analysis of errors during training network:

2 – 1 - Elementary errors

For the output layer

$$e_j = Y_j - A_j$$

where Yj required value output neuron, Aj - the real value of neuron activation

2 – 2 - Local Failures

where m - number of neurons

$$E_k = \sqrt{\frac{\sum_{1}^{m} e_j^2}{m}}$$

output layer of the neural network

2 – 3 – global error

where n – number of training

$$E = \sqrt{\frac{\sum_{1}^{n} E_k^2}{n}}$$

sets in the sample

3 - features training samples:

3 – 1 - Entire

the number of training sets for the class has 3-5 times more than that used in a set number of attributes of class

$$F_{OB} = \frac{N_F}{N}$$

where N_F number of classes satisfying this condition, N - the total number of classes

3 – 2 - irregularity

let $[C_i]$ number of training sets for the class, then

$$\overline{\Delta}_{C_i} = \sqrt{\frac{\sum_{1}^{k}([C_i]-[C_k])^2}{k-1}}; \quad k \neq i$$

$$R_{OB} = \frac{\sum_{1}^{k} \overline{\Delta}_{C_i}}{k}$$

And there is OB uneven

3 – 3 - inconsistency

$$A_{OB} = \frac{N_A}{N}$$ a measure of the number of similar objects belonging to different classes

Where NA - conflicting sets of the sample, and N - the total number of sets

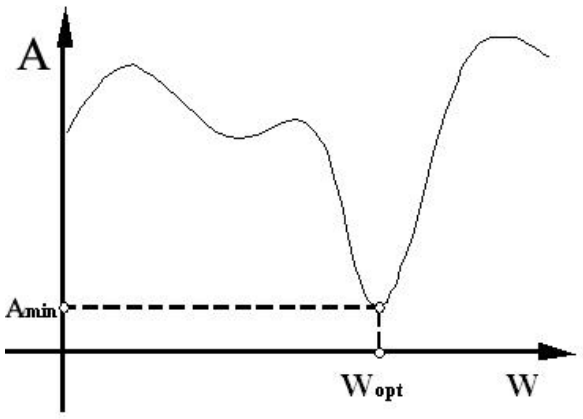
3 – 4 repeatability

$$P_{OB} = \frac{1}{n_c}\sum_{k=1}^{n_c}\frac{n_k^p}{n_k^c}$$ a measure of the number of identical sets within the same class

Where n_k^p and n_k^c accordingly, the number

duplicate sets and the total number of sets for the class k, and - the number of classes in the OB

4 - Dynamic correction increment weighting factor network:



$$W_{ij}^{t+1} = W_{ij}^{t} + \alpha * e_j * A_i^t$$

Where e_j error of the first neuron

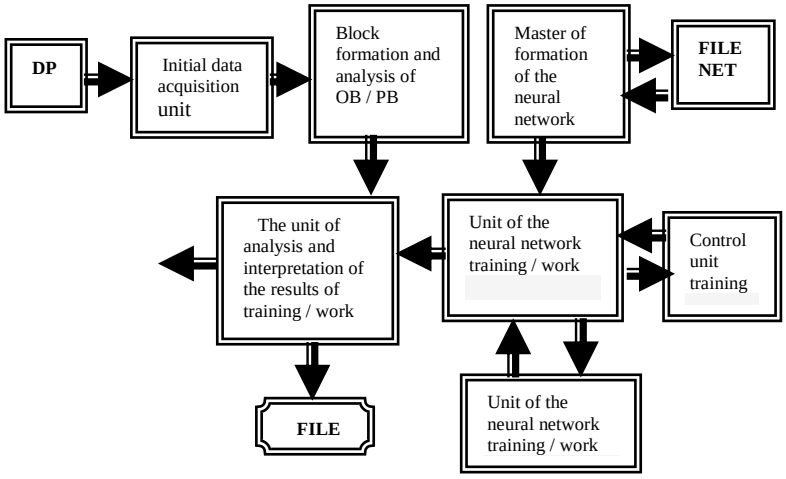
A_i and the level of activation of the first neuron

α step change in weight

$$\alpha_0 = 1; \quad \alpha_{t+1} = \alpha_t - \partial\alpha$$

where $\partial\alpha$ decrement increment network weights

5 - Forecast system:



6 - Back propagation Algorithm:

The error is a collection of errors (the difference between the desired output and actual) that was created by all types of training. Reverse wrong algorithm is one of the most commonly used and that used to orbit the broad (and some say wildly used) learning techniques for neural networks. First we'll look at the algorithm itself Backpropagation is used almost exclusively with feed forward, multi layer perceptions using continuous valued cells. Learning takes place based upon mean squared error and gradient descent. Backpropagation makes its easy to find the networks' error weight gradient for a given pattern

Aim of the Algorithm

1 - The error rate is reduced kidney
2 - Total error computed via forward propagation
3 - Weights updated via backward propagation

Steps of the Algorithm :

1 - Initialize weights
2 - For next pattern
  a - Perform a forward propagation step
  b - Perform backward propagation
  c - Update weights
3 - Stop when total error is acceptable

7 - Applications of artificial neural networks:

1 - Neural networks in business

Business is a transfer field with several general areas in the field of specialization such as accounting or financial analysis that any applications in the field of neural networks fit one of the business and financial analysis and there are also some potential for the use of neural networks for commercial purposes, including the allocation and scheduling of resources there is also a strong possibility of the use of neural networks to extract databases .And also explicitly search for patterns contained in the information stored in databases and rated the most business in this area funded and registered ownership and so it is impossible to provide a report on the full extent of the business. Because most of the business are applied in the field of neural networks

2 - Neural networks in medicine

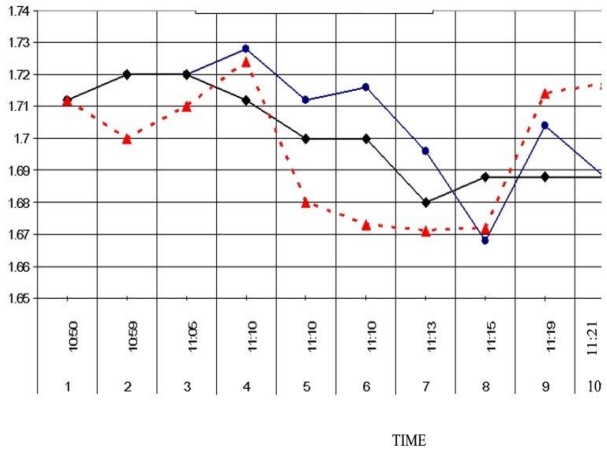
Will speak here about the artificial neural networks, which currently controversial of the hot topics in the area of research in the field of medicine and we believe it will get a wide range of applications for biomedical systems in the next few years. At this moment, this research mostly on modeling the human body and diseases recognized types of scanning different (CT scan sonar, etc.) and neural networks are ideal confession diseases through the use of scanning since not need to provide an algorithm specific in how to identify the disease .Learn neural networks through examples and there is no need to detail how to recognize the disease and here we need is a set of examples which are representing different diseases from each other quantitative examples are not important quantity but must be chosen very carefully in order to get reliable performance and is very effective infield of medicine

3 - Neural Networks in Practice

Here you will be given a specific description of the neural networks and how they work and the outside world applications Is it suitable for? Neural networks has broad applications to real business problems in the world, in fact, may have already been applications successfully in many industries, but will give you some more specific examples and are also used in the following specific models: Recognition of the speakers in the field of communications, diagnose hepatitis, return errors telecommunications and interpret the meaning of the multiplicity of Chinese words, sea mine detection and texture analysis and to identify the three dimensional and identify things handwritten and facial recognition

Conclusion

We have here the fundamental aspects of industrial performance modeling and neural networks and tried to get close to the problem of artificial neural networks Advantages of some specific neural network architectures and learning algorithms are also discussed Neural networks also contribute to other areas of research such as neurology and psychology. They are regularly used to model parts of living organisms and to investigate the internal mechanisms of the brain.



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