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(RESEARCH ARTICLE)

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Hybrid artificial intelligent for dielectric constant of concrete

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Abstract

Optimization of dielectric constant of concrete specifications based on hybrid artificial intelligent is used in this paper. in this study, neural network with feed forward neural network is applied in the system. The value of dielectric constant is estimated were determined by the number of hidden layers of NN.matlab is used with Simulink to enhance the complicated system.

Keywords: Dielectric constant; Neural network; Matlab; FFNN

1. Introduction

Many researchers proposed many papers to develop the value of constant for concrete the relative complex value of dielectric constant of concrete is (4.9−j0) [1] [2] [3]. The authors in refrences [4], [5], [6] were suggested new method to calculate the best constant value for concrete. Others used artificial intelligent system to predict constant value by using adaptive neuro fuzzy inference system, GA, FIS [7][8][9] and [10]. In this paper, the authors proposed novel method to drawing the value of dielectric versus the time .

2. Proposed method

In this system, new method was suggested by neurons and hidden layers with nonlinear output.the optimization of data is applied to th input of neural network which is called FFNN. The oputput results from the output of neural network are shown in figures 1,2,3, and 4.

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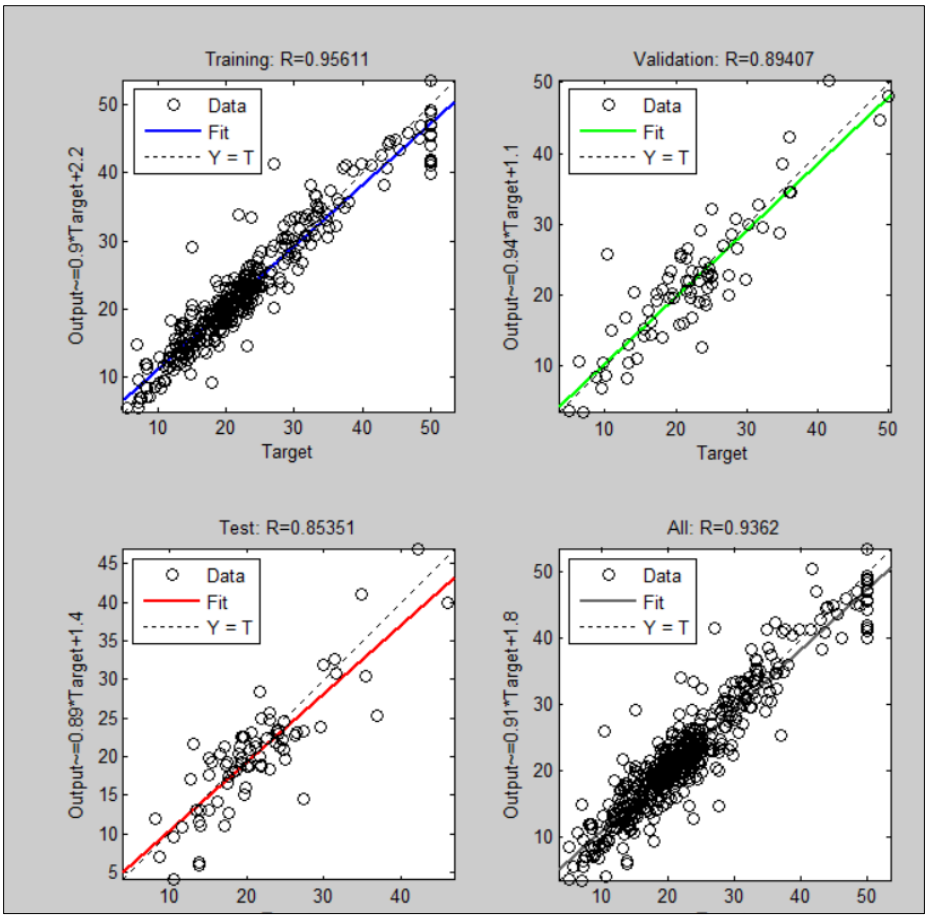

Figure 1 Training system

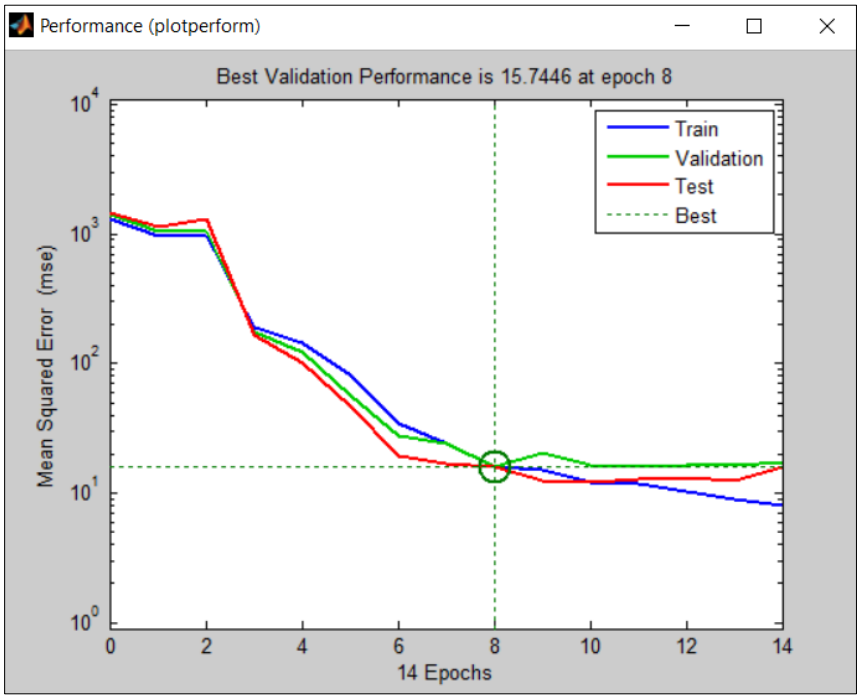

Figure 2 Validation systems

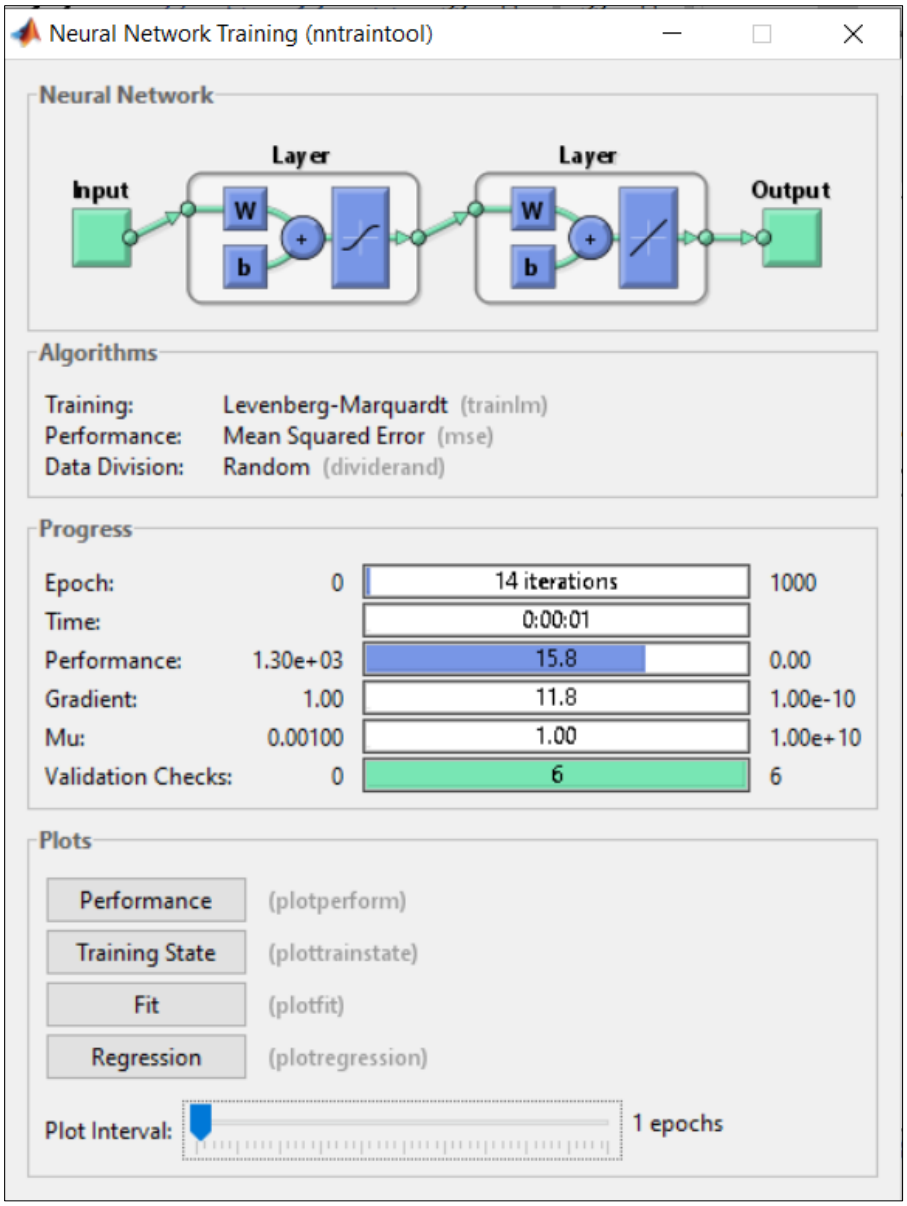

Figure 3 Performance system

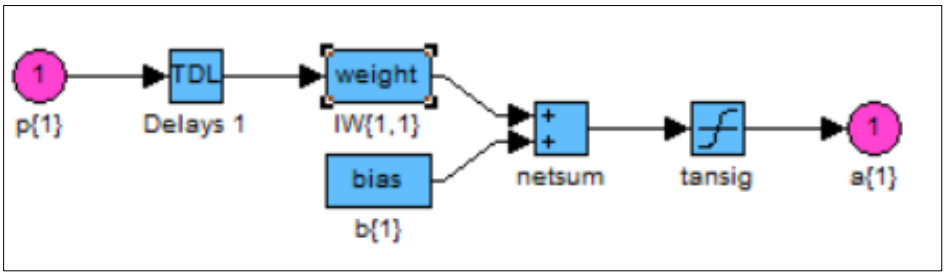

Figure 4 Matlab system

The program of FFNN is used in this method is appear as bellow.

```
function net = create_fit_net(inputs,targets)
%CREATE_FIT_NET Creates and trains a fitting neural
%
%  NET = CREATE_FIT_NET(INPUTS,TARGETS) takes these
%    INPUTS - RxQ matrix of Q R-element input sample
%    TARGETS - SxQ matrix of Q S-element associated
%  arranged as columns, and returns these results:
%    NET - The trained neural network
%
%  For example, to solve the Simple Fit dataset prob
%
%    load simplefit_dataset
%    net = create_fit_net(simplefitInputs,simplefitT
%    simplefitOutputs = sim(net,simplefitInputs);
%
%  To reproduce the results you obtained in NFTOOL:
%
%    net = create_fit_net(abaloneInputs',abaloneTarg

% Create Network
numHiddenNeurons = 20;  % Adjust as desired
net = newfit(inputs,targets,numHiddenNeurons);
net.divideParam.trainRatio = 70/100;  % Adjust as de
net.divideParam.valRatio = 15/100;  % Adjust as desi
net.divideParam.testRatio = 15/100;  % Adjust as des

% Train and Apply Network
[net,tr] = train(net,inputs,targets);
outputs = sim(net,inputs);
```

The dielectric constant of concret is shown in figure 5.

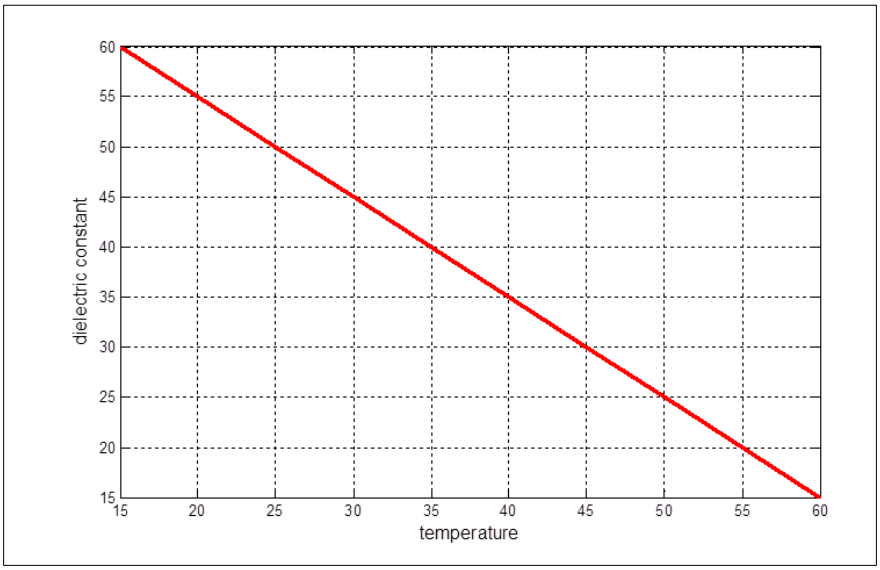

Figure 5 Dielectric constant

3. Conclusion

In this proposed method, the hybrid artificial based artificial bee colony with feed forward neural network are applid for concrete system. The ANN IS used by feed forward bag propagation. The results in this system appears the performance more efficient and high accuracy.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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