International Conference on Civil Engineering,
Architecture and Urban Management in Iran
Tehran University
DECEMBER-2018

The Analysis of Concrete Strength Using RBF Neural Networks Algorithm

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Abstract

Performing a wide range of experiments in order to gain the most appropriate result to produce a product is both costly and time-consuming. Therefore, using simulation and virtualization software for carrying out such experiments in frequent numbers and complex calculations is highly likely not only to save time and reduce costs, but also to increase the precision and accuracy of them. In the present study, the Matlab Software and neural networks have been applied to attain the percentage of microsilica for the highest strength of concrete. One of the most serious drawbacks of classifications using various neural networks is the presence of too many parameters to be taught. If such parameters are not appropriately opted, the efficiency is probably affected. One of the most frequently used ways to teach neural networks is Trial and Error to identify its parameters. In the present article, attempts have been made to optimize the number of parameters so that the data classification accuracy is increased using RBF Neural Network Algorithm, which is considered to be one of the most popular artificial neural networks.

Key words: Microsilica, Genetics Algorithm, Concrete Compressive Strength, RBF Neural Networks Algorithm.

1. Introduction

RBF Neural Network Algorithms are widely used for classification, estimation of nonlinear functions, modeling and system controlling [1 – 5]. RBF Neural Networks are consisted of two layers, one of which is a hidden nonlinear layer and the other is an output linear layer. The teaching of RBF Neural Networks includes in the selection of RBF centers in the hidden layer and the estimation of those linear weighs which are connected to the output layer. The selection of centers is one of the essential issues in this way. The free parameters of this approach are the selection of radius and the maximum number of neurons which are present at the hidden layer. In this method, when new data is entered, it