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Adaptation of Parameters of BP Algorithm Using Automata

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Abstract

Backpropagation (BP) algorithm is a systematic method for training multilayer neural networks. Despite of the many successful applications of backpropagation, it has many problems, it may require a long time to train the networks, and it may not train the networks well. This time can be the result of the non-optimal parameters. It is not easy to choose the best set of parameters for a particular problem. In this paper, by interconnection of finite state learning automata (FSLA) to the feedforward neural networks, we apply learning automata to adjusting these parameters based on the observation of random response of the network. The main motivation in using learning automata as an adaptation algorithm is to find the global optimum in global optimization when dealing with multi-modal surface. The feasibility of the proposed method is shown through simulations on three learning problems: exclusive-or, encoding and digit recognition. The simulation results show that the adaptation of these parameters not only increases the convergence rate of learning but it increases the likelihood of finding the local minima.

Additional Information

Index Terms- Neural Network, Backpropagation, Learning Automata, Morphological Feature, Steepness Parameter

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