Improving the Performance of Back-Propagation Training Algorithm by Using ANN

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Abstract : Artificial Neural Network (ANN) can be trained using backpropagation (BP). It is the most widely used algorithm for supervised learning with multi-layered feed-forward networks. Efficient learning by the BP algorithm is required for many practical applications. The BP algorithm calculates the weight changes of artificial neural networks, and a common approach is to use a two-term algorithm consisting of a learning rate (LR) and a momentum factor (MF). The major drawbacks of the two-term BP learning algorithm are the problems of local minima and slow convergence speeds, which limit the scope for real-time applications. Recently the addition of an extra term, called a proportional factor (PF), to the two-term BP algorithm was proposed. The third increases the speed of the BP algorithm. However, the PF term also reduces the convergence of the BP algorithm, and criteria for evaluating convergence are required to facilitate the application of the three terms BP algorithm. Although these two seem to be closely related, as described later, we summarize various improvements to overcome the drawbacks. Here we compare the different methods of convergence of the new three-term BP algorithm.
Keywords : neural network, backpropagation, local minima, fast convergence rate
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