

Article

Gen2Gen: Efficiently training artificial neural networks using a series of genetic algorithms

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Abstract: Artificial neural networks have been used in a multitude of applications in various research areas in recent decades, providing excellent results in both data classification and data fitting. Their success is based on the effective identification (training) of their parameters using optimization techniques, and in this direction, a multitude of techniques have been developed for training these models. However, many times these techniques either get trapped in local minima of the error function with poor overall results or present overfitting problems in which the performance of the artificial neural network is significantly reduced on data that was not present during its training. This paper proposes a new method for the efficient training of artificial neural networks, where a series of genetic algorithms are applied to the network parameters in several stages. In the first stage, an initial identification of the network value interval is made, in the second stage, the initial estimate of the value interval is improved, and in the third stage, the final adjustment of the network parameters within the previously identified value interval takes place. The new method was evaluated on a wide series of classification and regression problems from the relevant literature, and it was compared against other methods used for neural network training.

Keywords: Genetic algorithms; Evolutionary computation; Artificial neural networks

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1. Introduction	18
2. Materials and Methods	19
3. Results	20
4. Conclusions	21

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