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Improving the generalization abilities of constructed neural networks with the addition of local optimization techniques

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Abstract: Constructed neural networks with the assistance of Grammatical Evolution have been widely used in a series of classification and regression problems in the recent literature of machine learning. Application areas of this innovative machine learning technique include solving differential equations, autism screening, measuring motor function in Parkinson's disease. Although this technique has given excellent results, in many cases it is trapped in local minimum and cannot perform satisfactorily in many problems. For this purpose, it is considered necessary to find techniques to avoid local minima and one technique is the periodic application of local minimization techniques that will undertake to adjust the parameters of the constructed artificial neural network, but maintaining the already existing architecture created by Grammatical Evolution. Periodic application of local minimization techniques has shown a significant reduction in both classification and data fitting problems found in the relevant literature.

Keywords: Grammatical Evolution; Genetic Programming; Neural networks; Local Optimization

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