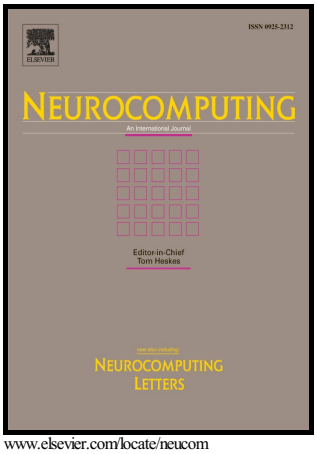

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Multi-Agent architecture for Multi-objective optimization of Flexible Neural Tree

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Abstract

In this paper, a multi-agent system is introduced to parallelize the Flexible Beta Basis Function Neural Network (FBBFNT)'training as a response to the time cost challenge. Different agents are formed; a Structure Agent is designed for the FBBFNT structure optimization and a variable set of Parameter Agents is used for the FBBFNT parameter optimization. The main objectives of the FBBFNT learning process were the accuracy and the structure complexity. With the proposed multi-agent system, the main purpose is to reach a good balance between these objectives. For that, a multi-objective context was adopted which based on Pareto dominance. The agents use two algorithms: the Pareto dominance Extended Genetic Programming ($PEGP$) and the Pareto Multi Dimensional Particle Swarm Optimization (PMD_PSO) algorithms for the structure and parameter optimization, respectively. The proposed system is called Pareto Multi Agent Flexible Neural Tree (PMA_FNT).
To assess the effectiveness of PMA_FNT, four benchmark real data sets of classification are tested. The results compared with some classifiers published in the literature.

Keywords: Flexible Neural Tree, multi-agent architecture, Multi-objective optimization, Evolutionary Computation algorithms, negotiation, classification

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