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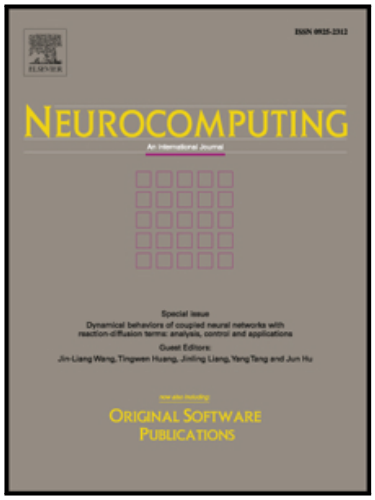

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Parallel population-based algorithm portfolios: An empirical study

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Abstract

Although many algorithms have been proposed, no single algorithm is better than others on all types of problems. Therefore, the search characteristics of different algorithms that show complementary behavior can be combined through portfolio structures to improve the performance on a wider set of problems. In this work, a portfolio of the Artificial Bee Colony, Differential Evolution and Particle Swarm Optimization algorithms was constructed and the first parallel implementation of the population-based algorithm portfolio was carried out by means of a Message Passing Interface environment. The parallel implementation of an algorithm or a portfolio can be performed by different models such as master-slave, coarse-grained or a hybrid of both, as used in this study. Hence, the efficiency and running time of various parallel implementations with different parameter values and combinations were investigated on benchmark problems. The performance of the parallel portfolio was compared to those of the single constituent algorithms. The results showed that the proposed models reduced the running time and the portfolio delivered a robust performance compared to each constituent algorithm. It is observed that the speedup gained over the sequential counterpart changed significantly depending on the structure of the portfolio. The portfolio is also applied to a training of neural networks which has been used for time series prediction. Result demonstrate that, portfolio is

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