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A new fine-grained evolutionary algorithm based on cellular learning automata

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Abstract:

In this paper a new evolutionary algorithm, called the CLA-EC (Cellular Learning Automata Based Evolutionary Computing), is proposed. This algorithm is a combination of evolutionary algorithms and the Cellular Learning Automata (CLA). In the CLA-EC each genome string in the population is assigned to one cell of the CLA, which is equipped with a set of learning automata. Actions selected by the learning automata of a cell determine the genome string for that cell. Based on a local rule, a reinforcement signal vector is generated and given to the set of learning automata residing in the cell. Each learning automaton in the cell updates its internal structure according to a learning algorithm and the received signal vector. The processes of action selection and updating the internal structures of learning automata are repeated until a predetermined criterion is met. To show the efficiency of the proposed model, to solve several optimization problems including real valued function optimization and data clustering problems.

Keywords:

Cellular learning automata, evolutionary algorithm, learning automata, cellular automata, optimization, CLA-EC

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