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A new evolutionary computing model based on cellular learning automata

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Abstract

In this paper, a new evolutionary computing model, called CLA-EC, is proposed. This new model is a combination of a model called cellular learning automata (CLA) and the evolutionary model. In this new model, each genome is assigned to a cell of cellular learning automata to each of which a set of learning automata is assigned. The set of actions selected by the set of automata associated to a cell determines the genome's string for that cell. Based on a local rule, a reinforcement signal vector is generated and given to the set learning automata residing in the cell. Based on the received signal, each learning automaton updates its internal structure according to a learning algorithm. The process of action selection and updating the internal structure is repeated until a predetermined criterion is met. This model can be used to solve optimization problems. To show the effectiveness of the proposed model it has been used to solve several optimization problems such as real valued function optimization and clustering problems. Computer simulations have shown the effectiveness of this model.

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