Improving Learning Automata based Particle Swarm: An optimization algorithm

Hasanzadeh, Mohammad; Meybodi, Mohammad Reza; Saeed Shiry Ghidary;
Computer Engineering and Information Technology Department, Amirkabir University of Technology, Tehran, Iran

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ABSTRACT

Numerous variations of Particle Swarm Optimization (PSO) algorithms have been recently developed, with the best aim of escaping from local minima. One of these recent variations is PSO-LA model which employs a Learning Automata (LA) that controls the velocity of the particle. Another variation of PSO enables particles to dynamically search through global and local space. This paper presents a Dynamic Global and Local Combined Particle Swarm Optimization based on a 3-action Learning Automata (DPSOLA). The embedded learning automaton accumulates the information from individuals, local best and global best particles then combines them to navigate the particle through the problem space. The proposed algorithm has been tested on eight benchmark functions with different dimensions. The work is unique from its test bed; evaluations contain large population size (150) and high dimension (150). The results show that, fitness and convergence pace is better than traditional PSO, DGLCPSO and previous PSO based LA algorithms.

INDEX TERMS

- **IEEE terms**
  Benchmark testing , Heuristic algorithms , Learning automata , Optimization , Particle swarm optimization , Topology , Vectors