A survey of swarm intelligence for dynamic optimization: algorithms and applications

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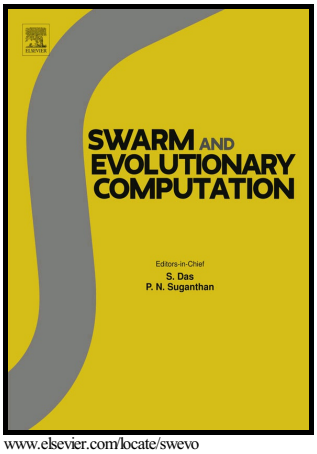

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A survey of swarm intelligence for dynamic optimization: algorithms and applications

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Abstract

Swarm intelligence (SI) algorithms, including ant colony optimization, particle swarm optimization, bee-inspired algorithms, bacterial foraging optimization, firefly algorithms, fish swarm optimization and many more, have been proven to be good methods to address difficult optimization problems under stationary environments. Most SI algorithms have been developed to address stationary optimization problems and hence, they can converge on the (near-) optimum solution efficiently. However, many real-world problems have a dynamic environment that changes over time. For such dynamic optimization problems (DOPs), it is difficult for a conventional SI algorithm to track the changing optimum once the algorithm has converged on a solution. In the last two decades, there has been a growing interest of addressing DOPs using SI algorithms due to their adaptation capabilities. This paper presents a broad review on SI dynamic optimization (SIDO) focused on several classes of problems, such as discrete, continuous, constraint, multi-objective and classification, and real-world applications. In addition, this paper focuses on the enhancement strategies integrated in SI algorithms to address dynamic changes, the performance measurements and benchmark generators used in SIDO. Finally, some considerations about future directions in the subject are given.

Keywords: Swarm intelligence, Dynamic optimization, Ant colony optimization, Particle swarm optimization

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