Performance evaluation and benchmarking of an extended computational model of ant colony system for DNA sequence design

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ABSTRACT
Ant colony system (ACS) algorithm is one of the biologically inspired algorithms that have been introduced to effectively solve a variety of combinatorial optimisation problems. In literature, ACS has been employed to solve DNA sequence design problem. The DNA sequence design problem was modelled based on a finite state machine in which the nodes represent the DNA bases {A, C, T, G}. Later in 2011, an extended computational model of finite state machine has been employed for DNA sequence designusing ACS. The performance evolution however, was limited. In this study, the extended computational model of finite state machine is revisited and an extensive performance evolution s conducted using 5, 7, 10, 15, 20, 25, 30, 35, and 40 agents/ants, each with 100 independent runs. The performance of the extended computational model is also benchmarked with the existing algorithm such as a Genetic Algorithm (GA), Multi-Objective Evolutionary Algorithm (MOEA), and Particle Swarm Optimisation (PSO).

KEYWORDS
Ant colony system; DNA sequence design; Finite state machine

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