

Peer Review

Review of: "PSO and the Traveling Salesman Problem: An Intelligent Optimization Approach"

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The manuscript presents an application of Particle Swarm Optimization (PSO), a metaheuristic originally developed for continuous optimization problems, to the Traveling Salesman Problem (TSP), a classic NP-hard combinatorial optimization challenge. The authors adapt PSO for TSP by treating city permutations as discrete variables and incorporate local search techniques (2-opt and 3-opt) to refine solutions.

1. The experimental section focuses heavily on a single toy example with five cities, which is insufficient to draw robust conclusions about PSO's effectiveness for TSP. While the authors mention evaluating PSO on "benchmark TSP instances," no detailed results (e.g., specific instances like TSPLIB datasets, solution quality, or runtime) are provided beyond vague statements like "competitive results for small to medium-sized instances." This lack of specificity undermines the claim of PSO's promise.
2. The adaptation of PSO for TSP is conceptually described (e.g., treating positions as permutations and velocities as city movements), but the technical details are vague. For example, how are continuous velocity values translated into discrete swaps or permutations? The manuscript mentions a "permutation-based update rule" but does not elaborate.
3. The results for the five-city experiment show costs ranging from 12.3 to 13.0 across five runs, but there's no statistical analysis (e.g., mean, standard deviation, or significance testing) to assess consistency or variability. This is a critical oversight for a stochastic algorithm like PSO.
4. The manuscript cites foundational works (e.g., Kennedy and Eberhart, 1995) but does not sufficiently position the contribution relative to prior PSO-TSP studies (e.g., Ghosh and Dehuri, 2011). It's unclear how this work advances beyond existing adaptations.

Declarations

Potential competing interests: No potential competing interests to declare.