Abstract

Although Ant Colony Systems (ACS) have gained much attention in last two decades but slow
execution and convergence speed are still two challenges for these meta-heuristic algorithms.
Many parallel implementations have been proposed for faster execution. However, most of
available implementations use coarse-grained synchronization mechanisms that are not
efficient and scalable. In this work, we have taken a fine-grained (ant-level) approach that is
more efficient and scalable. We have used traveling salesman problem as a test case and have
presented a parallel fine-grained implementation for shared-memory multi-core systems. Our
experimental results show that our proposed parallel implementation can achieve considerably
higher speedup values on modern multicore processors.

References

- M. Dorigo and L. M. Gambardella, &quot;Ant colony system: A cooperative learning
  approach to the traveling salesman problem,&quot; Evolutionary Computation, IEEE
- P. Delisle, M. Krajecki, M. Gravel, and C. Gagné, "Parallel implementation of an ant colony optimization metaheuristic with OpenMP," in Proceedings of the 3rd European Workshop on OpenMP (EWOMP'01), Barcelona, Spain, 2001.


Index Terms

Computer Science
Algorithms

Keywords
Ant Colony System  Parallel Computing  Traveling Salesman Problem  Shared Memory System