

Applying Particle Swarm Optimization to Schedule Order Picking Routes in a  
Distribution Center  
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### Abstract

The performance of a distribution center is typically judged on throughput-based criteria. Order picking consumes 30% to 40% of operation time in a typical distribution center. To effectively execute an order picking operation in a distribution center depends upon coordinating the formulation of the storage strategy, order processing, and planning the order picking route. However, it is usually too complicated to employ traditional optimization methods, such as linear programming, to solve this kind of problem. As a result, we applied the Particle Swarm Optimization (PSO) Algorithm to schedule order picking routes. PSO is one of the latest swarm intelligence algorithms; consequently, when compared to previous sophisticated algorithms such as genetic algorithms and simulated annealing, the study of its properties and applications is still in its infancy. This research considers the convergence rate, the convergent reliability (i.e., solution precision), and the performance test function (i.e., fitness function) in scheduling order picking routes. We apply genetic algorithms to determine the initial solution in order to locate the optimal solution faster by PSO. This paper also compares the effects of different parameters on particle swarm optimization. In order to verify the result, we also made a comparison with the Ant system in finding the optimal solution in order route planning. Overall, the research result will enhance the system of order picking in distribution centers and improve the efficiency of order picking operations.

Keyword : picking routing, particle swarm optimization.