**Vehicle Routing Problem with Time Window for Logistic Planning**

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**Abstract**

With the rapid developments of wireless communication technologies and mobile smart devices, people can search the goods information and buy them anytime anywhere. The change of shopping behavior leads to a large number of goods need to be transported and grows up the revenue of logistics. It is a challenge to satisfy real logistic constraints, such as the limitation of vehicle capacity and the available time windows of each customer. For these reasons, the *Vehicle Routing Problem with Time Window* (*VRPTW*) has been proposed to plan the logistic route by considering the available time of customers. Compared with previous research, *Ant Colony Optimization* (*ACO*) has been shown to be an efficient algorithm for solving this problem and easily combing with other heuristics. However, *S. R. Balseiro et al.* thought the weakness of *ACO* is that ants tend to create infeasible solutions with unvisited customers under the constraint about the number of vehicles. They proposed *Multiple Ant Colony System with Insertion Heuristics* (*MACS-IH*) based on the minimum delay technique to increase the number of feasible solutions at the final stage of the algorithm. Unlike *S. R. Balseiro et al.*, *Q. Ding et al.* thought the weaknesses of *ACO* are the premature convergence and low search efficiency. For these reasons, a *Hybrid Ant Colony Optimization* (*HACO*) was presented by adjusting pheromone, introducing a disaster operator, and combining saving algorithm andλ-interchange mechanism. The experiment compares *MACS-IH* and *HACO* using 12 datasets under 6 different data types, the results show that *HACO* performs well in 6 datasets, *MACS-IH* performs well in 3 datasets, and their solutions are similar in the remaining 3 datasets. However, these two papers only considered how to distribute goods to customers. There are more constraints need to be considered in real logistics such as to pick up goods from customers. To satisfy the real requirements, I will try to design suitable methods for solving the logistic planning problem.