

DRONE STATION LOCATION AND ROUTING OPTIMIZATION FOR INFRASTRUCTURE INSPECTION

Speaker

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Abstract

Recent advances in drone technology have expanded its applications in logistics, humanitarian aid, and infrastructure inspection. Motivated by drone-based infrastructure inspection and the emergence of battery swapping stations, this paper studies the location routing problem with heterogeneous stations and drones (LRPHSD). The problem jointly determines the locations and types of battery swapping stations and the multi-trip routes of heterogeneous drones to minimize the total cost. We formulate the LRPHSD as a mixed-integer linear programming model and develop a two-stage adaptive large neighborhood search (TSALNS) algorithm. Computational results demonstrate that TSALNS efficiently solves large-scale instances with solution quality comparable to or better than Gurobi. Both simulated instances and a real-world case study show that heterogeneous station-drone configurations outperform homogeneous alternatives by achieving a better balance between cost and task completion time.

Biography

Cheng Chun is a Professor at the School of Economics and Management, Dalian University of Technology. Her research focuses on logistics systems optimization and operations management, with particular interests in facility location, crowdsourced delivery, and drone/vehicle routing problems. Her work has appeared in leading journals, including Operations Research, Manufacturing & Service Operations Management, INFORMS Journal on Computing, Transportation Science, and Transportation Research Part B.



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