

Study on scheduling and path planning problems of multi-AGVs based on a heuristic algorithm in intelligent manufacturing workshop

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ABSTRACT

In order to solve the scheduling and path planning problems of multi-AGVs in an intelligent manufacturing workshop, it is necessary to consider loading, unloading, and transporting the workpiece of each AGV at the same time. A step task scheduling and path optimization mode of AGV is proposed. The process is as follows: Firstly, a mathematical model algorithm and a material transportation task allocation algorithm based on the urgency degree of workpiece processing were established for the optimization objective, and all workpiece transportation task sequences between shelves and processing equipment were assigned to the corresponding AGV to generate the initial feasible path of each AGV. Then, the AGV collision detection and anti-collision algorithm are designed to plan the global collision-free walking path of multi-AGVs in the workshop, and the path can be dynamically adjusted according to the delivery task. The model is solved by a heuristic algorithm ant colony algorithm and MATLAB coding. Finally, an example is given to verify the effectiveness of the method, which can effectively solve the task allocation of multi-AGVs and avoid collision path planning based on the transportation task sequence, and improve the work efficiency of AGV. This research can provide a theoretical basis and practical reference for realizing multi AGVs collaborative scheduling by using AGV automated material transport system in an intelligent production workshop.

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