Multi-objective automated guided vehicle scheduling based on MapReduce framework

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ABSTRACT

During material handling processes, automated guided vehicles (AGVs) pose a path conflict problem. To solve this problem, we proposed a multi-objective scheduling model based on total driving distance and waiting time, and used the A* path planning algorithm to search the shortest path of AGV. By using a speed control strategy, we were able to detect the overlap path and the conflict time. Additionally, we adopted an efficient MapReduce framework to improve the speed control strategy execution efficiency. At last, a material handling system of smart electrical connectors workshop was discussed to verify the scheduling model and the speed control strategy combined with the MapReduce framework is feasible and effective to reduce the AGV path conflict probability. The material handling system could be applied in workshop to replace manual handling and to improve production efficiency.

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