

# **Relation-based Item Slotting**

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## **ABSTRACT**

The cost of warehouse operations contributes approximately 20% of the total cost in a supply-chain system, and the cost of the picking process can be as high as 65% of the warehousing cost. Therefore, there is an incentive to improve the picking process in order to reduce the overall cost of the supply-chain system. The item assignment policy which allocates items to storage locations is one of the main decision processes that is aimed at lowering the travelling cost, which is normally considered as waste. Existing methods like the Cube-per-Order-Index (COI) and the volume-based strategy focus on the picking of items individually, the fact that multiple items can be picked in one single route is not considered. In this research, the concept of linear placement that has been used in computer science is adopted to create the Minimum Delay Algorithm (MDA). The method includes the relationship among items in order to generate the item storage layout that minimizes the total walking distance of order pickers. MDA was tested against other methods like CLP, COI, and OOS with 30 study cases. The results show that MDA can provide up to a 40% travel distance saving. Finally, MDA is combined with CLP, which is an iterative improvement method, in order to further improve the solution.