

Uncertainty-aware container warehousing planning for port throughput improvement

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Abstract. Against the backdrop of increasing demand for marine transportation and larger container vessels, ports and harbors are required to significantly increase their throughput capacity. As a measure to achieve this, new operating systems are being developed to optimize port operations by utilizing AI and IoT technologies at port sites. This paper aims to explore the feasibility of machine-learning-based container warehousing planning and shipper cooperative operations. The results of this study were as follows. The result of the warehousing plan that separates outbound containers and export containers based on the forecasted results of import containers resulted in a significant improvement in the evaluation index. Furthermore, assuming that some shippers would change the timing of outbound cargo, the more shippers cooperated, the better the index improved. The evaluation index was further improved when the containers of cooperative shippers were stored together in the same area to improve local efficiency. The study concluded that using machinelearning prediction information in warehousing planning and shippers' cooperation in determining the timing of outbound cargo effectively improves the throughput of container terminals.

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