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Demand prediction and optimization of workshop manufacturing resources allocation: A new method and a case study

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A B S T R A C T

At present, great changes are taken place in the internal production management and resource allocation model of manufacturers. Under the premise of rational resource allocation, the completion period of products largely depends on the timeliness of resource allocation. The related studies mostly tackle the allocation of a single type of production resources in a single workshop, without considering much about the mutual influence between workshops. Through in-depth research on workshop manufacturing practices, this paper chooses to explore the planning, allocation, and demand prediction of manufacturing resources, which has long been a difficulty in workshop production. The research has great scientific research significance and practical value. The authors designed an algorithm based on the difference of the mean stagnation time of different production processes in the execution process, and used the algorithm to predict the number of production resources required in each period, before formulating the optimal configuration plan. This method is highly reasonable and applicable. After presenting a prediction method for the allocation demand of workshop manufacturing resources, the authors discussed whether the manufacturing resource allocation between different workshops is balanced in a fixed period. Then, a new idea was proposed for collaborative production between machines of different workshops in a specific environment, and an optimization algorithm was put forward to optimize the manufacturing resource allocation to machines facing the operation execution process. Through experiments, the authors compared the utilization rate of material, technological or human production resources in each period, and thereby verified the effectiveness of the proposed algorithm.

A R T I C L E I N F O

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