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A New Priority Rule for Solving Project Scheduling Problems

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Abstract

Priority rule-based scheduling technique is a scheduling method for constructing minimum feasible schedules when solving project scheduling problems. This approach is made up of two parts: a priority rule for determining the activity list and a schedule generation scheme which constructs the feasible schedule of the constructed activity list. Quite a number of priority rules are available, selecting the best one for a particular input problem is extremely difficult. Hence, we present a new priority rule which assembles a set of priority rules and uses machine learning to form a hybrid strategy out of the assembled strategies. The hybrid strategy operates by choosing the strategy with the best performance at every point in time to construct an activity list of a project. The one with better performance is used most frequently. This removes the problem of manually searching for the best priority rule amongst the dozens of rules that are available. Experimentally, we solved a fictitious single-mode resource-constrained project scheduling problem (single-mode RCPSP) which was solved with 13 different priority rules in Pm Knowledge Center. Our result showed that the total completion time of the project obtained with our approach competes favorably with the completion times gotten with the 13 priority rules. Additionally, we computed initial population for Genetic Algorithm in solving some multi-mode RCPSP. We compared our results with the initial solutions the authors started with, and our results competes favorably with their initial solutions, making our algorithm a good entry point for metaheuristic procedures.

Keywords

Project scheduling Machine learning Motion planning Network analysis Metaheuristic procedures

Notes

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