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(Article begins on next page)

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Abstract. Nowadays, third-party logistics is an essential component of efficient delivery, enabling companies to purchase carrier services instead of keeping an expensive fleet of vehicles. However, the contracts with the carriers usually have to be booked beforehand when the delivery demand is unknown. This led to the managerial task of choosing an appropriate set of bins (fleet contracts) under uncertainty. Such a decision problem is defined as the Variable Cost and Size Bin Packing Problem with Stochastic Items [1]. It consists of packing the set of items (goods) with uncertain volumes and quantity into containers (bins) of different fixed costs and capacities. Since this problem cannot be solved for large realistic instances by means of exact solvers, this paper introduces a Machine Learning heuristic to approximate the first stage decision variables. Several numerical experiments are outlined to show the effectiveness of the proposed approach to deal with realistic instances of up to 3000 items. Moreover, different classification approaches are compared to gain insight into heuristic performance to deal with the outlined problem.

Keywords: Machine Learning; Variable Cost and Size Bin Packing

References

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