Multi-objective inventory classification
using Particle Swarm Optimization

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Abstract

In thousands upon thousands kinds of inventories, there are different items with various characters. It is not clever to handle all items with the same method of management. The best approach is classifying the items of inventory into several groups in accordance with goal of inventory management, and different groups are controlled in light of different management methods.

This research develops an inventory classification method based on Particle Swarm Optimization, and this approach can automatically classify the items of inventory to optimal number of groups. The result of classification satisfies different objective functions, including cost, demand correlations, inventory turnover, and in addition, the research integrates three objective functions to a multi-objective function. Practical data is used to test the performance of the proposed approach. Furthermore, it is compared to those of some general applied inventory classification methods, such as grouping policy according to provider, ABC classification system and all items classified in one group. Through experimental design and result analysis, it is shown that this approach performs the best among all tested methods. In addition, this research also investigates the best selection of parameter values in the Particle Swarm Optimization. The parameters which are analyzed include population size, iteration number, learning factors, max particle velocity and inertia weight. Finally, the proposed approach presents suggestions for setting the values of parameters.

Keywords：Particle Swarm Optimization、Multi-objective、inventory classification