Developing an Association Clustering Method
for Multi-item Inventory Control

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ABSTRACT

To satisfy customers' requirements and increase competition in serve market, it is critical for an enterprise to construct an optimal inventory control model. For the sake of managing various costomized products, most enterprises adopt multi-item inventory control instead of traditional inventory management. A few researches have mentioned the coordinated replenishment policy with correlated demands reduces the corresponding total cost more than that with independent demands, and the savings increase as the demand correlation increases. However, this approach made the multi-item inventory control increase the difficulties for dealing with many products, so that the efficiency and benefits are usually not as satisfied as predicted.

To conquer the difficulties, this research proposes an association clustering method to evaluate the correlated demands. The method adapts the concept of "support" from association rule algorithm to measure the similarity between products. After transforming supports for itemsets into distance function, we use clustering method to generate association clusters in which the items in the same cluster have similar demand models. These clustering results are used into can-order policy and calculating the quality of demand in different periods. Several simulation results show that the proposed method is efficient and cost-saving for several retailing transaction

databases. In addition, this method also successfully applies to an enterprise's transaction database to accomplish multi-item inventory control. It is found that the proposed method is beneficial for the enterprise to achieve a better and efficient inventory management.