An Ant Colony Optimization Clustering Algorithm

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ABSTRACT

Cluster analysis is a technique used to forecast and infer a great deal of data in the domain of data mining. Its major objective is to differentiate the data that have unknown categories. Decision manager can obtain the reference information through the result of cluster analysis. Therefore developing an efficient clustering algorithm is important for many applications. K-Means algorithm is commonly used to conduct clustering task since it can quickly cluster data. However, K-Means algorithm has many drawbacks when used to real world cluster problem.

This research combines the concept of traditional clustering algorithm and the technique of ant colony optimization to develop a clustering algorithm that can obtain the global optimization solution. The approach improves the drawback in which K-Means algorithm is easily fall into an awkward situation of the local optimization solution. To demonstrate the benefits of our method, this research experiments several sample data sets. These experiments show that the proposed cluster algorithm can improve the drawback of K-Means algorithm and obtain better cluster objective value and accurate rate. Furthermore, we use product specifications data and production defect data from a practical PCB manufacturer to forecast the defects for a new

product. This can prevent and reduce the produce cost and raise the quality of the new product during production.

Keywords：Data Mining, Cluster Analysis, Clustering Algorithm, Ant Colony Optimization, K-Means Algorithm