

## 一种改进的简化均值粒子群 K-means 聚类算法

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**摘 要:** 针对粒子群优化算法容易陷入局部最优且 K-means 算法受聚类数及初始聚类中心的选取影响较大, 提出了一种改进的简化均值粒子群 K-means 优化聚类算法 (ISMP SO-AKM)。一方面, 在简化粒子群算法的基础上, 加入邻域最优粒子, 由个体最优位置、全局最优位置及邻域最优位置线性组合改进位置公式。另一方面, 构造一种基于余弦函数和对数函数的惯性权重, 实现对惯性权重的动态调整。此外, 引入 AKM 聚类算法确定聚类数, 动态获取初始中心, 进一步提高算法的准确性。仿真实验表明, 改进的 ISMP SO-AKM 算法具有更快的收敛速度, 更高的求解精度及更稳定的聚类结果。

**关键词:** 粒子群优化算法; 简化粒子群; 邻域最优粒子; K-means 聚类; 聚类数; 初始聚类中心

## An improved simplified mean particle swarm optimization

### K-means clustering algorithm

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**Abstract:** To figure out the problems such as the fact that particle swarm optimization algorithm is easy to fall into local optimum and K-means algorithm is greatly influenced by the number of clusters and the selection of initial cluster centers, an improved simplified mean particle swarm optimization K-means clustering algorithm (ISMP SO-AKM) is proposed. On the one hand, on the basis of simplified particle swarm optimization, the neighborhood optimal particle is added to improve the position formula by linear combination of individual optimal position, global optimal position and neighborhood optimal position. On the other hand, an inertia weight based on cosine function and logarithmic function is constructed to realize dynamic adjustment of inertia weight. In addition, AKM clustering algorithm is introduced to determine the number of clusters and dynamically obtain the initial center, which further improves the accuracy of the algorithm. The simulation results show that the improved ISMP SO-AKM algorithm has faster convergence speed, higher accuracy and more stable clustering results.

**Key words:** particle swarm optimization algorithm; simplified particle swarm optimization; neighborhood optimal particle; k-means clustering; cluster number; initial cluster center

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