

优化的核模糊 C 均值聚类算法

刘奕麟, 安建成

(太原理工大学 计算机科学与技术学院, 山西 太原 030024)

摘要: 提出一种优化的核模糊 C 均值聚类算法 (WBAKFCM). 该算法首先通过改进蝙蝠算法 (Weight bat Algorithm, WBA) 确定最优聚类中心集合, 然后用核模糊 C 均值聚类算法指导聚类划分. 一方面, 改进的蝙蝠算法在传统的蝙蝠算法中引入佳点集理论和速度权重, 分别用于调节种群的初始化和个体位置的自适应更新. 另一方面, 在核模糊 C 均值聚类算法 (Kernel Fuzzy C-Means, KFCM) 中, 选用了高斯核函数, 从而将数据映射到高维特征空间进行聚类划分. 实验结果表明, 优化的核模糊 C 均值聚类算法在聚类准确率与时间效率上明显优于传统算法.

关键词: 模糊 C 均值聚类; 核函数; 蝙蝠算法; 佳点集; 速度权重

Optimized Kernel Fuzzy C-Means Clustering Algorithm

LIU Yi-lin, AN Jian-cheng

(College of Computer Science and Technology, Taiyuan University of Technology, Taiyuan 030024, China)

Abstract: This paper an optimized kernel fuzzy C-means clustering algorithm (WBAKFCM) is proposed. Firstly, the optimal clustering center is found by the improved bat algorithm (WBA), then the Kernel Fuzzy C-Means clustering algorithm (KFCM) is used to guide the clustering. On the one hand, the improved bat algorithm adding two strategies to the traditional bat algorithm, the good point set theory and velocity weight are used to adjust population initialization and adaptive updates of the individual position respectively. On the other hand, in the Kernel Fuzzy C-Means clustering algorithm, the Gaussian kernel function is selected to map the data to high-dimensional feature space for clustering. The experimental results show that the optimized kernel fuzzy C-means clustering algorithm is superior to the traditional algorithm in clustering accuracy and time efficiency.

Key words: Fuzzy C-Means; kernel function; Bat Algorithm; good point set; speed weight

作者简介:

刘奕麟 女, (1991-), 硕士. 研究方向为人工智能和图像处理. E-mail: 654969188@qq.com.

安建成 男, (1963-), 副教授. 研究方向为机器学习与图像处理.