

图形、图像、模式识别

自适应快速FCM彩色图像分割研究

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摘要 模糊C均值聚类算法(FCM)广泛用于彩色图像分割,但该算法存在需要预先指定聚类数目、计算量大、耗时长且易陷入局部最优等缺点。提出一种自适应快速模糊C均值彩色图像分割方法,该方法首先运用蚁群算法,自动获取初始聚类中心和聚类数目,然后使用基于梯度的分水岭算法对原始彩色图像进行预分割,得到一系列由色彩特征空间具有一致性的点构成的子集,最后对这些子集的中心进行模糊聚类。实验结果表明:由于子集数量远小于原始图像像素数目,使聚类样本数量显著减少,大大提高了聚类速度,同时在聚类中以特征距离代替欧式距离,增强了算法的鲁棒性。

关键词 [模糊C均值聚类](#) [彩色图像分割](#) [蚁群算法](#) [分水岭算法](#) [特征距离](#)

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Study on color image segmentation of self adapting fast FCM clustering

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Abstract

Fuzzy C-mean algorithm (FCM) has been being well used in the field of color image segmentation with some disadvantages such as: Predesignation of the number of clustering classes, high computational complexity and local optimal solution etc. This paper proposes a self adapting fast fuzzy C-mean algorithm of color image segmentation. This algorithm gets the number of clustering classes and the init-clustering centres with ant colony algorithm firstly. And then, pre-segments the original color image using a watershed algorithm based on gradients to obtain a series of subsets composed of pixels with similarity in the color feature space and uses FCM among centres of those subsets. Experimental result proves that the speed of FCM clustering is improved greatly because the number of pixel subsets is far less than that of original pixels and by the feature distance instead of Euclidian distance, robustness of this method is enhanced.

Key words [fuzzy c-mean clustering](#) [color image segmentation](#) [ant colony algorithm](#) [watershed algorithm](#) [feature distance](#)

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