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博士论坛

非局部降噪快速模糊C-均值聚类算法

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摘要 传统的模糊C-均值聚类算法未利用图像的空间信息，在分割迭加了噪声的MR图像时分割精度较差。采用了既能有效去除噪声又能较好地保持图像边缘特征的非局部降噪方法，结合基于图像灰度直方图聚类分析的快速模糊C-均值聚类算法，得到了一种具有较高分割精度的图像快速分割算法。通过对模拟图像、仿真脑部MR图像和临床脑部MR图像的分割实验，表明提出的新算法比已有的快速模糊C-均值聚类算法有更精确的图像分割能力。

关键词 非局部降噪滤波器 快速模糊C-均值聚类算法 图像分割

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Non-local denoising fast fuzzy C-means clustering algorithm

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Abstract

Fuzzy C-means（FCM） is a popular clustering algorithm widely used in fuzzy segmentation of Magnetic Resonance（MR）images.The conventional FCM can not yield satisfied segmented results when dealing with noisy MR images because it does not take spatial information of images into account.Non-local denoising filter can preserve image edge effectively.A fast FCM algorithm based on gray levels histogram clustering analysis can be implemented，because its segmentation time is only dependent on the number of the gray levels rather than the size of the image data.A novel non-local denoising fast FCM framework is proposed by combining non-local denoising filter and fast FCM.The segmentation of synthetic images，simulated brain MR images with different noise levels and real brain MR images are presented in the experiment.The results of experiments show that the proposed algorithm is more powerful than the existing fast FCM methods.

Key words non-local denoising filter fast fuzzy C-means algorithm image segmentation

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