

图像与信息处理

基于多分辨率的多模态医学图像配准

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摘要:

提出了一种多分辨率多模态医学图像配准方法来提高图像的配准速度与精度。利用小波函数对图像进行多层分解, 采用改进的Powell优化算法寻找待配准图像间的最大互信(MMI), 配准首先从图像金字塔中分辨率最低的0层图像开始, 将0层图像配准获得的变形参数作为1层图像配准的起始参数, 重复该过程直到完成最高精度层的图像配准。CT/MRI和CT/PET图像配准结果证明基于小波分解的多分辨率配准方法具有避免优化算子陷入局部极值、算子收敛速度快和配准精度高等优点。

关键词: 图像处理 图像配准 最大互信息 小波 改进Powell优化算法

Multimodality images registration based on multi-resolution

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Abstract:

The paper proposed a multi-resolution multi-modal medical image registration method to improve the speed and accuracy of registration. The images were decomposed by Wavelet function, and expanded Powell optimization algorithm was used to find the Maximize mutual information (MMI) between images. The registration starts from the lowest-resolution image level 0 of the images pyramid, the deformation parameters of image Level 0 registration will be available as the initial parameters of image Level 1, repeating the process until the completion of the highest-resolution image registration. The images registration results of CT/MRI and CT/PET show that wavelet-based multi-modal registration method has many advantages such as avoiding Optimizer getting into local maxima, fast convergence and high accuracy.

Keywords: image processing images registration maximize mutual information wavelets expanded Powell algorithm

收稿日期 2010-11-26 修回日期 2011-07-08 网络版发布日期 2012-01-28

DOI:

基金项目:

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