عنوان مقاله:

A Fully Automated Segmentation of Radius Bone Based on Active Contour in Wrist MRI Data Set

محل انتشار:

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خلاصه مقاله:

Advanced medical imaging techniques require high performance segmentation algorithms. Extracting the structures of interest accurately is one of the main challenges in medicalimaging segmentation. In this paper a methodological approach based on active contour is proposed for fully automated segmentation of radius bone. As soft tissues like tendons, muscles and fat around the bone have close intensities to internal parts ofthe bone, accurate segmentation is difficult. Here the designedframework takes an MR image including radius bone as input and produces the segmented radius bone in 3D voxel set. Themulti-step approach for segmentation is as following. Since our data set was much noisier, at first we denoised and enhancedcontrast of the data using wavelet transform. Then an initial segmentation was produced focusing on edge map. Next,according to anatomical knowledge about the radius bone shapeand size in intermediate slices, radius bone was extracted in this slice and used as the mask slice for adjacent slices. This masking procedure was applied to all slices with a 3D approach. After that we derived a convex hull region around the radius bone. Thisstep was done for whole slices as regions of interest. Finally the estimated convex region is used as an initial mask for activecontour. This framework was tested on more than 600 coronal MR slices of 23 subjects. In comparison to manual segmentationour method showed an average Dice similarity coefficient DSC and kappa statistics of 94.82% and 92.46% respectively. In the future works we utilize the proposed approach as part of a computer-aided diagnosis system for bone age estimation.

کلمات کلیدی:

coronal slice , wavelet transform , edge map , initial mask