A new segmentation and registration approach for vertebral body analysis

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Abstract:

To diagnose the osteoporosis accurately, the bone mineral density (BMD) measurements of the vertebral bodies (VBs) are required. In this paper, we propose a new segmentation and registration method in order to assist the BMD measurements and fracture analysis (FA) accurately. In this experiment, image appearance and shape information of VBs are used. Our shape model is required to be registered to the testing image to avoid user interaction(s). Our proposed framework has four phases: i) the detection of vertebral body (VB) using the Matched filter, ii) initial segmentation using the intensity and spatial interaction models, iii) the registration of the shape prior and initially segmented image by matching a vector distance function (VDF), and iv) final segmentation using graph cuts which integrates intensity, spatial interaction and shape prior. Preliminary results show that our new algorithm is very promising and can solve many segmentation and registration problems.

Keywords:

Vertebral Body (VB), shape based segmentation and registration, BMD measurements.

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