

A level set based deformable model for segmenting tumors in medical images

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Abstract

Tumor segmentation from medical image data is a challenging task due to the high diversity in appearance of tumor tissue among different cases. In this paper we propose a new level set based deformable model to segment the tumor region. We use the gradient information as well as the regional data analysis to deform the level set. At every iteration step of the deformation, we estimate new velocity forces according to the identified tumor voxels statistical measures, and the healthy tissues information. This method provides a way to segment the objects even when there are weak edges and gaps. Moreover, the deforming contours expand or shrink as necessary so as not to miss the weak edges. Experiments are carried out on real datasets with different tumor shapes, sizes, locations, and internal texture. Our results indicate that the proposed method give promising results over high resolution medical data as well as low resolution images for the high satisfaction of the oncologist at the Cancer Treatment Unit at Jaffna Teaching Hospital.

Author keywords

level set; segmentation; speed function; tumor

Indexed keywords

Deformable models; Gradient informations; Healthy tissues; High resolution; Iteration step; Level Set; Low resolution images; Medical data; Medical images; Real data sets; Regional data analysis; Speed function; Statistical measures; Tumor segmentation; Tumor shape; Tumor tissues; Tumor voxels; Velocity force; Weak edge

Engineering controlled terms: Biomedical engineering; Deformation; Image segmentation; Information science; Medical imaging; Pattern recognition

Engineering main heading: Tumors