

Image Segmentation Using Active Contours Based on Anisotropic Diffusion

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Abstract : Active contour is one of the image segmentation techniques and its goal is to capture required object boundaries within an image. In this paper, we propose a novel image segmentation method by using an active contour method based on anisotropic diffusion feature enhancement technique. The traditional active contour methods use only pixel information to perform segmentation, which produces inaccurate results when an image has some noise or complex background. We use Perona and Malik diffusion scheme for feature enhancement, which sharpens the object boundaries and blurs the background variations. Our main contribution is the formulation of a new SPF (signed pressure force) function, which uses global intensity information across the regions. By minimizing an energy function using partial differential framework the proposed method captures semantically meaningful boundaries instead of catching uninterested regions. Finally, we use a Gaussian kernel which eliminates the problem of reinitialization in level set function. We use several synthetic and real images from different modalities to validate the performance of the proposed method. In the experimental section, we have found the proposed method performance is better qualitatively and quantitatively and yield results with higher accuracy compared to other state-of-the-art methods.

Keywords : active contours, anisotropic diffusion, level-set, partial differential equations

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