Active Contours for Image Segmentation Based on Complex Domain Approach

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Abstract : The complex domain approach for image segmentation based on active contour has been designed, which deforms step by step to partition an image into numerous expedient regions. A novel region-based trigonometric complex pressure force function is proposed, which propagates around the region of interest using image forces. The signed trigonometric force function controls the propagation of the active contour and the active contour stops on the exact edges of the object accurately. The proposed model makes the level set function binary and uses Gaussian smoothing kernel to adjust and escape the re-initialization procedure. The working principle of the proposed model is as follows: The real image data is transformed into complex data by iota (i) times of image data and the average iota (i) times of horizontal and vertical components of the gradient of image data is inserted in the proposed model to catch complex gradient of the image data. A simple finite difference mathematical technique has been used to implement the proposed model. The efficiency and robustness of the proposed model have been verified and compared with other state-of-the-art models.

Keywords : image segmentation, active contour, level set, Mumford and Shah model

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