

Active Contour Model Based on Fuzzy C-Means and Local Pre-fitting Energy for Image Segmentation

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Online Resource 1

0.1 Effects of Data-driven Functions

We select 4 images to validate the second-order differential characteristics of the data-driven term and the regularization function. The experimental results are shown in Fig.1, where the first three images are artificially synthesized images and the fourth image is a real image.

It is indicated from Fig.1 that image single-row data has obvious second-order differential characteristics, which is the driving force used to guide the evolution of the level set. The images' data-driven item $e_{\text{org}} = e_1(\mathbf{x}) - e_2(\mathbf{x})$ vary greatly and the numerical distribution is disorderly, resulting in the target outline cannot be identified. After being optimized by the adaptive regularization function, the data-driven function $e_{\text{ARF}} = -\alpha f_{\text{RS}}(e_1(\mathbf{x}) - e_2(\mathbf{x}))/\beta$ is limited to a small range. The slope of the regularization function near the zero point is improved, and the two ends of the data are smoothed so that the target contour can be clearly identified in each of the four images.

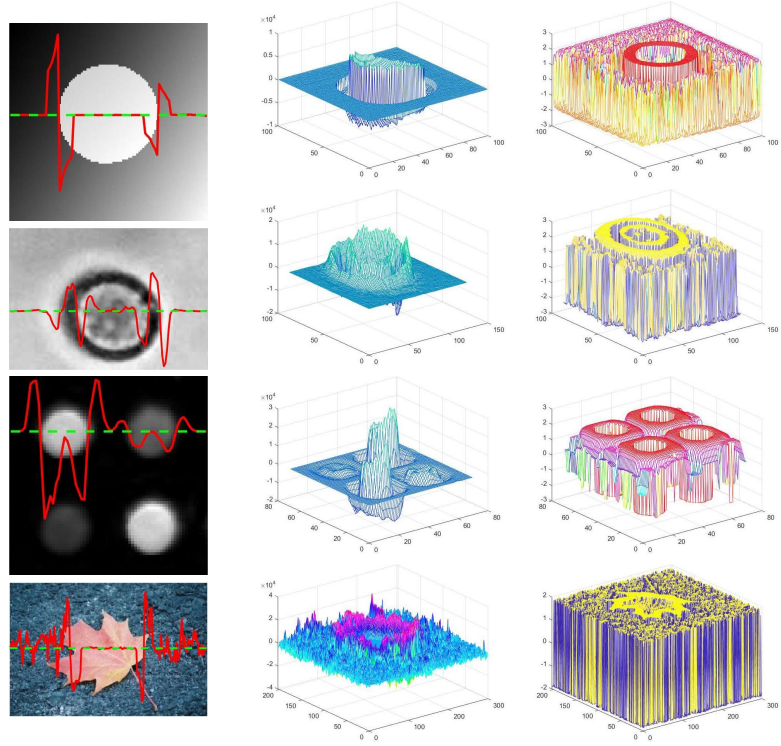


Fig. 1 Data-driven function visualization experiments. First column: the single-row(drawn by the red solid line) second-order differential value curve(indicated by the green dotted line) in the image. Second column: the 3D display of the data-driven function e_{org} . Third column: the 3D display of the adaptive data-driven function e_{ARF} .