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Hai Min , Jingting Lu , Wei Jia , Yang Zhao , Yuetong Luo

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An Effective Local Regional Model Based on Salient Fitting for Image Segmentation

Hai Min¹, Jingting Lu^{2,*}, Wei Jia¹, Yang Zhao¹, Yuetong Luo¹

¹School of Computer and Information, Hefei University of Technology, Hefei 230009, China

²Institution of Industry and Equipment Technology, Hefei University of Technology, Hefei, China;

Abstract: Intensity inhomogeneity often occurs in real-world images, and inevitably leads to many difficulties for accurate image segmentation. Although a lot of level set methods have been proposed to solve the problem of intensity inhomogeneity, they are often unavailable for some images with severe intensity inhomogeneity. In this paper, we propose a novel level set based segmentation model to effectively segment those images with severe intensity inhomogeneity, which is named as Local Salient Fitting (LSF) model. In LSF, we firstly transform original image into the new modality in which the object and background regions can be discriminated easily. Specially, we propose a weight factor based on local intensity variation to highlight the local region contrast of image. Meanwhile, the variation degree of local region is also computed to extract the distribution information of intensity variation. Then, since the new modality embodies the distribution information of intensity variation, we utilize the idea of fitting region distribution information to construct the salient fitting term. Finally, the salient fitting term is incorporated into the level set method to segment intensity inhomogeneous images. Furthermore, the combined effect of highlighted local region contrast and statistical distribution information of intensity variation will enhance the robustness of our method. Experiments conducted on synthetic and real images clearly demonstrate the efficiency and robustness of the proposed LSF model.

Keywords: level set, intensity inhomogeneity, image segmentation, salient fitting

* Corresponding author

Email address: lujt@hfut.edu.cn (Jingting Lu), minhai361@aliyun.com (Hai Min)

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