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## Abstract

The application of the level set method in image segmentation has been very popular due to its capability of automatically handling changes in topology. However, a re-initialization procedure, which leads to expensive computation, is required in the traditional level set method to keep the level set function as a signed distance function to its interface. A method based on Gaussian filtering and binary level set is proposed for the level set function of region based active contour model (ACM). The proposed level set method is integrated with the global region based Chan-Vese (C-V) ACM for image segmentation. The proposed method can, not only ensure the smoothness of the level set function by Gaussian filtering, but also eliminate the requirement of re-initialization, which is very computationally expensive task. The level set function can also be easily initialized as a binary function, which is more efficient to construct practically than the widely used signed distance function (SDF). Moreover, as the proposed scheme allows using larger time step than what can be used with the standard C-V model, it is tremendously faster than standard C-V model. Finally, the proposed algorithm can be efficiently implemented by the simple finite difference scheme. Experimental results on synthetic and real images shows that the proposed method is more efficient in terms of computational time and accuracy than global

region based C-V active contour model.

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## Index Terms

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