

MASTER'S THESIS

Advances in active contour algorithms

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Advances in Active Contour Algorithms

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Abstract

Locating an object's boundary is one of the important steps for many image processing applications such as pattern recognition systems and content-based retrieval systems. An active contour model or Snake has been successfully used in contour detection for object recognition, computer vision, computer graphics, and biomedical image processing. Based on the object's boundary, the image's contents can be extracted. However, Snake has difficulties handling image objects with sharp corners or non-convex regions.

In this thesis, we proposed four methodologies on modifying the Snake algorithm. These four methodologies can be classified into 2 groups. The first group is to modify the energy term of the Snake algorithm. The second group is to modify the Snake algorithm by transforming the domain in which contour detection takes place. The first class of methods work well but require introducing extra parameters, while the second group of methods seem to overcome most of the problems associated with traditional Snake algorithms without the need to use many user-specified parameters. Moreover, all our methods can be combined with other existing models including Segmented Snake algorithm, Robust Active Contour, etc. Extensive experiment have been carried out and these results show that our new methods can handle image objects of highly irregular boundaries effectively.

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