Image Segmentation Based on Fuzzy Maximum Entropy and Simulated Annealing Algorithm

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ABSTRACT

Thresholding is an important topic for image processing, pattern recognition and computer vision. Selecting thresholds is a critical issue for many applications. It is generally believed that many image properties, such as brightness, boundary, region, etc., are fuzzy in nature, and can be described as a fuzzy set. In this paper, we propose a method for image segmentation, basing on the maximum fuzzy entropy. The brightness for gray levels of an image is used as a fuzzy set, the Maximum Entropy Principle is used as the criterion to find the optimal membership function which will best represent the membership of the brightness for each gray level of an image. The simulated annealing algorithm is used to obtain the optimal threshold value for the image segmentation. Experiments on many images have been conducted. The experimental results show that the proposed method can segment an image effectively and rapidly. The main features of the original images can be preserved very well.

Keywords: Image Processing, Thresholding, Fuzzy Set, Maximum Entropy, Simulated Annealing Algorithm