

Applying New Method for Computing Initial Centers of k -Means Clustering with Color Image Segmentation

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Abstract

As a classic clustering method, the traditional k -Means algorithm has been widely used in image processing and computer vision, pattern recognition and machine learning. It is known that the performance of the k -means clustering algorithm depends highly on initial cluster centers. Generally initial cluster centers are selected randomly, so the algorithm could not lead to the unique result. In this paper, we present a method to compute initial centers for k -means clustering. Our method based on an efficient technique for estimating the modes of a distribution. We apply the new method in segmentation phase of color images. The experimental results appeared quite satisfactory.

Keywords: clustering; k -Means algorithm; Image segmentation; Color spaces.

1.Introduction

Image segmentation is the first step of the most critical tasks of image analysis, as shown in Figure (1). It is used either to distinguish objects from their background or to partition an image onto the related regions. There are different techniques that would help solve the image segmentation problem. Jeon *et al.* [1] in his review of the previous related studies, categorized these techniques into the following: thresholding approaches, contour based approaches, region based approaches, clustering based

approaches and other optimization based approaches using a Bayesian framework and neural networks. The clustering approaches can be categorized into two general groups: partitionial and hierarchical clustering algorithms.

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