A novel dynamic minimum spanning tree based clustering method for image mining

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Abstract

Image mining is more than just an extension of data mining to image domain. Image mining is a technique commonly used to extract knowledge directly from image. Image segmentation is the first step in image mining. Image segmentation is very difficult but important problem in computer vision. We present a novel Minimum Spanning Tree based approach to image segmentation which can be applied to either greyscale or color image. The assumption is the nearby pixels with similar color or greyscale intensities may belong to the same region or segment of the image. A graph representation for an image is derived from the similarity between the pixels, and then partitioned by computationally efficient graph clustering method. We treat image segmentation as graph partitioning problem. The minimum spanning tree based clustering algorithm is capable of detecting clusters with irregular boundaries. In this paper we propose minimum spanning tree based clustering algorithm using weighted Euclidean distance for edges, which is key element in building the graph from image. The algorithm produces best number of clusters (regions) with segments. An important characteristic of the method is its ability to preserve detail in low-variability image regions while preserving detail in high-variability regions.

Keywords: *Clustering, Image mining, Image segmentation, Weighted Euclidean Minimum Spanning Tree, Cluster separation*