Image Segmentation with Adjustable Spatial-Color Features Weights using Kohonen Self-Organizing Maps

Bogdan PETROVAN

Abstract

Among pixel clustering approaches to color image segmentation, an appealing technique is the Self Organizing Map (SOM). Pixels' clustering on color only can lead to spatially non-homogeneous regions; to correct this, spatial information is often embedded. This paper proposes and implements in Java such an approach, in which the segmentation is achieved in a feature space formed by the color and spatial coordinates of a pixel as input to a SOM. Unlike similar approaches, where spatial and color information have equal weights, I propose to weight differently the two types of information, for a more robust segmentation. The approach is implemented in Java. Two color spaces are examined: the basic RGB and the perceptually uniform YUV color spaces. The later gives much better image segmentation performance. The experimental results show good performance tuning the weight of the spatial and color features. Further optimizations will include automatic adjustment of the weights.