



Unsupervised Segmentation Method of Multicomponent Images Based on Fuzzy Connectivity Analysis in the Multidimensional Histograms

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Résumé en anglais	<p>Image segmentation denotes a process for partitioning an image into distinct regions, it plays an important role in interpretation and decision making. A large variety of segmentation methods has been developed; among them, multidimensional histogram methods have been investigated but their implementation stays difficult due to the big size of histograms. We present an original method for segmenting n-D (where n is the number of components in image) images or multidimensional images in an unsupervised way using a fuzzy neighbourhood model. It is based on the hierarchical analysis of full n-D compact histograms integrating a fuzzy connected components labelling algorithm that we have realized in this work. Each peak of the histogram constitutes a class kernel, as soon as it encloses a number of pixels greater than or equal to a secondary arbitrary threshold knowing that a first threshold was set to define the degree of binary fuzzy similarity between pixels. The use of a lossless compact n-D histogram allows a drastic reduction of the memory space necessary for coding it. As a consequence, the segmentation can be achieved without reducing the colors population of images in the classification step. It is shown that using n-D compact histograms, instead of 1-D and 2-D ones, leads to better segmentation results. Various images were segmented; the evaluation of the quality of segmentation in supervised and unsupervised of segmentation method proposed compare to the classification method k-means gives better results. It thus highlights the relevance of our approach, which can be used for solving many problems of segmentation.</p>

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