Hierarchical segmentation of multimodal images

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Abstract

This talk deals with the problem of multimodal segmentation, that is how to find a partition starting from images of the same objects acquired by different sensors (modalities).
The availability of images acquired by different sensors is of particular interest since joining diverse information sources allows one to have a more accurate perception of the imaged objects.
However, performing image segmentation jointly on several modalities is a challenging process: how to preserve and exploit the complementarity of the different modalities and how to get rid of their redundancy?
In this work we consider a segmentation approach that deals with hierarchical representations of the image content.
We address the problem of the joint segmentation of images with different characteristics by using the recently proposed structure of braids of partitions, which can be considered as an extension
of the concept of hierarchies of partitions. Specifically, we derive a novel and practical architecture implementing the fusion of hierarchical representations based on braids of partitions.
Formulating the segmentation process in an energetic framework it is possible to obtain segmentation maps, considering joinlty different modalities, that are optimal with respect to some criterion (defined according to the application). The validation of the proposed methodology is conducted using various multimodal data sets.

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