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Visualization and analysis of multidimensional data using morphological techniques

Monday, January 9, 2017 1:20 PM (1 hour)

This talk centers around the analysis and visualization of multidimensional scalar and tensor data within the framework of mathematical morphology. Initiated in the 1960s, mathematical morphology was developed to describe image operators for enhancement, segmentation, and extraction of shape information from digital images. In contrast to traditional linear image processing, the morphological image operators focus on the geometrical content of images and are nonlinear.

In this talk we first discuss morphological pyramids for multiresolution visualization of volume data. Then we describe recent work on morphological filters for multidimensional tensor-valued data. From the theoretical point of view, an important aspect in the design of morphological operators is their invariance under translation, rotation or scale changes, or, more generally, under an arbitrary group of transformations. A recent approach to group invariance (and particularly rotation invariance) for tensor fields is presented, based on the concept of frames.

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