

COMPUTATIONAL METHODS IN IMAGE ANALYSIS

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Abstract

In many applications computers analyse images or image sequences quality of which can be poor, e.g., they are contaminated by a noise and/or boundaries of image objects are partly missing (e.g. in bio-medical imaging, in scene with occlusions or ilusory contours). We will discuss how nonlinear partial differential equations can be used to denoise and segment such images and extract further useful information from large-scale 3D image sequences arising e.g. in cell developmental biology. We apply finite volume spatial discretizations and semi-implicit time discretizations to geometrical advection-diffusion equations related to level set formulation of the surface evolution problems. The methods are unconditionally stable, robust, fast and naturally parallelizable.

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