

Nonlinear Evolutionary PDE's for Imaging and Graphics

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Abstract

In the past few years, methods based on nonlinear evolutionary partial differential equations has become increasingly popular in the image processing and computer graphics fields. PDE-based techniques have brought new and powerful tools in imaging and graphics, the areas traditionally occupied by electrical engineers and computer scientists. In their turn, image processing and computer graphics bring to the PDE field many new and challenging problems.

In my talk, I will give a brief and informal overview of nonlinear diffusion techniques used for image denoising, enhancement, and segmentation. I will also discuss classical and recent applications of nonlinear diffusion tools in computer graphics and geometry processing areas. In particular, the following topics will be covered:

- Perona-Malik nonlinear diffusion and its extensions;
- Curvature-driven curve and surface evolutions for object boundary detection and adaptive smoothing;
- Bilateral filter and its generalizations.