Modeling and Numerical Solution of Variational Image Segmentation

K. Chen

Centre for Mathematical Imaging Techniques
and Department of Mathematical Sciences
The University of Liverpool

Abstract:

Edge detection algorithms were the traditional methods for finding feature edges in an image but noise can seriously reduce the effectiveness of such models. More recently, variational segmentation models provide more effective and reliable tools for image processing applications. The Chan-Vese (2001) model in two dimensions is effective and widely used.

In this talk, I shall first present some new multigrid algorithms for this model in the three dimensional setting. Then I show some recent generalization works of selective segmentation where pre-defined geometric constraints guide the segmentation models. Numerical experiments will demonstrate the advantages of the new algorithms and the new models over existing results. Collaborators related to this work include Noor Badshah (Peshawar, Pakistan), Jian-ping Zhang and Bo Yu (Dalian, China).