



Medical Imaging – Reconstruction, tracking, segmentation

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Abstract

The reconstruction of anatomical and physiological information from 3D and 4D images is one of the key problems in medical imaging. This reconstruction typically requires the segmentation and tracking of organs in images. Model-based approaches have been shown to be very powerful in this context as these approaches can incorporate a priori knowledge about the scene (in this case the anatomy and its natural variability) into the problem formulation. We will discuss various model-based approaches that employ statistical as well as probabilistic approaches for segmentation and tracking. In particular, we will focus on atlas-based segmentation approaches that employ advanced machine learning approaches such as manifold learning and classifier fusion to improve the accuracy and robustness of the segmentation approaches. We will also illustrate how these approaches can be extended to the tracking of organs in dynamic 3D image sequences.

Syllabus: Statistical and probabilistic image segmentation, shape models, atlases