

Postprocessing and Cross Validation

Basics of Imaging Processing

Image Segmentation: Methodolgy and Validation

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Learning Objectives:

- To get a comprehensive overview of different image segmentation techniques
- To understand how prior knowledge is integrated in various model-based image segmentation techniques
- To learn about standardization and validation of image segmentation techniques

In this talk, a comprehensive overview of image segmentation techniques will be provided. The talk will first introduce low-level, unsupervised techniques, which utilize image information, such as intensity, gradients, and textures, for voxel classification. Subsequently, segmentation techniques that utilize prior information will be discussed. Prior information can relate to object smoothness, the physics of image formation, anatomy of physiology, or on image appearance. The following segmentation techniques will be discussed in some detail: (i) Pixel/voxel based classification, (ii) deformable model based segmentation, (iii) active shape and appearance based models, (iv) atlas-based segmentation, and (v) graph cuts. Different examples in the field of biomedical and biological image analysis will be shown. Finally, the importance for validation and standardization, different frameworks for standardized validation, and consolidation of image segmentation techniques will be discussed.