Title: Algorithms and Software for Image Segmentation

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Abstract:
Image processing techniques have an increasingly important role in the quantitative assessment of medical images. Segmentation algorithms identify the structure or type of tissue present at every voxel in an image. This is an important prerequisite which enables calculation of volume and shape measures. The focus of this course is to review algorithms for image segmentation, and the software that is widely available and frequently used.

Often the most appropriate and effective techniques are designed to suit the special requirements of the anatomy and appearance of the structures under consideration. Particular challenges include overcoming the effects of image acquisition artifacts, imaging system noise, and patient-specific normal and pathological variability.

The similarities and differences between algorithms in commonly used software packages will be described. The strengths and weaknesses of the packages for a range of types of images and subject populations will be described. Practical approaches to assessing the quality of image segmentation, and the validity of measures derived from image segmentation will be discussed.

The fundamental aspects of image segmentation analysis will be described with emphasis on knowledge of the applications of commonly used software packages in practice.