2D / 3D GPU-Cut for Interactive Medical Image Segmentation

Short description:
Design and implementation of an interactive segmentation algorithm for medical image analysis on the GPU

Goal:
Segmentation of digital imagery in general is a labeling problem in which the goal is to assign to each pixel in an input image a unique label that represents an object. However, in the medical field automatic segmentation methods are typically only suitable for a specific type of pathology in a specific imaging modality and still fail time-by-time, and more-over, most automatic approaches need precise parameter settings to provide good results. As a consequence, the state of the art or rather clinical practice in medical departments is still manual slice-by-slice segmentations which are very time consuming. Thus, interactive segmentation approaches get more and more popular, because they allow the user to support the algorithm with more information, especially in difficult segmentation tasks. However, in this project an interactive graph-based approach which requires only one user-defined seed point inside the segmentation object should be designed and implemented for the GPU. The algorithm should eligible for real-time segmentation by means of giving the user real-time feedback of the segmentation result.

Note: Biomedical Engineering Students are welcome!

Keywords:
2D, 3D, Interactive, Segmentation, GPU, Computer Vision

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