**Segmentation of Visible Chinese Human (VCH) Anatomic Images and 3D Reconstruction of Segmentation Results**

**Abstract**

This article discusses image segmentation and 3D reconstruction. Image segmentation has been widely acknowledged as the fundamental process as well as a typically difficult problem involved in image processing. Three Dimensional reconstruction technology could help to reconstruct series of 2D segmented binary images and display the 3D image of the target object.

I have finished segmentation of vessels in both legs from the anatomic images of VCH (Visible Human Data) and using ITK (InsightToolkit) as the tool, thus accomplished 3D reconstruction of those segmented images. Ten satisfactory body-figure images have been segmented with the combination of manual methods with watershed and region growing algorithms, while eighteen less satisfactory bone and medulla images segmented using region growing algorithm.

Segmentation of vessel image comes to be the most important part because vessels of VCH have been perfused. First, I made an analysis of the difficulties in vessel segmentation. Then, basic segmentation thought has been proposed and several methods, like thresholding, region growing and Hough transformation algorithms have been employed, but still could not solve all the difficulties. So, a hybrid method integrating manual way and region growing algorithm has been put forward and resulted in 1600 segmented vessel images, 800 each in both legs.

Afterwards, VTK (Visualization Toolkit) based 3D reconstruction of the 1600 segmented vessel images, 100 images each time, help to display 16 frames of 3D vessel images, of which, three view angel have been gained to make a better performance of each 3D images. Finally, evaluation of the 3D images has been made to estimate the segmentation effects.

At the end of this thesis, both experience and lessons during the diploma design have been pointed out.

**Keywords:** Image segmentation; 3D reconstruction; ITK; VCH; VTK
Reference


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