

Segmentation and 3D Reconstruction of Animal Tissues in Histological Images

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Abstract: Nowadays, Histology is a science that is considered the "gold standard" to access anatomical information at a cellular level.

In histology studies, tissue samples are cut into very thin sections, stained, and observed under the microscope by a specialist. Such studies, mainly about tissue structures, acellular components and their interactions, can be useful for the detection and diagnosis of certain pathologies. This fact makes even more interesting to find new techniques and computational solutions to assist this diagnosis, such as the 3D image based reconstruction.

To build full 3D histological volumes from 2D slices, i.e. histological images, it is necessary to segment the input set of images, to register the segmented images and finally, built the associated 3D geometric model.

In this paper, a methodology to build 3D models from histological images will be proposed. The results obtained using four experimental cases will be presented and discussed based on quantitative and qualitative metrics.

Keywords: 3D volume, histology, image registration, image segmentation.