Supplementary material

Web page http://www.3dbar.org/wiki/barPossumFrameworkSupplement contains the most recent versions of the supplementary materials for the article:

Possum - a framework for three-dimensional reconstruction of brain images from serial sections

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ABSTRACT

Techniques based on imaging serial sections of brain tissue provide insight into brain structure and function. However, to compare or combine it with results from three dimensional imaging methods such data requires reconstruction into a volumetric form. Currently, there are no tools for performing such a task in a streamlined way.

Here we propose the Possum volumetric reconstruction framework which provides a selection of 2D to 3D image reconstruction routines allowing one to build workflows tailored to one's specific requirements. The main components include routines for reconstruction with or without using external reference and solutions for typical issues encountered during the reconstruction process, such as propagation of the registration errors due to distorted sections. We validate the implementation using synthetic datasets and actual experimental imaging data derived from publicly available resources. We also evaluate efficiency of a subset of the algorithms implemented.

The Possum framework is distributed under MIT license and it provides researchers with a possibility of building reconstruction workflows from existing components, without the need for low-level implementation. As a consequence, it also facilitates sharing and data exchange between researchers and laboratories.

The following supplementary materials are available:

1. GitHub repository with the current:
    1. Release branch: https://github.com/pmajka/poSSum/tree/release
    2. Develop branch: https://github.com/pmajka/poSSum/tree/develop

   Including installation instruction test and usage examples.

2. Screencast Showing how to install the framework on a fresh Ubuntu Linux system.

3. Virtual Box Virtual Appliance (2GB) containing reinstalled Xubuntu 12.04 Linux and ready to use PoSSum Reconstruction Framework installation. See the readme file for information how to deploy and use the virtual machine.

4. Complete set of calculations of the 3D reconstruction of the Waxholm Space Mouse Brain Reference based on 312 images of section stained with the Nissl method (Johnson et. al. 2010) described in the article.