Stereoscopic Atlas of Intrinsic Brain Networks (SAIBN)

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1.- Introduction

Stereoscopic Atlas of Intrinsic Brain Networks (SAIBN version 1.0) is a 3D stereoscopic (anaglyph method) full brain functional connectivity atlas created using a parcellation atlas published by Craddock et al. (Craddock et al., 2012). Using 3D Slicer 3.6.3 (Brigham & Women's Hospital, Boston, Massachusetts, USA; Gering et al., 1999; Pieper et al., 2004; Pieper et al., 2006; http://www.slicer.org) and the two hundred ROI version of the Craddock atlas, 200 grayscale surface models were created using a z-stat threshold > 2.3. Additionally, each surface model was processed with a surface decimation algorithm and was smoothed with the Taubin algorithm and without surface normals.

For improved visualization of the functional connectivity networks and their relative anatomical position, the surface model of five subcortical anatomical structures (corpus callosum, bilateral caudate, pallidum, putamen, thalamus, amygdala and hippocampus) were included in SAIBN. These surfaces were created with 3D Slicer using the segmentation computed with Freesurfer v. 5.1. (Fischl et al., 1999, 2000; Dale et al., 1999; http://surfer.nmr.mgh.harvard.edu).

Red-cyan glasses should be used with 3D Slicer in order to perceive the 3D stereoscopic effect.

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2.- Installation

Download 3D Slicer (http://www.slicer.org) and install 3D Slicer version 3.6.3 (SAIBN 1.0 WAS ONLY TESTED USING THAT VERSION) in Mac OS X, Linux 64 or Windows 64 bits.

Download file *saibn.zip* and uncompress it in a new folder.

Computer Requirements (minimum):
Operating System: Windows XP/7/8 64 bits or later, Linux 64 bits, Mac OS X 64 bits
CPU: Intel i7 Quad Core or higher
Memory: 8 GB RAM
Hard Disk: 150 MB available
Video card: NVIDIA Quadro Quadro FX 880M with 1GB graphics memory, or equivalent.

3.- Open and Display

In 3D Slicer, select "Load Scene… (Ctrl-O)" item under the "File" menu and open the file entitled "SlicerScene1_SAIBN.mrml". In "Modules" menu select "Models" option to get the "Model Hierrarchy" window. In the "Model Hierarchy" window the following four series of models will appear:
1) WM Surface and Pial Surface. See Fig. 1
2) The surface of some subcortical structures (corpus callosum, bilateral caudate, pallidum, putamen, thalamus, and hippocampus). See Fig. 2
3) Two hundred functional connectivity networks (Sx_S; x from 1 to 200). See Fig. 3
4) Two hundred ROIs of the Craddock parcellation (ROI_x_x; x from 1 to 200). See Fig. 4

Selection of the aforementioned structures allows for visualization. For stereoscopic visualization of the models, the "Anaglyph" radio button must also be selected (see arrow in Figure 5). The model colors were chosen for optimal anaglyph visualization, but the color and transparency factor of each model may be adjusted to the user's preference.

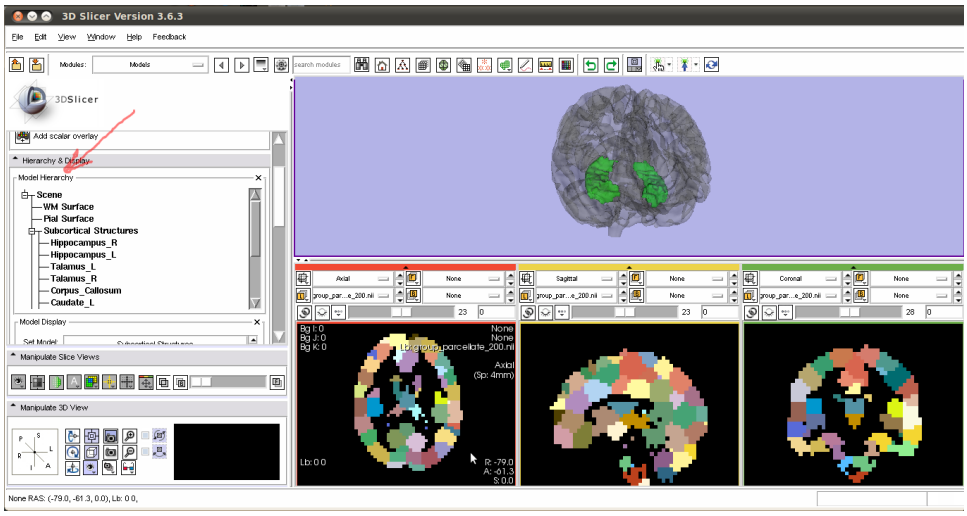

Figure 1: SAIBN screenshot. In Model Hierarchy windows appears SAIBN elements (WM Surface, Pial Surface, and the Subcortical

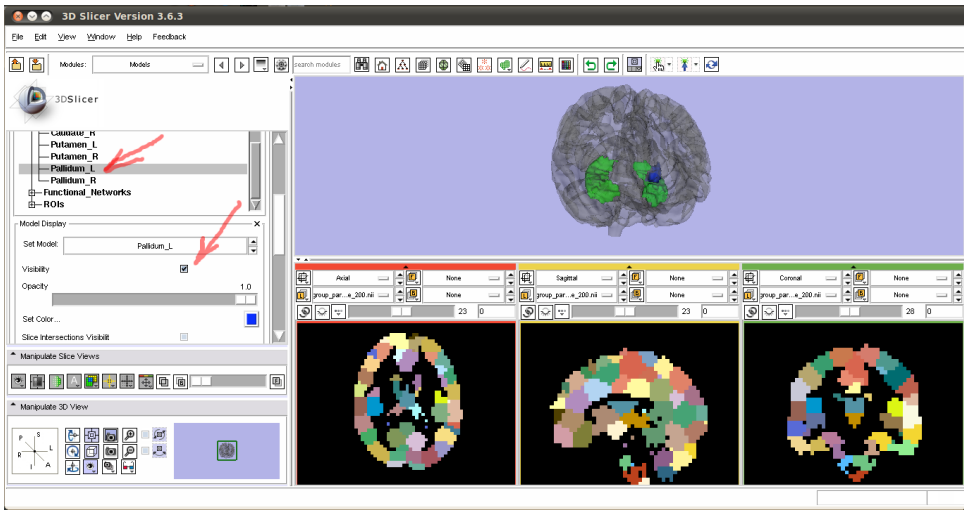

Figure 2: Each Subcortical Structure could be selected using "Visibility" check box (for example see red arrow pointing to Left Pallidum), and the transparency factor could be changed using Opacity slider.

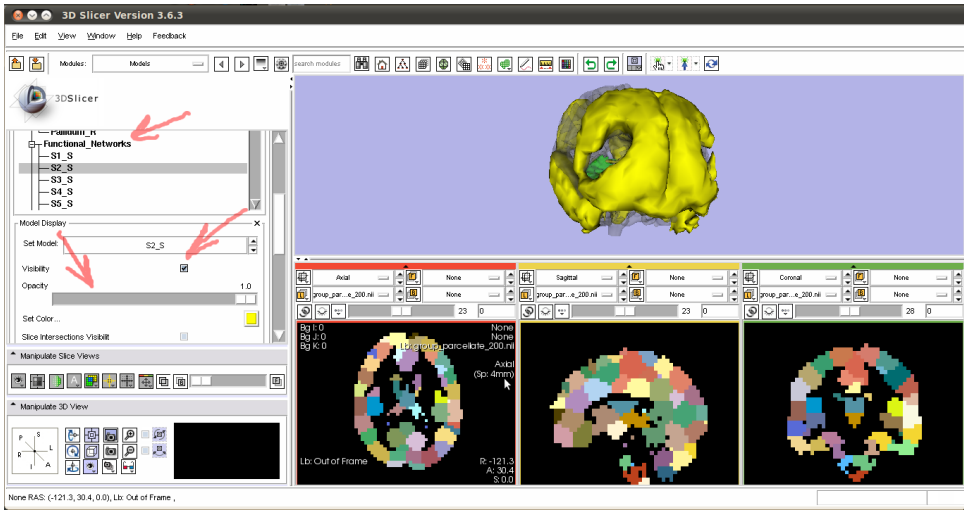

Figure 3: Each Functional Network could be selected using "Visibility" check box (for example see red arrow pointing to functional network 2), and the transparency factor could be changed using Opacity slider.

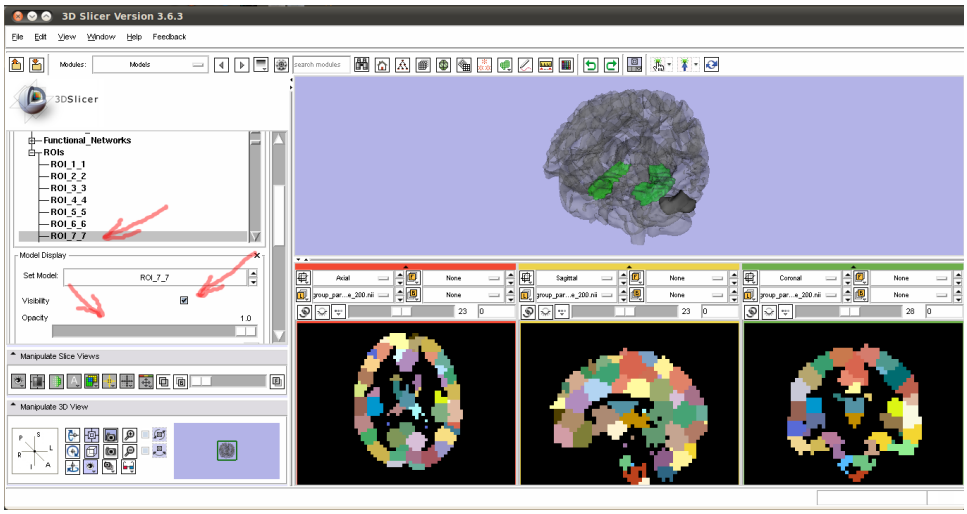

Figure 4: Each ROI could be selected using "Visibility" check box (for example see red arrow pointing to ROI 7), and the transparency factor could be changed using Opacity slider.

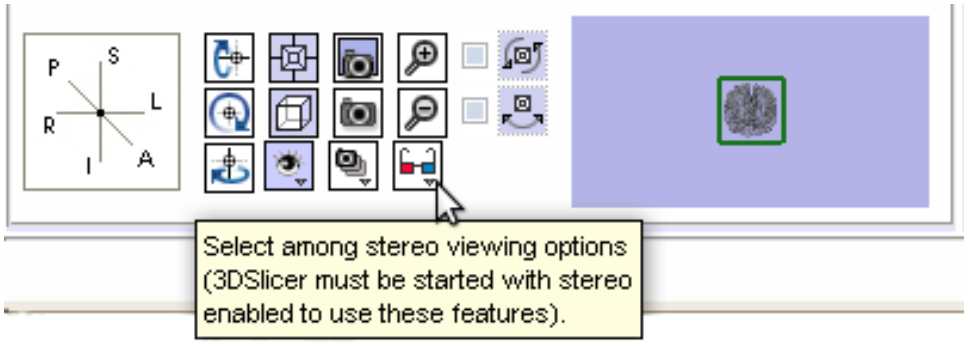

Figure 5: Select "Anaglyph" radio button in stereo options (see arrow).

4.- References

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