



INTRODUCTION

BrainBrowser is a set of open source, web-based 3D visualization tools primarily targetting neuroimaging. Using open web-standard technologies, such as WebGL and HTML5, it allows for real-time manipulation and analysis of 3D imaging data within a modern web browser.

DISTRIBUTED VISUALIZATION

As a web application, BrainBrowser can leverage already existing web technologies to allow researchers to easily visualize large datasets in a lightweight, distributed manner and to connect them to any other data or APIs that exist on the web. For example, the MACACC dataset (Lerch et al., 2006) is a 1TB database of 6.3 million structural cortex correlation maps that has been made available for visualization through BrainBrowser. Normally, visualizing this type of data would require that the entire dataset be downloaded and that specialized software be locally installed. BrainBrowser, on the other hand, embeds its viewer into an ordinary web page and dynamically loads only those parts of the dataset currently being viewed by the user. The exploration of this complex dataset thus becomes trivially simple.



REFERENCES

BrainBrowser Distributed, Web-based Neurological Data Visualization

https://brainbrowser.cbrain.mcgill.ca/

Tarek Sherif, Nicolas Kassis, Marc Rousseau, Reza Adalat and Alan Evans Montreal Neurological Institute, McGill University, Montréal, Québec, Canada

SURFACE VIEWER

The BrainBrowser Surface Viewer is a WebGL-based, real-time 3D viewer capable of displaying 3D surfaces from a variety of surface file formats, including MNI OBJ, FreeSurfer ASC and Wavefront OBJ. Data is loaded either over the network or from local files and then parsed in separate threads using Web Workers, ensuring that performance remains as high as possible. Various types of data can be mapped to loaded surfaces, depending on the type visualization required. A Surface Viewer web service has also been made available, allowing developers to make a simple API call to embed a Surface Viewer in their own web pages to visualize their own data.



WEB-STANDARD TECHNOLOGIES

At its core, BrainBrowser is a JavaScript library that can be included in any web page to create a data viewer for local or remote data. The BrainBrowser library exposes a programmable API that allows for dynamic manipulation of the viewer and the visualized data. The choice of JavaScript for development makes the API approachable to anyone familiar with web development. BrainBrowser uses only web-standard technologies such as HTML5, WebGL and Web Workers meaning users are not required to install any specialized software or plugins. All that is required is a modern, up-to-date web browser. BrainBrowser is an open source project, which allows researchers and developers to directly inspect the code and contribute to it if they so choose.

BrainBrowser.SurfaceViewer.start("visualization-div", function(viewer) { viewer.render(); viewer.loadColorMapFromURL("color-map.txt"); viewer.loadModelFromURL("brain.obj" { complete: function() { viewer.loadIntensityDataFromURL("cortical-thickness.txt"); }); });



VOLUME VIEWER

The BrainBrowser Volume Viewer allows users to navigate 3D or 4D MINC structural or functional MRI volume data. The Volume Viewer simultaneously displays slices along the sagittal, tranverse and coronal planes, and the user can navigate along each dimension by manipulating an on-screen cursor. Volumes can be loaded over the network or from local files. A volume's intensity data can be visualized in various ways by applying different color maps. When dealing with 4D functional data, the Volume Viewer is capable of navigating along the time dimension as well. Multiple volumes can be loaded, the navigation through them can be synchronized, and their slices can be blended together, all of which allows for detailed comparisons between separate datasets.



