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FreeROI: an integrated toolbox for region of interest definition and visualization

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Introduction

With the increasing knowledge for the topography of brain function, neuroimaging studies are moving away from traditional brain mapping towards investigating the response properties of specific brain regions. As a result, region of interest (ROI) approach, which allows one to ask how a region responds to a range of situations and tasks, become an important methodology in neuroimaging. The FreeROI is designed to help ROI analysis by providing versatile tools for defining/manipulating ROIs and calculating a summary time course from the region data. A pipeline for handling big dataset is also included.

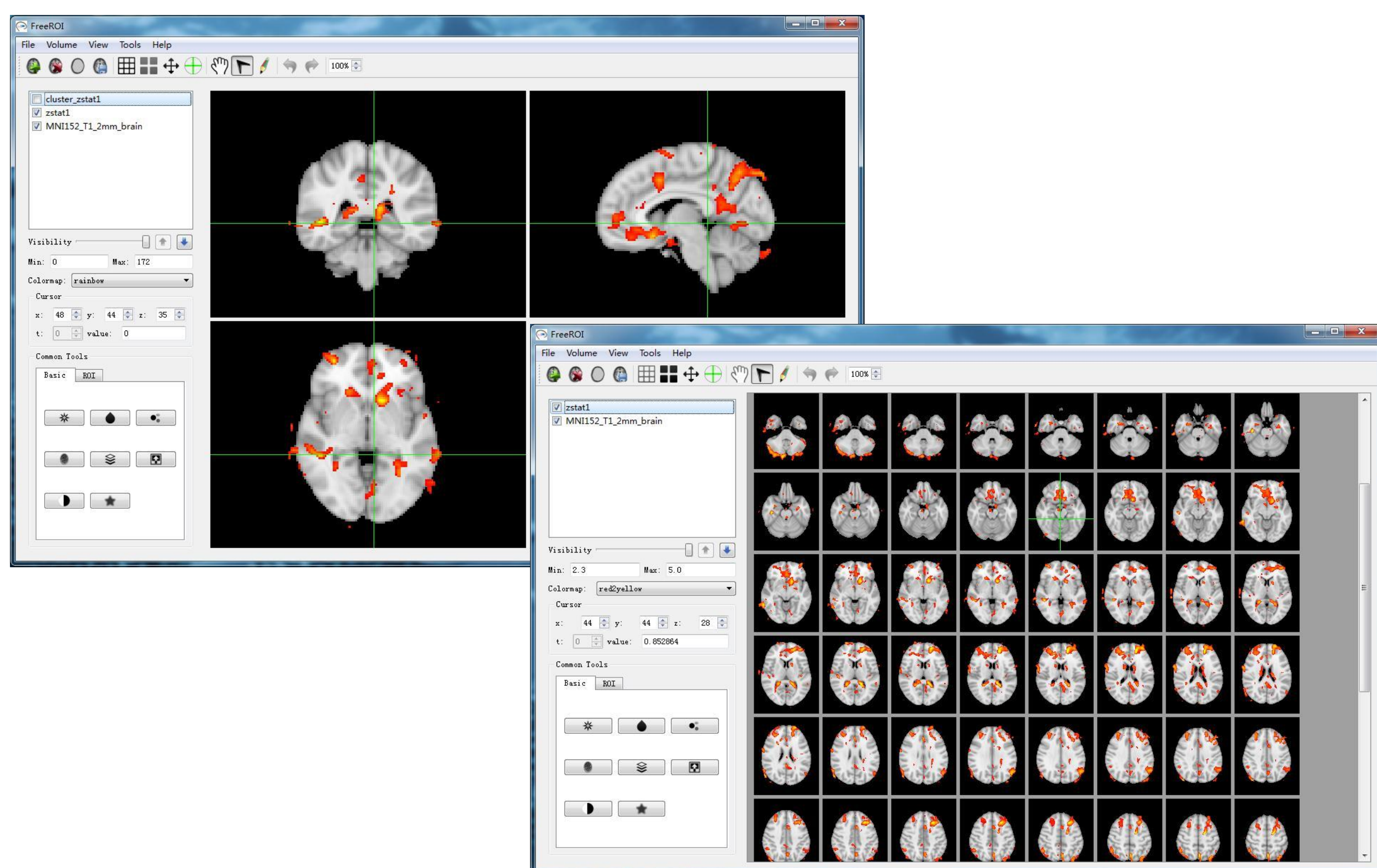


The software is free to download and use, and is released under Revised BSD License, the stable version is currently available at <http://freeroi.brainactivityatlas.org>.

FreeROI features

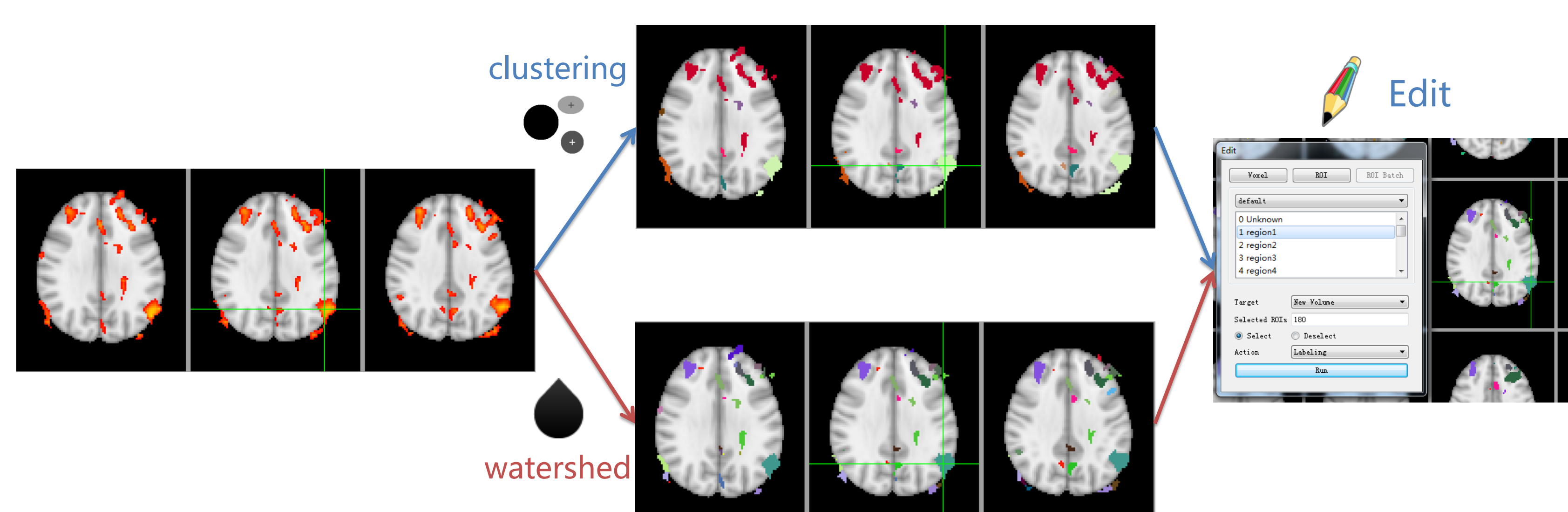
FreeROI provides a user-friendly interface for researchers to visualize and analyze their data, especially in defining ROI.

- Powerful ROI defining and manipulating tools
- User-friendly data visualization and interaction manners
- A bunch of image processing tools to manipulate and analyzing data
- Multi-platform (Windows, Linux, and Mac OSX)



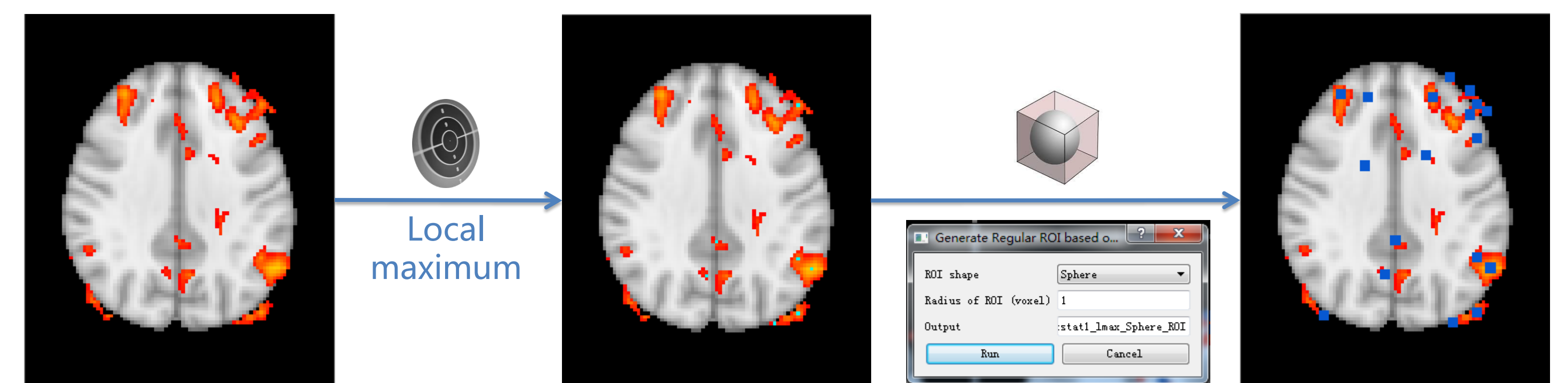
What you can do with FreeROI ...

- ROI from activation clusters

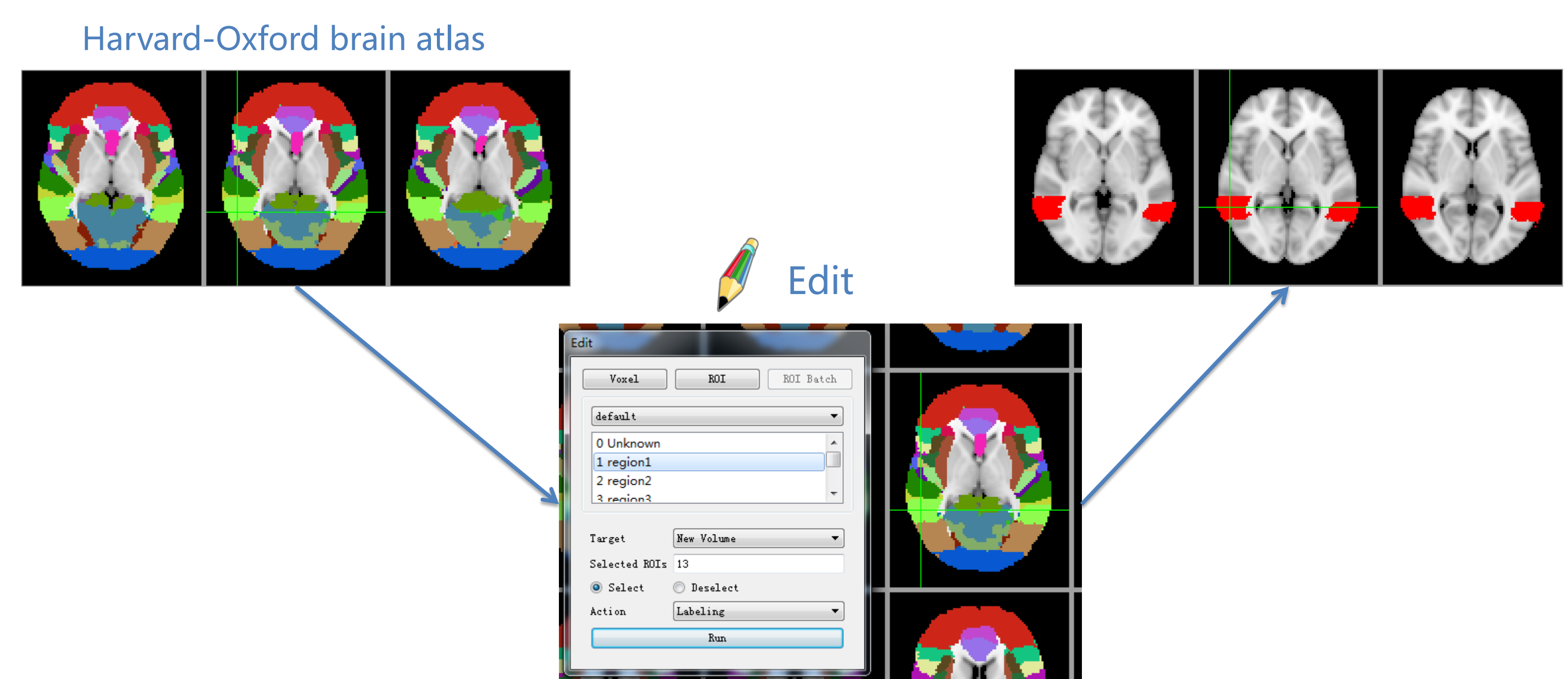


What you can do with FreeROI ...

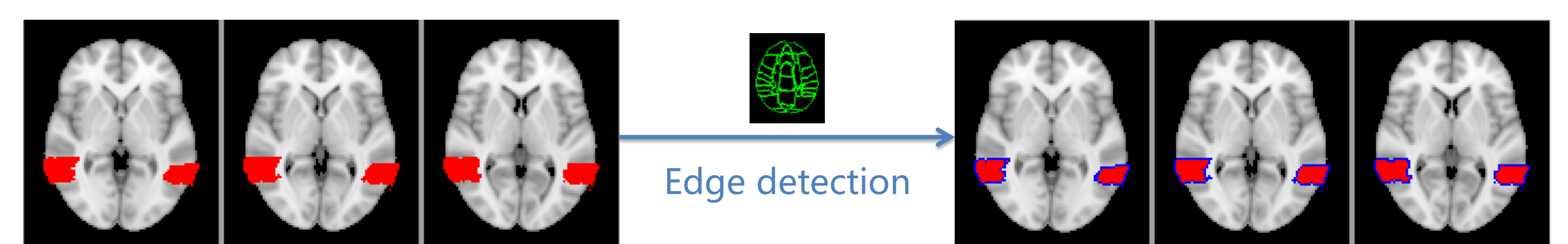
- Regular shape which centered at peak voxel



- ROI from atlas



- ROI edge detection



What's more ...

Many related tools for image processing are also included in the software.

- Editing by voxel
- Binarization
- Smoothing
- Inversion
- Intersection
- Time course extraction
- ROI merging
- Mapping from ROI to cortical surface (for DTI fiber tracking)
- Morphological Processing (Erosion and Dilation)

Conclusions

Region of interest analysis is likely to play an increasing role in neuroimaging, especially for studies with large sample size and very high dimensional data. The FreeROI is designed to provide the tools and user-friendly interface to analyze and visualize the data in ROI analysis. With the increase of the understanding of brain function and the data collected, the automatic method for defining ROIs based on machine learning would be integrated into the software to assist researchers for their further studies.

Acknowledgement



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