Mayavi for 3D visualization of NeuroImaging data: powerful scripting and reusable components in Python

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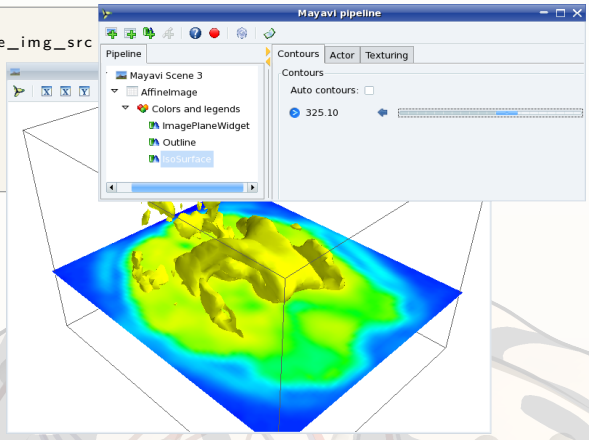
Mayavi is developed by P. Ramachandran (IIT Bombay) and G. Varoquaux (INRIA)

3D data visualization for Python

```
# Create a data source object
from nipy.neurospin.viz3d import affine_img_src
src = affine_img_src(data, affine)

# Visualize it
from enthought.mayavi import mlab
mlab.pipeline.image_plane_widget(src)
mlab.outline()
mlab.show()
```



- Works with `numpy` arrays
- For programming
- and interactive use
  ... move the plane,
  add isosurfaces...

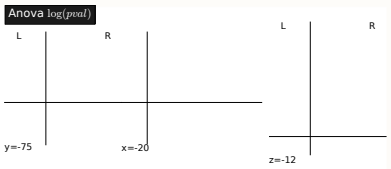
Integrated with NiPy

For scripting and pretty figures.

```
import pylab
from nipy.io.imageformats import load
from nipy.neurospin import viz

img = load('anova_scores.hdr')
viz.plot_map(img.get_data(), img.get_affine(),
             cmap=pylab.cm.hot, threshold=2,
             title='Anova $\log(pval)$', do3d=True)

pylab.savefig('anova_scores.png')
```



Open
Reusable, scriptable, extensible

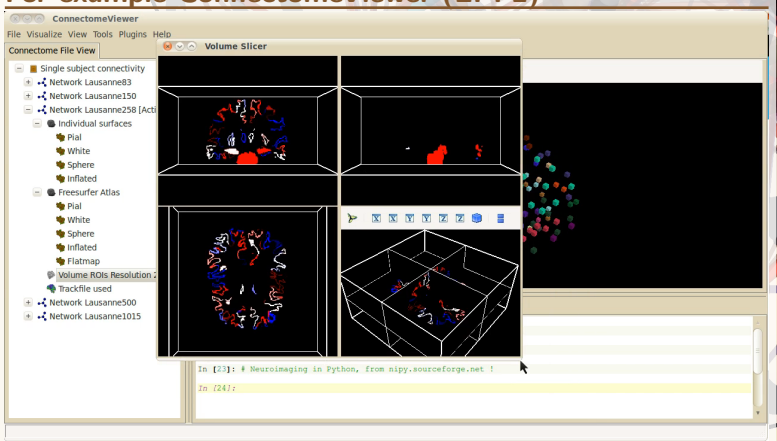
Features

- Very rich visualization components (using VTK)
- Full graphical environment: modification of all properties interactively
- Automatic script generation
- Clean Python API
- Extensive user-manual and tutorials
- Filters and data processing (mesh simplification, smoothing...)

To build applications

- All features and dialogs exposed as reusable components
- Integrated in a full Python stack ranging from GUI-building (`traits`) to numerical computing (`scipy`, ...)
- Event-driven, but no need to learn GUI programming

For example ConnectomeViewer (EPFL)

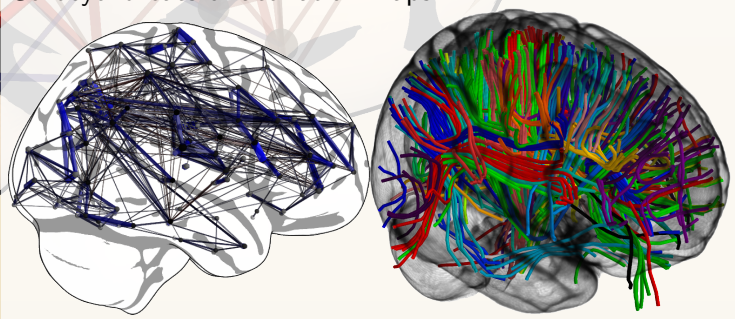


Versatile

- Many data structures (3D volumes, lines, grids)
- Many visualization types (cuts, volume rendering, iso surface, vector fields)
- Pipeline design: chain data sources and filters

To easily visualize new objects

Go beyond cuts of activation maps



Mayavi http://code.enthought.com/projects/mayavi/
NiPy http://nipy.sourceforge.net/nipy/stable/neurospin/viz.html
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