Dipy - a library for diffusion MR and tractography

Introduction

Dipy stands for diffusion imaging in python and is

Dipy is an international, free and open software project for diffusion magnetic resonance imaging analysis in Python.

Methods

Results

Conclusions

dipy is on the way to being the software platform of choice for brain scientists who want to be able to expl0ore new approaches to white matter tractography using diffusion weighted MR. Where it goes is in the hands of those who join us in its development.

References

Figures

Bullets

What is dipy?

- free, open source, python toolbox, growing, extensive, library, API, multiplatform, developed by research scientists across different labs and countries.

What is the aim of dipy?

- to make it easier to do better diffusion MR imaging research.

How does it achieve its aim?

- by being clearly written, clearly explained with a good fit to the underlying ideas in a way that fosters collaborative development.

What is new in dipy?

- everything is new

Which other libaries does dipy use? It depends on

- python
- numpy
- scipy
- cython

optionally, it can use

- python-vtk
- pytables
- matplotlib
- ipython

Which operating system does it require? Any.

- Windows
- Linux
- Macosx

Does dipy provide visualisation tools?

- fvtk

Does size matter?

- dipy overcomes size constraints that come with the very large datasets typical of tractography

Does dipy interoperate with other brain imaging software?

- fsl
- camino

Which file formats does it support?

Nifti (.nii), Dicom (Siemens), Trackvis (.trk), Dipy (.dpy), Numpy (.npy, ,npz), text and all other formats supported by nibabel,nifti and pydicom.

Which are the killer applications?

- Reconstruction algorithms e.g. DTI, GQI
- Tractography generation algorithms e.g. EuDX
- Intelligent downsampling of tracks
- Clustering tractography
- Resampling datasests with anisotropic voxels to isotropic
- Visualize multiple brains simultaneously
- Find track correspondence between different brains
- Warping tractographies into another space e.g. MNI space

Which are the main modules in dipy? Just a glimpse

- **dipy**
  - **core**
    - graph
  - **align**
    - aniso2iso
  - **reconst**
    - dti
    - gqi
    - qball
  - **tracking**
    - distances
    - metrics
    - propagation
    - learning
  - **io**
    - dpy
    - bvectxt
    - pickles
  - **external**
    - fsl