Tutorial Contest Project Week 2017

# Simple Multi-shell Diffusion Gradients Information Extractor

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# Presentation

- Simple Python script parsing multi-shell sensitizing gradients information from nifti file format (separated bvecs, bvals files)

# Presentation

- Several commands:
  - help : Display the help message
  - info : Print information about the number of gradients in each shell
  - symmetry : Find symmetrical gradients (given a certain error) with similar b-values
  - print : Print all gradient  vectors (or a single one if specified with option –bvec #bvec_id)
  - show : Display a graphical representation of the gradient vector distribution

# Info Command

- Info command will print information about the number of gradient vectors within each shell

```
0206\T1w\Diffusion>python -m bvecs --path . info
Opening files...
Read files...

Bvecs Info:
-------------------------------

Baseline(s) : 18 found
b = 1000    : 90 found
b = 2000    : 90 found
b = 3000+   : 90 found
total       : 288 found
```

# Symmetry Command

- Symmetry command will ask users to provide an error range for the dot product and output all symmetrical gradient vectors within this range and within the same shell

```
0206\T1w\Diffusion>python -m bvecs --path . symmetry
Opening files...
Read files...
Find symmetrical pairs of bvecs with similar bvals
Enter inner product maximum error allowed [0.0-1.0]? 0.02

Bvec1   Bvec2   InnerProduct        Bvals
-------------------------------------------------
#022    #267     -0.981262       2005    1990
#090    #285     -0.980501        990    1005
#137    #278     -0.983222       3000    2990
#164    #259     -0.980434       3005    2990
```

# Print Command

- If command specfied with –bvec option, followed by gradient vectors id, such as –bvec 22 for example, only the information about this specific vector

```
0206\T1w\Diffusion>python -m bvecs --path . print --bvec 22
Opening files...
Read files...

Bvec            X             Y             Z       Bval
-------------------------------------------------------------
#022      -0.195790    -0.799082     0.568450     2005
```

# Print Command

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```
0206\T1w\Diffusion>python -m bvecs --path . print
Opening files...
Read files...

Bvec          X             Y             Z          Bval
-------------------------------------------------------------
#000      0.540241     -0.679789      0.496010          5
#001     -0.914501      0.312166      0.257375       1000
#002     -0.391673     -0.838105     -0.379701       1995
#003      0.097429     -0.448395      0.888510       3005
#004      0.211082      0.907922     -0.362107        995
#005      0.411062     -0.792332     -0.450821       2995
#006      0.710358     -0.530335      0.462749       2005
#007     -0.344414     -0.277909     -0.896742        990
#008      0.593609      0.098730     -0.798675       1990
#009      0.907680      0.406577      0.103988       3000
#010     -0.162318      0.872336      0.461176       1000
#011     -0.264251     -0.067615     -0.962081       1985
#012     -0.842380      0.470367     -0.262966       2995
#013     -0.408856     -0.280543      0.868408       1005
#014      0.978715      0.195402     -0.062745       1995
#015      0.303025      0.945637     -0.118102       2995
#016      0.540241     -0.679789      0.496010          5
#017     -0.907398     -0.275111     -0.317715        995
#018     -0.415077      0.885361      0.209400       2000
#019      0.112487      0.376002      0.919766       3010
#020     -0.752511     -0.078188      0.653923       3005
#021     -0.538694      0.621286     -0.569046        995
#022     -0.195790     -0.799082      0.568450       2005
#023      0.797339      0.535348     -0.278663        995
#024      0.295039     -0.540808     -0.787705       1990
#025     -0.701938     -0.088890     -0.706670       2985
#026     -0.429940      0.389192      0.814667       1005
```

# Show Command

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