Data Processing & Analysis for (Resting-State) Brain Imaging (DPABI): Utilities

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Outline

• Standardization
• Utilities

Standardization

Yan et al., 2013. Neuroimage

Table 1. Factors can introduce unintended variations in fMRI measurements. Effect of nuisance covariates on R2 of the whole brain estimated using linear mixed-effects model. The first value in each cell is the F value, and the second value is the p value. The red number indicates significance after Bonferroni correction (p < 0.05) across 6 measures.

Yan et al., 2013. Neuroimage

Table 2. The influence of age, sex, and R2 on the whole brain standard deviation of fMRI measures. Effects of nuisance covariates on R2 of the whole brain estimated using linear mixed-effects model. The first value in each cell is the F value, and the second value is the p value. The red number indicates significance after Bonferroni correction (p < 0.05) across 6 measures.

Yan et al., 2013. Neuroimage
- Mean regression-based approach.
- Mean regression + SD division (for controlling multiplicative effects).
Multiple labels in mask file: each label is considered as one ROI

Dosenbach et al., 2010
Andrews-Hanna et al., 2010
Craddock et al., 2011
Define other ROIs
Scatter Plot

\[ r = \text{corrcoef}(\text{ALFF}, \text{MMSE}) \]

Image Reslicer

Example expressions:

(a) \( g1 - 1 \) Subtract 1 from each image in group 1

(b) \( g1 - g2 \) Subtract each image in group 2 from each corresponding image in group 1

(c) \( i1 - i2 \) Subtract image 2 from image 1

(d) \( i1 > 100 \) Make a binary mask image at threshold of 100

(e) \( g1 \cdot \text{To4D}(i1 > 2.3, 100) \) Make a mask (threshold at 2.3 on \( i1 \)) and then apply to each image in group 1 (group 1 has 100 images)

(f) \( \text{mean}(g1) \) Calculate the mean image of group 1

(g) \( (i1 - \text{mean}(g1)) / \text{std}(g1) \) Calculate the z value of \( i1 \) related to group 1

(h) \( \text{corr}(g1, g2, 'temporal') \) Calculate the temporal correlation between two groups, i.e., one correlation coefficient between two “time courses” for each voxel.

(i) \( \text{corr}(g1, g2, 'spatial') \) Calculate the spatial correlation between two groups, i.e., one correlation coefficient between two images for each “time point”.

Image Calculator
Reading and Writing functions

Reading:

```matlab
[Data Header] = y_Read('brodmann.nii');
Data = 181*217*181 double
Header = Structure
```

Processing:

```matlab
BA20Data = (Data==20);
y_ReadRPI y_ReadAll
```

Writing:

```matlab
Header.pinfo = [1;0;0]; Header.dt = [16,0];
y_Write(BA20Data, Header, 'BA20.img');
```

Further Help

http://rfmri.org/wiki

The R-fMRI Journal Club

http://rfmri.org/Course

http://rfmri.org/wiki

Official Account: RFMRILab

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第六届DPABI/DPARSF特训营
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深度特训与数据分析

http://deepbrain.com

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每天完成20个被试的皮层计算!!!
The R-fMRI Lab

Acknowledgments

• National Natural Science Foundation of China
• National Key R&D Program of China
• Chinese Academy of Sciences

Thanks for your attention!