



ADVANCED FUNCTIONAL BRAIN IMG.

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Assignment 5: Single Subject Analysis using Genera...

Assignment 5: Single Subject Analysis using General Linear Model

Aim: The goal of this assignment is to build General Linear Model using your own scripts for the analysis of fMRI data.

Task:

- You need to first do complete preprocessing of fMRI data. If your code for preprocessing is not working correctly, you can do preprocessing using feat. Use the optimum parameters that you calculated in Assignment 4 for preprocessing.
- You then need to build a general linear model using a programming language of your choice and perform hypothesis testing for finding voxels that get activated. Take zstat threshold as 2.3 and HRF to be double gamma. You are not allowed to use any inbuilt functions while building general linear model or while doing hypothesis testing.
- You have to do full model processing of the same subject using fsl and then compare results. To compare, create a scatter plot between the zstat values computed by your code and zstat values computed by fsl. Use only the voxels in the brain for the scatter plot.
- Perform linear regression to find similarity between the two scores. Let Y be the zstat value generated by fsl and X represent the zstat values generated by your script. Perform a linear regression (using voxels in the brain only) to find the value of a and b in the equation $Y = aX + b$.

Experimental Paradigm and Contrast:

Same as in Assignment 4

Data Location:

Same as in Assignment 4


What to Submit:

- Your design.fsf files for preprocessing. Call it <design_preprocess.fsf>
- Your design.fsf file for full model analysis using fsl. Call it <design_fullModel.fsf>
- Zstat file generated by fsl. Call it <zstat_fsl.nii.gz>
- Zstat file generated by your code. Call it <zstat_mycode.nii.gz>
- Scatter plot generated. Call it <scatterPlot.png>
- Coefficient of determination of GLM fitted on the data, and the values of a and b (from the equation $Y = aX + b$) in a text file.
- Your code for performing GLM analysis.
- Your code for creating scatter plot, performing linear regression and computing coefficient of determination.

References:

1. https://fsl.fmrib.ox.ac.uk/fsl/fslwiki/FEAT/UserGuide#Stats_.28FirstNAVIGATION
2. <http://imaging.mrc-cbu.cam.ac.uk/imaging>
3. https://www.wikiwand.com/en/Coefficient_of_determination
4. <http://fsl.fmrib.ox.ac.uk/fslcourse/>
5. http://mumford.bol.ucla.edu/mumford_stat_modeling_1per_pg.pdf
6. <https://onlinecourses.science.psu.edu/stat501/node/250>

Submission status

Submission status	Submitted for grading
Grading status	Not graded
Due date	Saturday, 15 April 2017, 11:55 PM
Time remaining	Assignment was submitted 1 day 19 hours late
Last modified	Monday, 17 April 2017, 7:33 PM
File submissions	 2014EE30506_Assign5.zip
Submission comments	► Comments (0)

NAVIGATION



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1602-COL786

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Advanced and Fun Readings


Lecture slides and videos

Assignments

 Time Series and Correlation Map

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 Assignment 3: Optimizing preprocessing of fMRI data

 Assignment 4: Optimising preprocessing steps (Visu...

 **Assignment 5: Single Subject Analysis using Genera...**