

### Homework #3

Due date: 3/14/2013

1. With the “deconv2.s” script used in the “JohnIndoorOutdoor” study as an example, explain ALL arguments, such as “input”, “polort”, “tout”, and “bucket”, for the AFNI program “3dDeconvolve” for block design. (10 points)

Hints:

- (1) Run “3dDeconvolve –help” to match with what are used in “deconv2.s”.
- (2) “-polort 2” means to model baseline, linear trend and quadratic trend with the scanning system. You are modeling the data in the case of no brain activation.
- (3) “-concat”: The input file defines the starting point of each run of your input data file.

**For the following two exercises, you will need to create your own directory with your name under “training”. Perform the analysis under your directory and hand in the results and associated explanation. I will check your directory!**

**To transfer files from the CIRC server, you can install the free program called “WinSCP” and transfer the results to your local PC. You can also run “scp [login\\_name@circ.psy.msu.edu](mailto:login_name@circ.psy.msu.edu):/the\_path/the\_filename.” at the local Linux computer to transfer files from the server to your local Linux computer. Then copy your files to a USB drive.**

2. Under the directory that you created, test the AFNI command “waver”.
  - (1) Run “waver -GAM -peak 1 -dt 1 -inline 1@1 | 1dplot –stdin”. Save the output as “hw3\_q2\_test1.jpg”. Explain the arguments (“GAM”, “peak”, “dt” and “inline”) and the output.
  - (2) Modify the “peak” to 10. Run the “waver”. Save the output as “hw3\_q2\_test2.jpg”. Explain the change of output from (1).
  - (3) Modify the “inline” to “inline 1@1 5@0 1@1” in the (1). Run the “waver”. Save the output as “hw3\_q2\_test3.jpg”. Explain the change of output from (1). (10 points)

Hints: When you run “waver”, you convolve the “GAM” function (model) with the input stimuli. The different “peak” changes the amplitude but not the shape of the response curve. In the case of (3), the second stimulus is presented before the BOLD response to the first one returns to baseline.

3. You have done the lab exercise with the dataset called “henderson\_E10702.tar.gz”. We often find that a subject can lose attention in some of the fMRI runs. I need you to re-run the fMRI analysis with only fMRI time series 1, 2 and 4. You can modify the existing scripts to accomplish this task. You can get helps from your classmates, but you must present your own work. You will need to create your own directory with your name under “training” if you have not done already. Perform the analysis under your directory and hand in

the result in the form of an activation map following. Please save a brain picture in a name of “hw3\_q3.jpg” in jpg format with the activation map of “Indoor-Outdoor” showing the PPA activation (p value threshold at  $1 \times 10^{-4}$  or indicate the p value threshold that you use and explain the choice, red or orange = Indoor more active than Outdoor, blue = Outdoor more active than Indoor.) Please submit this brain picture. Please submit your modified scripts. (30 points)

Hints:

(1) The change of “createWave.s” or equivalent is needed. Pick the corresponding reference function for comparison.

```
cat face_TS1_wave_194.1D face_TS2_wave_194.1D face_TS4_wave_194.1D >
face_TSall_wave.1D
```

```
cat indoor_TS1_wave_194.1D indoor_TS2_wave_194.1D indoor_TS4_wave_194.1D >
indoor_TSall_wave.1D
```

```
cat outdoor_TS1_wave_194.1D outdoor_TS2_wave_194.1D outdoor_TS4_wave_194.1D
> outdoor_TSall_wave.1D
```

(2) Change “concat.1D”. We only have three runs:

```
0
194
388
```

(3) The change “analyze\_ts\_blur4fwhm\_group1.s” or equivalent is needed. Pick the corresponding data.

```
3dTcat -session . -prefix reg_cat_TS_before_blur reg_TS1+orig reg_TS2+orig
reg_TS4+orig
```

```
cat mot_temp1 mot_temp2 mot_temp4 > motion_plot
```