

ASSIGNMENT-4

In this assignment, you are required to write a code, in R/python/octave, to perform remaining of the preprocessing steps that is spatial smoothing and temporal filtering. Range of High pass filter (temporal filtering) cut off will be from 80s to 120s. The range of spatial smoothing will be from 4mm to 8mm (FWHM). Note that you cannot use any standard libraries such as convolution, high pass filter etc. for the implementation of the same. **Only allowed libraries are fft and ifft i.e, Fast Fourier transforms**. We have also made a little change in the moodle interface. Now, Instead of uploading your zip files, this time you are required to go to the edit tab, where you will find the following two files :-

1. spatialSmooth
2. temporalFilter

You are required to type in your code in these files and then evaluate to see your grade. Further instructions are at the end of the doc.

Command line arguments given to spatialSmooth

INPUT:-

1. Image File name
2. FWHM(in mm)(say **k**)
3. Output File name (say **output.nii.gz**)

OUTPUT :-

1. It should create a file **output.nii.gz** spatially smoothed to **k** mm

Command line arguments given to temporalFilter

INPUT:-

1. Image File name
2. TR (say **t**)
3. Cut-off time(say **C**)
4. Output File name (say **output.nii.gz**)

OUTPUT :-

2. It should create a file **output.nii.gz** after high pass filtering the input image.

Please note that the input image will be of type NIFTI format only. So you need not worry about the other formats.

INSTRUCTIONS FOR CODING IN MOODLE

- **PYTHON**

- The first line should be `#!/usr/bin/python`
- Then, you must take read all the command line arguments and then code as you code in your editors.

- **OCTAVE**

- The following lines must be present
 - `#!/usr/bin/octave3.2`
 - `addpath('/COL786/Nifti')`
 - `addpath('/COL786/Nifti_octave')`
- The `load_untouch_nii('FILENAME')` function has been changed to `load_untouch_nii_octave('FILENAME')`
- The `make_nii(4Darrayvar)` function has been changed to `make_nii_octave(4Darrayvar)`
- The `save_nii(imageVar,output.nii.gz)` function has been changed to `save_nii_octave(imageVar,output.nii.gz)`
- Then, you must take read all the command line arguments and then code as you code in your editors.

- **R**

- The first line should be `#!/usr/bin/R`
- Then, you must take read all the command line arguments and then code as you code in your editors.

SAMPLE RESULTS

SPATIAL_SMOOTHING

INPUT FILE NAME : rest.nii.gz

FWHM : 3mm

OUTPUT FILE NAME: spatial_TR2.5_whole.nii.gz

TEMPORAL FILTERING

INPUT FILE NAME :spatial_TR2.5_whole.nii.gz

TR: 2.5 s

CUT OFF: 100s

OUTPUT FILE NAME: temporal_TR2.5_whole.nii.gz

Link to the data

[:https://drive.google.com/open?id=1vagORLsyFlar9W3kUu9m9dzBX-1ozAFq](https://drive.google.com/open?id=1vagORLsyFlar9W3kUu9m9dzBX-1ozAFq)

