Basic steps in FSL and ReHo in AFNI

Open FSL gui:

Type fsl in ubuntu prompt and select the required option.

View image:

Click FSLEYES and add required file.

Remove skull:

Click B.E.T

To register 2 structural images (e.g.: T2 to spgrT1):

flirt -in t2flairorig.nii.gz -ref spgr.nii.gz -dof 6 -cost mutualinfo -omat T2toT1_MI.mat -out T2toT1_MI

To register spgr to standard image:

flirt -in spgr.nii.gz -ref $FSLDIR/data/standard/MNI152_T1_2mm.nii.gz -dof 12 -out spgrtoMNIlin -omat spgrtoMNIlin.mat

Register skull removed functional image(bold_brain) to skull removed structural image(spgr_brain) [spgr:before skull removal] :

epi_reg --epi=bold_brain --t1=spgr --t1brain=spgr_brain --out=trial1

Save invert transformation:

Type InvertXFM

Apply transformation to convert structural ROIs to functional space:

Type ApplyXFM

Thresholding the masks:

fslmaths inputfilename -thr 0.5 -bin binary_outputfilename

Segmentation of WM, GM and CSF:

Click FAST Segmentation option in gui

FInd mean time series from all volumes:

fslmeants -i functional_image -o outputfilename.txt -m functional_mask_image

To create confoundevs file with motion parameters and csf parameters:

Use feat fmri button in gui, select mcflirt, add extended motion parameters, add extra confound file and set up model with only 1 EV and empty. Go. Locate the confoundevs file in design folder.

Confoundevs.txt: 24 motion parameters and 1 csf time series regressor.

Convert .txt to .mat:

Text2Vest confoundevs.txt confoundevs.mat

Nuissance Regression with regression parameters in confoundevs.mat:

fsl_glm -i bold_brain.nii.gz -d confoundevs.mat --out_res=res_brain_new30_1.nii.gz

Normal Regression with design matrix(maps.nii):

fsl_glm -i functional.nii -d maps.nii -o functional_glm.nii

Creating gaussian noise images 4D :

Use jupyter notebook : gaus_add_niftiimage.pynb

Add nifti+ noise image:

fslmaths bold_brain -add gauss20output bold_braingauss20

(fslmaths nifti –add noiseimage outputname)

CSF regressor:

fslmeants -i bold_braingauss20 -o gauss20CSF_noise.txt -m threshold_trial1_fntl_csf.nii.gz

Apply a mask to an image:(in z-stat image to get only inside portion)

fslmaths 'image_1.nii.gz' -mas 'mask.nii.gz' 'output_image.nii.gz'

res_brain_gauss20: residual

MERGE 3D FILES TO 4D FILE:

OUTPUT: *ADNI_002_S_1155_MR_Axial_rsfMRI__Eyes_Open__br_raw*

fslmerge -t ADNI_002_S_1155_MR_Axial_rsfMRI__Eyes_Open__br_raw ADNI_002_S_1155_MR_Axial_rsfMRI__Eyes_Open__br_raw_*.nii

Finding Refressors:

fslmeants -i res_brain_new8_july -o tumornew8.txt -m trial1_fntl_mask_bin.nii.gz

fslmeants -i res_brain_new8_july -o controlnew8.txt -m trial1_fntl_controlmaskbin.nii.gz

AFNI:

Start afni: Type afni

Convert nifti to tlrc: 3dcopy res_brain_new30_1.nii res_brain_new30_1+tlrc

ReHo on timeseries data: 3dReHo -prefix ReHoTest -inset res_brain_new30_1+tlrc %not required

Convert mask nifti to tlrc: 3dcopy trial1_fntl_mask_bin.nii trial1_fntl_mak_bin+tlrc

ReHo on timseries data with mask: 3dReHo -prefix ReHoTesttumor -inset res_brain_new30_1+tlrc -mask trial1_fntl_mak_bin+tlrc

Convert AFNI to nii to use in fsl: 3dAFNItoNIFTI ReHoTesttumor+tlrc

To view in afni: afni RehoTesttumor+tlrc

Thresholding reho mapo for tumor regressor:fslmaths ReHoTesttumor -thr 0.2 -bin ReHoTesttumor_bin

fslmeants -i bold_brain -o mean_tumorreho.txt -m ReHoTesttumor_bin.nii.gz *%use residual instead of bold_brain*

Mean and std deviation:

fslstats reg_8july.feat/stats/zstat1 -k trial1_fntl_mask_bin –M

fslstats reg_8july.feat/stats/zstat1 -k trial1_fntl_controlmaskbin -M

fslstats reg_8july.feat/stats/zstat1 -k trial1_fntl_mask_bin -S

fslstats reg_8july.feat/stats/zstat1 -k trial1_fntl_controlmaskbin –S