

Updates On Aligning Anatomical Volumes with Oblique Axial Functional Volumes

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OVERVIEW:

Previously, users are required to record the scan prescription (Rx) coordinates in order to use our MATLAB-based program for aligning anatomical volumes with oblique function volumes. For datasets that do not have such information, aligning becomes difficult. We recently implemented some changes to automatically save the Rx coordinates in the dataset header so that users do not need to provide them as inputs to the program. To ensure this automated functionality, following changes will need to be made:

1. Install the updates
 - 1) Download **obexample_new.tar** from [CFMRI](http://cfmri.ucsd.edu) website, click on FAQ -> data handling. Untar the file and replace the old ObliqueReg.m if you have one from the previous version.
 - 2) Download **dicom2**, **dicomrx** and **d2afni** from <http://cfmri.ucsd.edu/fmap>
Save these files in your bin directory and change their properties to be executable.
 - 3) Update ppge or ppge2 (<http://cfmri.ucsd.edu/fmap>) if you perform field-map correction prior to aligning,. Helps on using ppge or ppge2 can be obtained from cfmri FAQ web page.
 - 4) Update FSL (v3.2) and AFNI (v. AFNI_2005_08_10_1627) if you would like to use NIFTI format.
2. Use **d2afni** (instead of **to3d**) to convert GE dicom files to AFNI brik.
The usage of d2afni is identical to to3d, e.g.
FSPGR: d2afni -prefix name anatdir/i*
EPI: d2afni -prefix name -time:zt #slices # reps TR alt+z epidir/i*
(if the name contains .nii, or .nii.gz, d2afni will output in NIFTI format)
3. Use the new syntax for calling Oblique_Reg:
new syntax: Oblique_Reg(brikdir,func_brik,anat_brik,outname);
old syntax: Oblique_Reg(brikdir,func_brik,anat_brik,outname, func_Rx, anat_Rx, func_angel_dir);

brikdir: Directory with briks. Examples: '/mnt/raid3/sdc/data' or '.' to denote current directory.

func_brik: Name of functional brik (without +orig) , e.g. 'func1brikreg_e01'
(use full name if NIFTI, e.g. 'func1brikreg_e01.nii.gz')

anat_brik: Name of anatomical brik (without +orig) , e.g. 'anat'
(use full name if NIFTI, e.g. 'anat.nii.gz')

outname: Name of output (rotated dataset) ,e.g. 'anat4' or 'anat4.nii.gz'

Example script in MATLAB:

```
%obexample.m
% Example of using Oblique_Reg program
brikdir='.';
func_brik='func1brikreg_e01'; % or 'func1brikreg_e01.nii.gz'
anat_brik='anat'; % or 'anat.nii.gz'
outname = 'anat_reg'; % or 'anat_reg.nii.gz', will output in NIFTI instead of AFNI briks
Oblique_Reg(brikdir,func_brik,anat_brik,outname);
```

Example script in PERL:

```
#!/usr/bin/perl
{
# Script Name: obreg
# PUT NAME OF FUNCTIONAL BRIK HERE
$func = "func1brikreg_e01";
# PUT NAME OF ANATOMICAL BRIK HERE
$anat = "anat";
# PUT NAME OF ROTATED ANATOMICAL BRIK HERE
$anatout = "anat_rot2";
# INDICATE DIRECTORY WITH BRIKS HERE
$sdir = ".";
$command1 = "matlab -nojvm -nosplash -r ";
$command2= "\"Oblique_Reg('$sdir','$func','$anat','$anatout');quit\"";
$command = "$command1 $command2";
print "$command\n";
system($command);
print "DONE WITH ROTATION\n"
}
```

BACKWARD COMPATIBILITY

The update is backward compatible. Below are the backward compatible MATLAB examples:

```
% Example of using Oblique_Reg program
brikdir='.';
func_brik='func1brikreg_e01';
anat_brik='anat';
outname = 'anat_reg';
func_Rx=[0.0 0.0 -9.0 -47.0 -24.0 41.8]; %[-R +L -A +P -I +S]
anat_Rx=[0.6 0.6 -14.8 -14.8 -72.1 77.9]; %[-R +L -A +P -I +S]
% or
%func_Rx={'R0.0' 'R0.0' 'A9.0' 'A47.0' 'I24.0' 'S41.8'};
%anat_Rx={'L0.6' 'L0.6' 'A14.8' 'A14.8' 'I72.1' 'S77.9'};
Oblique_Reg(brikdir,func_brik,anat_brik,outname,func_Rx, anat_Rx,-1);
```

LIMITATION:

The program has only been tested with axially and sagittally acquired anatomical volumes. Coronal or oblique anatomical images are not supported at this point.

For questions and suggestions, please contact Kun Lu <kunlu@ucsd.edu>