Preprocessing Pipeline DJS Nov, 2016

1. Move files into formatted directory structure – SCRATCH\_moveNIIFiles.m
   1. ..\SubjectName\STRUCTURALS\T1\_01.nii
   2. ..\SubjectName\FIELDMAPS\FM\_01.nii
   3. ..\SubjectName\RSS\RSS\_01.nii (or any functional dataset)
2. Reorient files into normal plane – SCRATCH\_batchReorient2Normal.m
3. Manually create mask on white T1 image using **MRIcron** volume draw tool
   1. Find the appropriate T1 image (the computed T1 image), copy and rename it to T1\_00.nii
   2. Smooth once by hitting Ctrl+Q
   3. Use volume draw tool seeded from center of brain
   4. Modify the parameters of the volume draw tool until the brain is covered
   5. Use Draw -> Advanced -> Dialate
   6. Use Draw -> Smooth VOI with 3 mm FWHM kernel in all planes
   7. Save VOI mask to a subfolder in STRUCTURALS called VOI and name it MASK.voi
   8. Use Draw -> Convert -> VOI to NII to convert VOI mask to NII mask, saving it as: ..\STRUCTURALS\VOI\MASK.nii
   9. This step creates new files with the prefix: m
4. Apply mask to all volumes – SCRATCH\_Masking.m
   1. Run first block of code to refine the mask made in step 3
   2. Evaluate comparison figure and refine code until satisfied
   3. Run second block of code to bask all relevant NIfTI files for that subject.
5. Coregistration to Template Brain
   1. Use coregistration script to apply a rigid body affine transformation to align the masked brains to template brain – SCRATCH\_batchFinalizeReorient.m
   2. Select the masked T1 volume.
   3. \*\* Make certain that the origin is near the anterior commissure and make gross adjustments to orientation to be straight. Also make sure to reorient all of the subjects’ volumes starting with m, including all functional subvolumes. \*\*
   4. This step creates new files like: rmT1\_00.nii, rmRSS\_01.nii, etc.
6. Estimate motion parameters and smooth functional volumes – SCRATCH\_RealignAndSmoothFunc.m
   1. This scripts corrects for subject motion during functional imaging.
      1. Creates text a text file for each functional session – like: rp\_rmRSS\_01.txt – with motion estimates for use later as 1st level covariates
   2. Realign functional sequences and smooth with a 2 mm3 Gaussian.
   3. ~~This step creates new functional files like: rrmRSS\_01.nii and srrmRSS\_01.nii~~
7. Segmentation of Structural Volume – SCRATCH\_SegmentT1.m
   1. Run SPM Segmentation on rmT1\_00.nii
   2. This step creates:
      1. GM, WM, CSF, NB tissues: c1rmT1\_00.nii … c4rmT1\_00.nii
      2. Same, but smoothed: sc1rmT1\_00.nii … sc4rmT1\_00.nii
8. Nonlinear Normalization using DARTEL – SCRATCH\_DartelWarp2Template.m
   1. Runs DARTEL Warp to existing template
      1. Uses cat brain TPMs of high to low smoothing
      2. This step creates a warp field: u\_sc1rmT1\_00.nii
   2. Apply Deformations to Functional Volumes
      1. Uses u\_sc1rmT1\_00.nii

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