Makefile Documentation

Contents

1 This File

- This document was prepared on February 21, 2018 at 11:38 by `madhyt`.
- Prepared in: `/mnt/adrc/adrc-neuropath/lib`
- This file documents the following makefiles:
  `makefile_subject.mk`

1.1 Description

No description supplied.

1.2 Files

`makefile_subject.mk` Subject-specific makefile for ADRC Neuropath project

Note that the items are sorted uppercase, then lowercase: [A-Za-z]

2 Targets

Target	Description
`all` (`makefile_subject.mk`)	Do everything
`allmasks` (`makefile_subject.mk`)	Include all the masks that should be created from Caitlin's editing
`clean` (`makefile_subject.mk`)	Clean does not do anything yet but would remove unnecessary files
`overlap` (`makefile_subject.mk`)	These images are projections of the standard space ROI reigstered to the subject-specific space
`ref` (`makefile_subject.mk`)	Create reference rois (ROIs in std space transformed to subject specific space
`slices` (`makefile_subject.mk`)	Cut up the T1 into virtual slices

3 Variables

Note: Variables with an asterisk ("*") are global variables initialized with "export." Read more about exporting variables in the GNU Make manual: 5.7.2 Communicating Variables to a Sub-make .

Variable	Definition & Description
ANTSpath (makefile_subject.mk)	/usr/local/ANTs-2.1.0-rc3/bin Location of Advanced Normalization Tools
MNI1mmBRAIN (makefile_subject.mk)	/usr/share/fsl/data/standard/MNI152_T1_1mm_-brain.nii.gz Location of the MNI brain template
PROJHOME (makefile_subject.mk)	/mnt/adrc/adrc-neuropath This is the location of the project home
STANDARD_DIR (makefile_subject.mk)	/mnt/adrc/ADRC/standard This is where we find project-specific templates used for registration of these images

4 Intermediate Files

%_mask.nii.gz makefile_subject.mk

Convert the edited slice which has ROI markup into a NiFTI mask

%_mask_to_1mm.nii.gz makefile_subject.mk

Transform the subject-specific mask to 1mm MNI space

%_mask_to_1mm_bin.nii.gz makefile_subject.mk

Theshold the 1mm mask to maintain approximate size and binarize it

reference/%_reference.nii.gz makefile_subject.mk

"Convert MNI reference ROIs to subject space, forming the ""reference"" ROIs Note that we use nearest neigbor interpololation to preserve the size as much as possible. It will be a little different because there is shrinkage/ expansion in the mapping from std space to the subject."

registered/%_toref.nii.gz makefile_subject.mk

Create mask registered to the reference sample using 6dof registration allowing us to calculate overlap if we both align to the perfect slice and are able to get the perfect angle. We also use nearest neighbor interpolation to maintain a similar size.

5 Functions

Variable	Description
-	None found
(-)	

6 Makefiles

6.1 makefile_subject.mk

```
#* Subject-specific makefile for ADRC Neuropath project

#! This is the location of the project home
PROJHOME=/mnt/adrc/adrc-neuropath

#! This is where we find project-specific templates used for registration of
#! these images
STANDARD_DIR=/mnt/adrc/ADRC/standard

#! Location of Advanced Normalization Tools
ANTSpath=/usr/local/ANTs-2.1.0-rc3/bin

#! Location of the MNI brain template
MNI1mmBRAIN=/usr/share/fsl/data/standard/MNI152_T1_1mm_brain.nii.gz

.PHONY: allmasks ref slices overlap clean

#? Do everything
all: allmasks ref overlap

#?  Include all the masks that should be created from Caitlin's editing
allmasks: V1_mask.nii.gz IPL_mask.nii.gz MSTG_mask.nii.gz  MFG_mask.nii.gz

######################### Make the slices ###################################

#? Cut up the T1 into virtual slices
slices: T1_brain.nii.gz
        mkdir -p slices
        Rscript $(PROJHOME)/bin/virtualmeatslicer.R $<


######################### Make reference ROIs ###############################

#?  Create reference rois (ROIs in std space transformed to subject specific
#?  space
ref: reference/MSTG_reference.nii.gz reference/MFG_reference.nii.gz reference/
   IPL_reference.nii.gz reference/V1_reference.nii.gz


#> Convert MNI reference ROIs to subject space, forming the "reference" ROIs
#> Note that we use nearest neigbor interpololation to preserve the size as
#> much as possible. It will be a little different because there is shrinkage/
#> expansion in the mapping from std space to the subject.
reference/%_reference.nii.gz: ../mni/references/%_instd.nii.gz
        mkdir -p reference ;\
        export ANTSPATH=$(ANTSpath) ;\
        $(ANTSpath)/WarpImageMultiTransform \
                3 \
                $< \
                $@ \
                --use-NN -R T1_brain.nii.gz -i  \
                xfm_dir/T1_to_CT_0GenericAffine.mat \
```

```
                xfm_dir/T1_to_CT_1InverseWarp.nii.gz \
                -i $(STANDARD_DIR)/CT_to_1mmmni_Affine.mat \
                $(STANDARD_DIR)/CT_to_1mmmni_InverseWarp.nii.gz


######################### Convert edited slices into masks ################

#> Convert the edited slice which has ROI markup into a NiFTI mask
%_mask.nii.gz: slices/$(wildcard s.???_%.png)
        Rscript $(PROJHOME)/bin/reassemble.R T1_brain.nii.gz $*

#> Transform the subject-specific mask to 1mm MNI space
%_mask_to_1mm.nii.gz: %_mask.nii.gz
        export ANTSPATH=$(ANTSpath) ;\
        $(ANTSpath)/WarpImageMultiTransform \
                3 \
                mask.nii.gz \
                $@ \
                -R $(MNI1mmBRAIN) \
                $(STANDARD_DIR)/CT_to_1mmmni_Warp.nii.gz \
                $(STANDARD_DIR)/CT_to_1mmmni_Affine.mat \
                xfm_dir/T1_to_CT_1Warp.nii.gz \
                xfm_dir/T1_to_CT_0GenericAffine.mat

#> Theshold the 1mm mask to maintain approximate size and binarize it
%_mask_to_1mm_bin.nii.gz: %_mask_to_1mm.nii.gz
        fslmaths $< -thr .5 -bin $@

######################### Compute overlap with perfect angle and slice ########


#? These images are projections of the standard space ROI reigstered to the
#? subject-specific space
overlap: registered/MSTG_toref.nii.gz  registered/V1_toref.nii.gz  registered/
   IPL_toref.nii.gz  registered/MFG_toref.nii.gz

#> Create mask registered to the reference sample using 6dof registration
#> allowing us to calculate overlap if we both align to the perfect slice and
#> are able to get the perfect angle. We also use nearest neighbor interpolation
#> to maintain a similar size.
registered/%_toref.nii.gz: %_mask.nii.gz reference/%_reference.nii.gz
        mkdir -p registered ;\
        flirt -dof 6 -interp nearestneighbour -in $*_mask.nii.gz -ref reference/$*
           _reference.nii.gz -out $@ -omat registered/$*_toref.mat

#? Clean does not do anything yet but would remove unnecessary files
clean:
```