

Makefile Documentation

Documenting makefiles: `Flex.mk`

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1 Using this File

- Note that the items are sorted uppercase, then lowercase: [A-Za-z]
- **Targets:** the sort of thing you would call from the command line, `make XYZ`.
- **Variables:** variables set in a makefile, accessible to it, and any other makefiles referenced through the `include` directive.
- **Intermediate Files:** things created during the makefile run, may or may not be removed at the end.

2 Targets

Target	Definition & Description	File
-	None found	-

3 Variables

Variable	Definition & Description	File
FLEXPATH	\$(BIN)/wmpprogram/sb/cross_platform/scripts where the flex scripts are stored	Flex.mk
SBBINDIR	\$(BIN)/wmpprogram/sb/linux where the linux wrappers for the flex scripts are stored	Flex.mk
SCALE	0.00266 scalar to adjust intensities, found through trial and error	Flex.mk

4 Intermediate Files

Flex ([Flex.mk](#)) No comment supplied

QA/images/checkflex.gif ([Flex.mk](#)) check flex output - this is a quickie image for checking

skull stripping and whether the hyperintensities seem at least to be in the right places

`flair/Flair_R0.nii.gz` (`Flex.mk`) reorient to standard

`flair/Flair_brain.hdr` (`Flex.mk`) skull-strip and export as ANALYZE filetype for the `sb_flex` script

`flair/Flair_brain_flwmt_lesions.hdr` (`Flex.mk`) identify wm lesions

`flair/Flair_restore.nii.gz` (`Flex.mk`) produce bias-field corrected image that is segmented

`flair/Flair_scaled.nii.gz` (`Flex.mk`) The default Flair image has crazy-high intensities that flex doesn't like, so we lower the intensities

`flair/Flair_wmh_mask.nii.gz` (`Flex.mk`) create mask of wm lesions

`flair/wmhstats.csv` (`Flex.mk`) ??

5 Makefiles

5.1 Flex.mk

```
## Identifies WM hyperintensities
## copied from act-plus PrepSubject.mk

#! where the flex scripts are stored
FLEXPATH=$(BIN)/wmprogram/sb/cross_platform/scripts

#! where the linux wrappers for the flex scripts are stored
SBBINDIR=$(BIN)/wmprogram/sb/linux

#! scalar to adjust intensities, found through trial and error
SCALE=0.00266

#? Identify wm hyperintensities
Flex: flair/Flair.nii.gz flair/Flair_scaled.nii.gz flair/Flair_R0.nii.gz flair/
    Flair_brain.hdr flair/Flair_brain_flwmt_lesions.hdr flair/Flair_wmh_mask.nii.gz
    QA/images/checkflex.gif

#> The default Flair image has crazy-high intensities that flex doesn't like,
#> so we lower the intensities
flair/Flair_scaled.nii.gz: flair/Flair.nii.gz
    cp $< $@ ;\
    fslmaths $@ -mul $(SCALE) $@ -odt float

#> reorient to standard
flair/Flair_R0.nii.gz: flair/Flair_scaled.nii.gz
    fslreorient2std $< $@

#> produce bias-field corrected image that is segmented
flair/Flair_restore.nii.gz: flair/Flair_R0.nii.gz
    fast -B -o flair/Flair -t 2 $<

#> skull-strip and export as ANALYZE filetype for the sb_flex script
flair/Flair_brain.hdr: flair/Flair_restore.nii.gz
    niftiname=$(basename $@).nii.gz ;\
    bet $< ${niftiname} -R ;\
    fslchfiletype ANALYZE ${niftiname} $@ ;\
    rm ${niftiname}

#> identify wm lesions
flair/Flair_brain_flwmt_lesions.hdr: flair/Flair_brain.hdr
    @echo "Flex processing " $< ;\
    export PATH=$(FLEXPATH):$(SBBINDIR):$$PATH ;\
    export SBBINDIR=$(SBBINDIR) ;\
    $(FLEXPATH)/sb_flex -fl $<

#> create mask of wm lesions
flair/Flair_wmh_mask.nii.gz: flair/Flair_brain_flwmt_lesions.hdr
    fslmaths $< -uthr 1 $@

#> check flex output - this is a quickie image for checking skull stripping
#> and whether the hyperintensities seem at least to be in the right places
QA/images/checkflex.gif: flair/Flair_brain.hdr flair/Flair_wmh_mask.nii.gz
```

```

mkdir -p QA/images ;\
pngname=$(basename $@).png ;\
slicer flair/Flair_brain.hdr flair/Flair_wmh_mask.nii.gz -l "orange" -a $$
    {pngname} ;\
convert $$ {pngname} $@ ;\
rm $$ {pngname}

```

*# we have to use backticks here because \$() is interpreted to be a make command,
 # not a command expansion of a shell command - we can use make::basename, but
 # there is no make::fslstats
 #> ??*

```

flair/wmhstats.csv: flair/Flair_brain_flwmt_lesions.hdr flair/Flair_brain.hdr
    @echo Writing wmhstats.csv ;\
#    Where does $tot go?
    tot=`fslstats $(word 2,$^) -V | awk '{print $$2}'` ;\
    wmh=`fslstats $(word 1,$^) -u 2 -V | awk '{print $$2}'` ;\
    per=`echo $$wmh $$tot | awk '{print ($$1/$$2)*100}'` ;\
    echo $(subject)", " $$wmh, " $$per > $@

```