

FreeSurfer Tutorial: Process Flow

This table shows the recon-all steps for the current **dev** version of FreeSurfer. See ReconAllStableTablev4 to see a process flow for the latest **stable** version of FreeSurfer.

Click here to see this information presented in a block diagram format and here for a process v. files table.

See also the OtherUsefulFlags for other recon-all options.

recon-all step	Individual Flag	Input	Command Line	Output
recon-all -autorecon1 -subjid <subjid>	-i <invol1> -i <invol2>	invol1.dcm	mri_convert invol1.dcm orig/001.mgz	orig/001.mgz
		invol2.dcm	mri_convert invol2.dcm orig/002.mgz	orig/002.mgz
	-motioncor	orig/001.mgz	mri_motion_correct.fsl -o rawavg.mgz -wild orig/001.mgz orig/002.mgz	rawavg.mgz
		orig/002.mgz		
		rawavg.mgz	mri_convert rawavg.mgz orig.mgz --conform	orig.mgz
		orig.mgz	<u>mri_add_xform_to_header</u> -c transforms/talairach.xfm orig.mgz orig.mgz	orig.mgz
	-nuintensitycor	orig.mgz	mri_nu_correct.mni --i orig.mgz --o nu.mgz --n 2	nu.mgz
	-talairach	nu.mgz	talairach_avi --i nu.mgz --xfm transforms/talairach.auto.xfm	transforms/talairach.auto.xfm
		transforms/talairach.auto.xfm	cp transforms/talairach.auto.xfm transforms/talairach.xfm	transforms/talairach.xfm
		transforms/talairach.xfm	talairach_afd -T 0.005 -xfm transforms/talairach.xfm	transforms/talairach.xfm
			awk -f \$FREESURFER_HOME/bin/extract_talairach_avi_QA.awk transforms/talairach_avi.log	transforms/talairach_avi.log
	-normalization	nu.mgz	mri_normalize -g 1 nu.mgz T1.mgz	T1.mgz
	-skullstrip	nu.mgz	mri_em_register -skull nu.mgz \$FREESURFER_HOME/average/RB_all_withskull_2007-08-08.gca transforms/talairach_with_skull.lta	transforms/talairach_with_skull.lta
		T1.mgz	mri_watershed -T1 -brain_atlas \$FREESURFER_HOME/average/RB_all_withskull_2007-08-08.gca transforms/talairach_with_skull.lta T1.mgz brainmask.auto.mgz	brainmask.auto.mgz
		T1.mgz	mri_gcut -110 -mult brainmask.auto.mgz T1.mgz brainmask.auto.mgz	brainmask.auto.mgz
		brainmask.auto.mgz		
		brainmask.auto.mgz	cp brainmask.auto.mgz brainmask.mgz	brainmask.mgz
	-gcareg	brainmask.mgz	mri_em_register -mask brainmask.mgz nu.mgz \$FREESURFER_HOME/average/RB_all_2007-08-08.gca transforms/talairach.lta	transforms/talairach.lta
		nu.mgz		
	-canorm	brainmask.mgz	mri_ca_normalize -mask brainmask.mgz nu.mgz \$FREESURFER_HOME/average/RB_all_2007-08-08.gca transforms/talairach.lta norm.mgz	norm.mgz
		nu.mgz		
		transforms/talairach.lta		
	-careg	brainmask.mgz	mri_ca_register -align-after -nobigventricles -mask brainmask.mgz -T transforms/talairach.lta norm.mgz \$FREESURFER_HOME/average/RB_all_2007-08-08.gca transforms/talairach.m3z	transforms/talairach.m3z
		transforms/talairach.lta		
		norm.mgz		
	-careginv	transforms/talairach.m3z	mri_ca_register -invert-and-save transforms/talairach.m3z	transforms/talairach.m3z.inv.x.mgz
				transforms/talairach.m3z.inv.y.mgz
				transforms/talairach.m3z.inv.z.mgz
	-rmneck	nu.mgz	mri_remove_neck -radius 25 nu.mgz transforms/talairach.m3z \$FREESURFER_HOME/average/RB_all_2007-08-08.gca nu_noneck.mgz	nu_noneck.mgz
		transforms/talairach.m3z		
	-skull-lta	transforms/talairach.lta	mri_em_register -skull -t transforms/talairach.lta nu_noneck.mgz \$FREESURFER_HOME/average/RB_all_withskull_2007-08-08.gca transforms/talairach_with_skull.lta	transforms/talairach_with_skull.lta
		nu_noneck.mgz		
	-calabel	norm.mgz	mri_ca_label -align -nobigventricles norm.mgz transforms/talairach.m3z \$FREESURFER_HOME/average/RB_all_2007-08-08.gca aseg.auto_noCCseg.mgz	aseg.auto_noCCseg.mgz
		transforms/talairach.m3z		
		aseg.auto_noCCseg.mgz		
		aseg.auto_noCCseg.mgz	mri_cc -aseg aseg.auto_noCCseg.mgz -o aseg.auto.mgz	aseg.auto.mgz

recon-all - autorecon2 -subjid <subjid>		aseg.auto_noCCseg.mgz	<subjid>	aseg.auto.mgz	
		aseg.auto.mgz	cp aseg.auto.mgz aseg.mgz	aseg.mgz	
	-normalization2	brainmask.mgz	mri_normalize -aseg aseg.mgz -mask brainmask.mgz norm.mgz brain.mgz	brain.mgz	
		norm.mgz			
		aseg.mgz			
	-maskbfs	brain.mgz	mri_mask -T 5 brain.mgz brainmask.mgz brain.finalsurfs.mgz	brain.finalsurfs.mgz	
		brainmask.mgz			
	-segmentation	brain.mgz	mri_segment brain.mgz wm.seg.mgz	wm.seg.mgz	
		wm.seg.mgz	mri_edit_wm_with_aseg wm.seg.mgz brain.mgz aseg.mgz wm.asegedit.mgz	wm.asegedit.mgz	
		aseg.mgz			
		brain.mgz			
		wm.asegedit.mgz	mri_preless wm.asegedit.mgz wm norm.mgz wm.mgz	wm.mgz	
		norm.mgz			
	-fill	wm.mgz	mri_fill -a ./scripts/ponscut.cut.log -xform transforms/talairach.lta -segmentation aseg.auto_noCCseg.mgz wm.mgz filled.mgz	filled.mgz	
		aseg.auto_noCCseg.mgz		./scripts/ponscut.cut.log	
		transforms/talairach.lta			
	-tessellate	filled.mgz	mri_preless filled.mgz 255 norm.mgz filled-preless255.mgz	filled-preless255.mgz	
		norm.mgz			
		filled-preless255.mgz	mri_tessellate filled-preless255.mgz 255 lh.orig.nofix	lh.orig.nofix	
		filled.mgz	mri_preless filled.mgz 127 norm.mgz filled-preless127.mgz	filled-preless127.mgz	
		norm.mgz			
		filled-preless127.mgz	mri_tessellate filled-preless127.mgz 127 rh.orig.nofix	rh.orig.nofix	
		?h.orig.nofix	mrisc_extract_main_component ?h.orig.nofix ?h.orig.nofix	?h.orig.nofix	
			rm -f filled-preless255.mgz filled-preless127.mgz		
	-smooth1	?h.orig.nofix	mrisc_smooth -nw ?h.orig.nofix ?h.smoothwm.nofix	?h.smoothwm.nofix	
	-inflate1	?h.smoothwm.nofix	mrisc_inflate -no-save-sulc ?h.smoothwm.nofix ? h.inflated.nofix	?h.inflated.nofix	
	-qsphere	?h.inflated.nofix	mrisc_sphere -q ?h.inflated.nofix ?h.qsphere.nofix	?h.qsphere.nofix	
	-fix	?h.orig.nofix	cp ?h.orig.nofix ?h.orig	?h.orig	
		?h.inflated.nofix	cp ?h.inflated.nofix ?h.inflated	?h.inflated	
		?h.qsphere.nofix	mrisc_fix_topology -mgz -sphere qsphere.nofix -ga <subjid> ?h	?h.orig	
		?h.orig	mrisc_euler_number ?h.orig	?h.orig	
		?h.orig	mrisc_remove_intersection ?h.orig ?h.orig	?h.orig	
			rm ?h.inflated		
	-finalsurfs	brain.finalsurfs.mgz	mrisc_make_surfaces -noaparc -mgz -T1 brain.finalsurfs <subjid> ?h	?h.white	
				?h.pial	
				?h.thickness	
		?h.orig		?h.curv	
				?h.area	
				?h.cortex.label	
	-surfvolume	?h.area	mrisc_calc -o ?h.area.mid ?h.area.add ?h.area.pial	?h.area.mid	
		?h.area.pial			
		?h.area.mid	mrisc_calc -o ?h.area.mid ?h.area.mid div 2	?h.area.mid	
		?h.area.mid	mrisc_calc -o ?h.volume ?h.area.mid mul ?h.thickness	?h.volume	
		?h.thickness			
	-smooth2	?h.white	mrisc_smooth -n 3 -nw ?h.white ?h.smoothwm	?h.smoothwm	
	-inflate2	?h.smoothwm	mrisc_inflate ?h.smoothwm ?h.inflated	?h.inflated	
				?h.sulc	
		?h.inflated	mrisc_curvature -thresh .999 -n -a 5 -w -distances 10 10 ? h.inflated	?h.inflated.H	
				?h.inflated.K	
		-sphere	?h.inflated,?h.smoothwm	mrisc_sphere ?h.inflated ?h.sphere	?h.sphere
		-surfreg	?h.sphere	mrisc_register -curv ?h.sphere \$FREESURFER_HOME/average/? h.average.curvature.filled.buckner40.tif ?h.sphere.reg	?h.sphere.reg
	-iacobian white	?h.white	mrisc_iacobian ?h.white ?h.sphere.reg ?h.iacobian white	?h.iacobian white	

recon-all - autorecon3 -subjid <subjid>		?h.sphere.reg		
	-avgcurv	?h.sphere.reg	mrisc_paint -a 5 \$FREESURFER_HOME/average/? h.average.curvature.filled.buckner40.tif#6 ?h.sphere.reg ? h.avg_curv	?h.avg_curv
	-cortparc	aseg.mgz	mrisc_ca_label -aseg mri/aseg.mgz <subjid> ?h ? h.sphere.reg \$FREESURFER_HOME/average/? h.curvature.buckner40.filled.desikan_killiany.2007-06- 20gcs ?h.aparc.annot	label/?h.aparc.annot
		?h.sphere.reg		
	-parcstats	label/?h.aparc.annot	mrisc_anatomical_stats -mgz -f stats/?h.aparc.stats -b -a label/?h.aparc.annot -c label/aparc.annot.ctab <subjid> ?h	stats/?h.aparc.stats label/aparc.annot.ctab
	-cortparc2	aseg.mgz	mrisc_ca_label -aseg aseg.mgz <subjid> ?h ?h.sphere.reg \$FREESURFER_HOME/average/? h.destrieux.simple.2009-07-29.gcs label/? h.aparc.a2009s.annot	label/?h.aparc.a2009s.annot
		?h.sphere.reg		
	-parcstats2	label/?h.aparc.a2009s.annot	mrisc_anatomical_stats -mgz -f stats/?h.aparc.a2009s.stats - b -a label/?h.aparc.a2009s.annot -c label/aparc.annot.a2009s.ctab <subjid> ?h	stats/?h.aparc.a2009s.stats stats/aparc.annot.a2009s.ctab
	-cortribbon	aseg.mgz	mrisc_volmask --label_left_white 2 --label_left_ribbon 3 -- label_right_white 41 --label_right_ribbon 42 --save_ribbon --save_distance <subjid>	?h.ribbon.mgz
		?h.white		
		?h.pial		
	-segstats	aseg.mgz	mri_segstats --seg mri/aseg.mgz --sum stats/aseg.stats --pv mri/norm.mgz --empty --excludeid 0 --excl-ctxgmwm -- supratent --subcortgray --totalgray --in mri/norm.mgz --in- intensity-name norm --in-intensity-units MR --etiv --surf- wm-vol --surf-ctx-vol --ctab \$FREESURFER_HOME/ASegStatsLUT.txt --subject <subjid>	stats/aseg.stats
	-aparc2aseg	aseg.mgz	mri_aparc2aseg --s <subjid> --ribbon	aparc+aseg.mgz
		?h.ribbon.mgz		
		label/?h.aparc.annot	mri_aparc2aseg --s <subjid> --ribbon --a2009s	aparc.a2009s+aseg.mgz
		aseg.mgz		
	-wmparc	?h.ribbon.mgz	mri_aparc2aseg --s <subjid> --labelwm --hypo-as-wm -- rip-unknown --ribbon --o mri/wmparc.mgz --ctxseg aparc+aseg.mgz	wmparc.mgz
		label/?h.aparc.a2009s.annot		
		aparc+aseg.mgz		
		wmparc.mgz	mri_segstats --seg mri/wmparc.mgz --sum stats/wmparc.stats --pv mri/norm.mgz --excludeid 0 -- brain-vol-from-seg --brainmask mri/brainmask.mgz --in mri/norm.mgz --in-intensity-name norm --in-intensity- units MR --etiv --subject <subjid> --surf-wm-vol --ctab \$FREESURFER_HOME/FreeSurferColorLUT.txt	stats/wmparc.stats

Differences from Stablev4.0.2

- mri_cc uses aseg.mgz whereas in v4.0.2, mri_cc uses aseg.auto.mgz.
 - For those using v4.0.2, this means that if edits are made to the aseg.mgz, you must copy the aseg.mgz to aseg.auto.mgz before running -ccseg to generate a new cc segmentation based on your edits.

ReconAllDevTable (last edited 2010-04-08 02:25:23 by NickSchmansky)