A4 / LEARN White Matter Hyperintensity Segmentation Methods

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We segmented white matter hyperintensity (WMH) from FLAIR MRI for each MR imaging session independently. To follow is the step-by-step processing procedure for accurate segmentation of WMH using an automated tool (hypermapp3r.readthedocs.io).

1. We identified FLAIR and MPRAGE MRI from the same session for all subjects
2. Using spm_coreg, we co-registered FLAIR MRI to MPRAGE MRI from the same session
3. Using fsl_anat (https://fsl.fmrib.ox.ac.uk/fsl/fslwiki/fsl_anat), we performed bias field correction on the FLAIR image.
4. We used ICVmapper for brain extraction (i.e. skull removal) on MPRAGE
5. We resliced the brain-extracted MPRAGE to the subject space FLAIR
6. Using HyperMapper algorithm, we segmented WMH in the FLAIR space.
7. We upsampled WMH from HyperMapper to the MPRAGE space
8. We co-registered the baseline FreeSurfer segmentation mask (https://surfer.nmr.mgh.harvard.edu/) to the subject space MPRAGE to create a subject-specific white matter mask from the following aseg ROIs (2 41 43 44 77 4 5 11 50)
9. The WMH HyperMapper images were masked by the FreeSurfer white matter mask to remove unwanted voxels
10. We computed the WMH volume and intracranial volume in cubic mm.

References

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