OFFICIAL ABSTRACT and CERTIFICATION

Gray Matter Changes in Cerebral Development

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Volumetric analysis is an essential neuroimaging tool for identifying and characterizing morphometric and connectivity brain changes. Due to the convenience of imaging processing software, such as FreeSurfer, standard practice is to rely on automated results. CAT12, an extension of the segmentation in SPM12, uses an internal interpolation to provide more reliable results even with low resolution images and anisotropic spatial resolutions. With data from Human Connectome Project Development(HCP-D) dataset, gray matter volume (GMvol) and white matter volume (WMvol) were investigated using FreeSurfer and CAT12 software. Volumetric analysis was performed on preprocessed T1 images of 20 healthy male subjects, ages 5-21. Results show that in comparison to FreeSurfer, CAT12 is regularly underestimating gray matter volumes and overestimating white matter volumes, with the exception of 2 subjects. Ages were also correlated with cerebral volumes for future work. Trends map a slight decline in gray matter volume and a slight increase in white matter volume as subject ' s age increases, for both CAT12 and FreeSurfer.

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