



EMIF Deliverable 3.10: Novel combinatorial MRI marker algorithms for diagnosis

Executive summary

The objective of this deliverable was to find a combination of MRI biomarkers, characterized through advanced imaging pipelines for the diagnosis and prognosis of Alzheimer's disease (AD) by identifying brain atrophy patterns associated with cognitive decline.

Thanks to the NeuGRID platform, 814 volumetric scans from 1000-AD-Cohort were processed with fully automated analysis pipelines such as FreeSurfer, FSL-FIRST and LEAP. The selected pipelines were three of the best tools for brain cortical and sub-cortical segmentation. An expert reader visually inspected the subcortical and cortical segmentations to verify that the generated outputs were not characterized by processing artifacts.

In order to gather in EMIF all the patients' markers the MRI-based measures derived with the three pipelines were added to the Electronic Health Record (EHR) together with the most significant biological, cognitive, and neuropsychological data already archived in the TranSMART platform.

To investigate the potential added value of combinatorial biomarkers, that are easily obtained in routine clinical practice, we combined several MRI imaging biomarkers (i.e.: hippocampal volume, amygdala volume, entorhinal cortex thickness) that significantly differed ($p < 0.05$) across three diagnostic groups (AD, MCI and controls). Finally, the performances of the "combinatorial marker" were compared with those obtained from each single marker.

Contacts

EMIF-AD: Enrico Peira and Alberto Redolfi

epeira@fatebenefratelli.eu / aredolfi@fatebenefratelli.eu