NeuroImaging Brain Chart: Individualized Imaging Biomarkers of Disease and Aging

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Teaching Points

Adoption of specialized AI software and processing pipelines at a very broad scale can be challenging. We present a machine learning based image processing and analysis suite with a user-friendly web interface that allows clinicians and researchers to calculate a panel of individualized imaging biomarkers of disease and aging from MRI images.

Outline

The NiChart software suite consists of stand-alone image processing pipelines for MRI images, as well as pattern analysis and machine learning (PAML) models for precision diagnostics and personalized prognostication that have been built on top of an extensive multi-study dataset of MRI images. A cloud-based infrastructure and a web-interface with associated seamless "drag and drop" procedures enables any user to easily upload their brain MRIs and obtain measures of brain age, Alzheimer's Disease score, predictions of accelerated path to cognitive decline or of resilient brain aging, measures of vascular lesions, and many other measures of disease and aging, called as "SPARE scores" [1]. The data analysis and machine learning components of the suite were pre-trained on large multi-study datasets [2]. Processing modules include statistical harmonization [3], supervised pattern regression and classification for deriving aging and disease biomarkers [4, 5, 6], and semi-supervised clustering for disease subtyping and heterogeneity analysis [7, 8].

References

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