# Ayu - Characterization of Healthy Ageing from Neuroimaging Data with Deep Learning and rsfMRI

ABSTRACTS

Various studies have established that estimated brain age, as derived from statistical models trained on healthy populations, establishes a significant biomarker that is a prescient of cognitive decline and different neurological diseases. In this work, we utilized a heterogeneous dataset (N = 638, age-range 20-87) of rs-fMRIs from CAMCAN in a healthy population whereupon we train both machine learning and deep learning models for brain age assessment. We also analysed how different functional regions contribute differently across ages by applying attention-based networks and activation maps.

OBJECTIVE

To develop an end-to-end diagnostic tool which is able to detect the deviation in rs-fMRI scans from normal ageing scans and to better understand and slowdown the effects of various neurodegenerative disorders.

rs-fMRI Data → Brain Functional Connectivity Network → Biomarkers / Connectivity / Interpretability
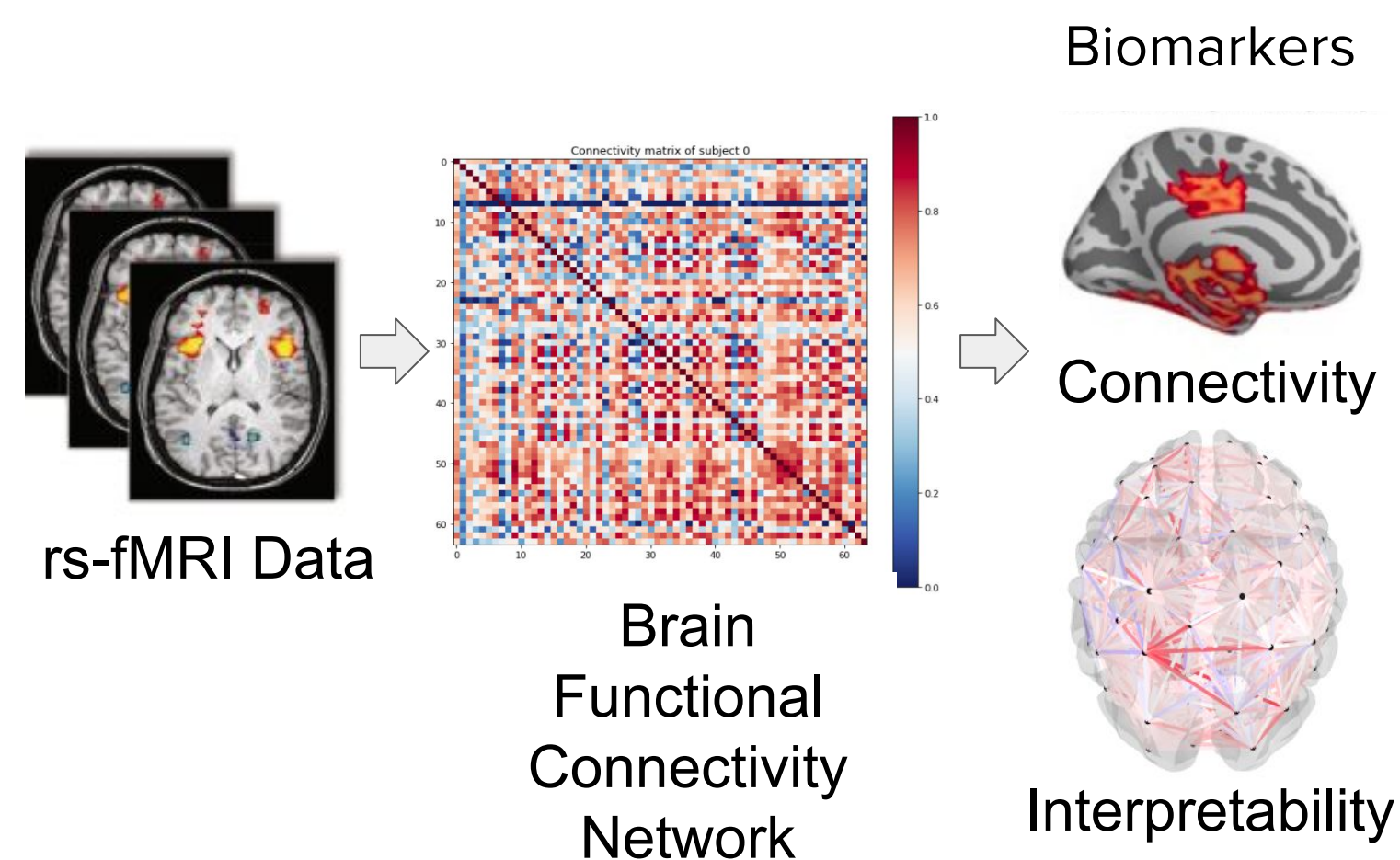
METHOD

- Our approach first employs normalizing the functional connectivity matrices for all the subjects.
- We worked with 2D ConvNets architecture where to reduce the computation, we perform 1D convolution twice instead of 2D convolution.
- We apply attention-based network and activation maps to get the ROIs and the strong connectivity between ROIs.

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