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Medical goal: Individual prediction of cognitive deterioration in elders based on MRI
More efficient clinical trials (by sorting into clean cohorts)

Data: Neuropsychological (NPSY) assessment baseline + follow up
5 MRI modalities (T1, T2, DW, SW, ASL, fMRI?) baseline

550 subjects classified by NPSY at baseline into:
- ~150 Mild Cognitive Impairment (MCI)
- ~400 Healthy Controls (HC) classified by NPSY at follow up into:
  - ~200 Healthy Stable Controls (SHC)
  - ~200 Healthy Progressive Controls (HPC)

Data is available and accessible
Previous work on (some) of this data exists
Data acquisition adheres to one protocol (?)
Each subject ~5GB, up to 1TB processed data
Acquisition time & cost: 2.5 years and ~1000CHF/subject

Tasks:
1. Classify subjects into MCI and HC (with MRI data, labels from NPSY)
2. Classify HC into SHC and PHC
3. Test classifier on independent data (different scanner, protocols, etc.)

So far: Image processing based on univariate voxelwise analysis
Unimodal analysis prevalent

Now: Consider multivariate methods / interaction between features
Merge multiple modalities
Incorporate anatomic & prior knowledge

Collaborators: Sven Haller: Neurophysician & -scientist
http://publicationslist.org/sven.haller

CIBM: Center for Biomedical Imaging
(Uni + Uniklinik Genf, Uni + Uniklinik Lausanne, EPFL)

Synergies: Tittgemeyer, Köln:
> Individualized medicine / Neurodegenerative diseases
> Multimodal Neuroimaging + Neuropsychology