



SuperBigFLICA: Code Modifications and Applications

You (Lily) Cheng, Ph.D.

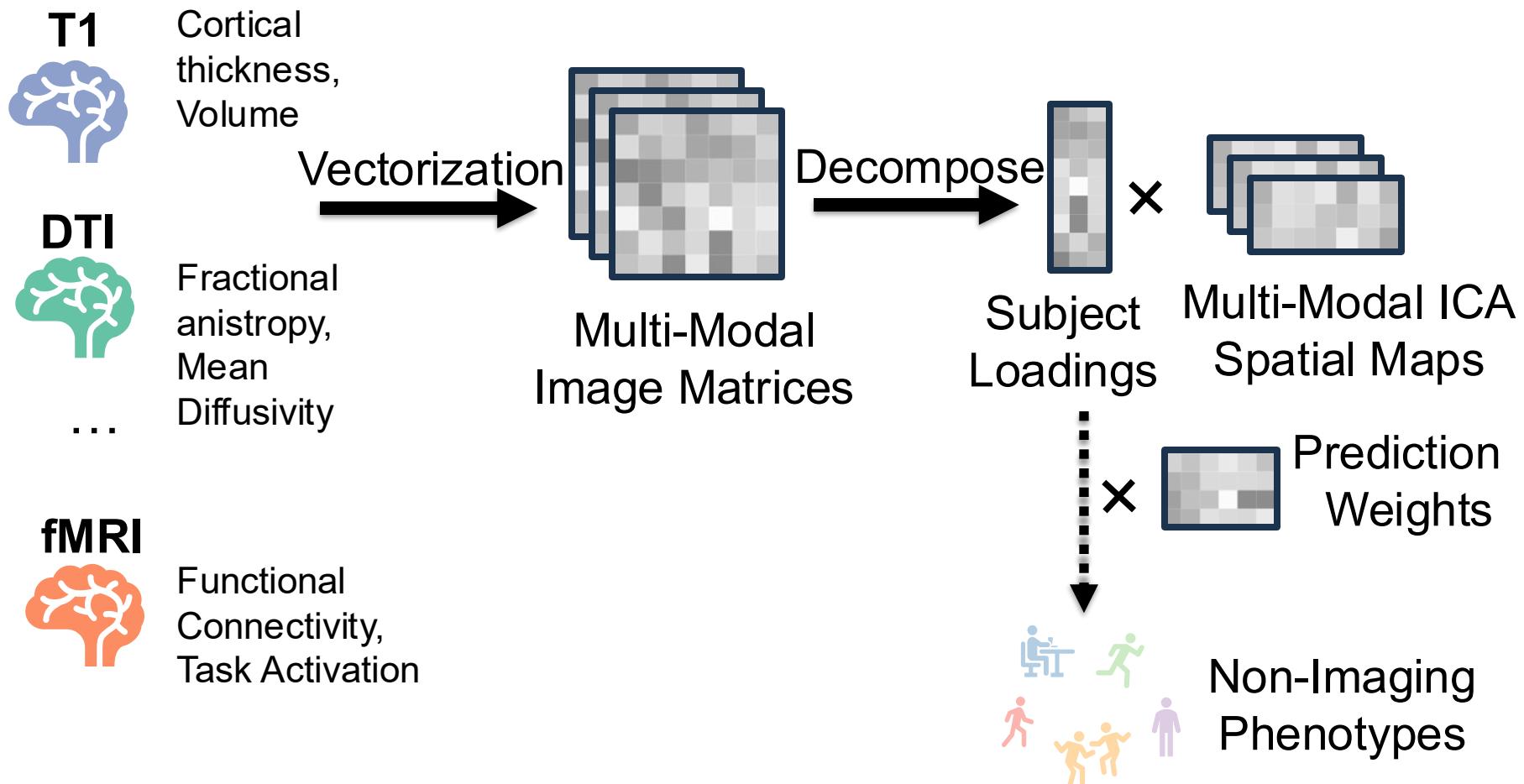
Research Fellow

Applied Neuroimaging Statistics Research (ANSR) Lab
McLean Hospital, Harvard Medical School

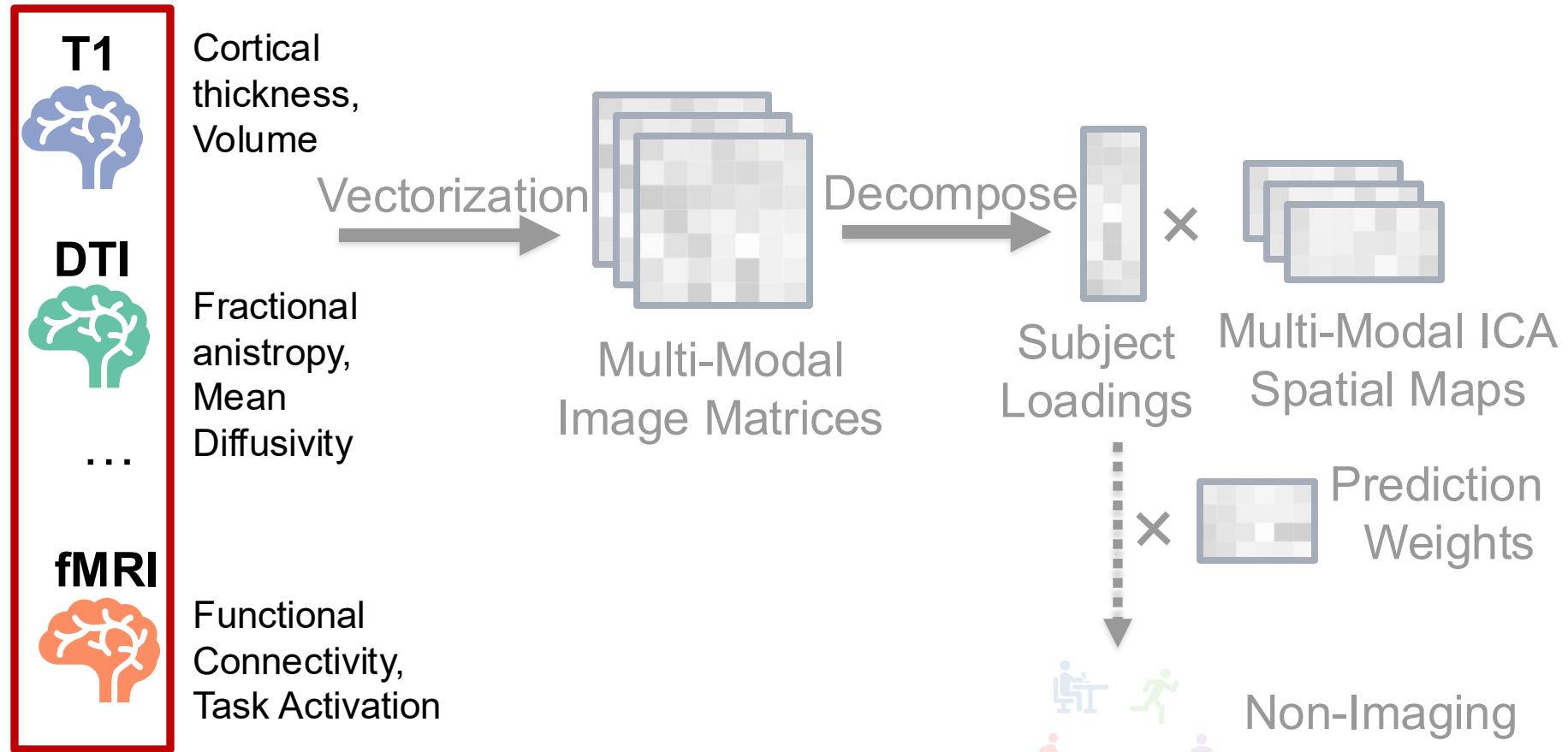


McLean HOSPITAL
HARVARD MEDICAL SCHOOL AFFILIATE

SuperBigFLICA



SuperBigFLICA Update



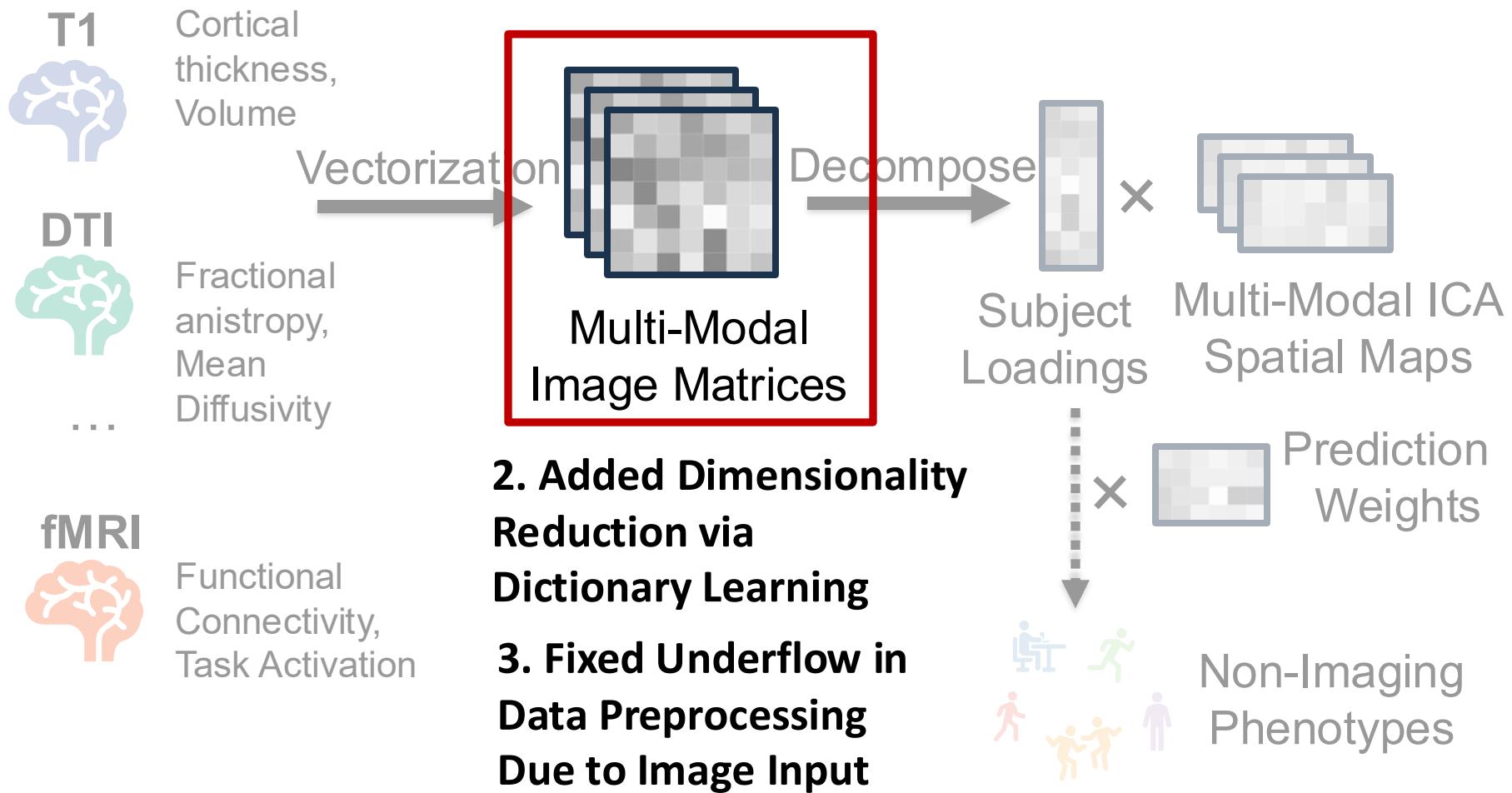
1. Built an Expanded Data Loader:

a. Flexible imaging filetypes

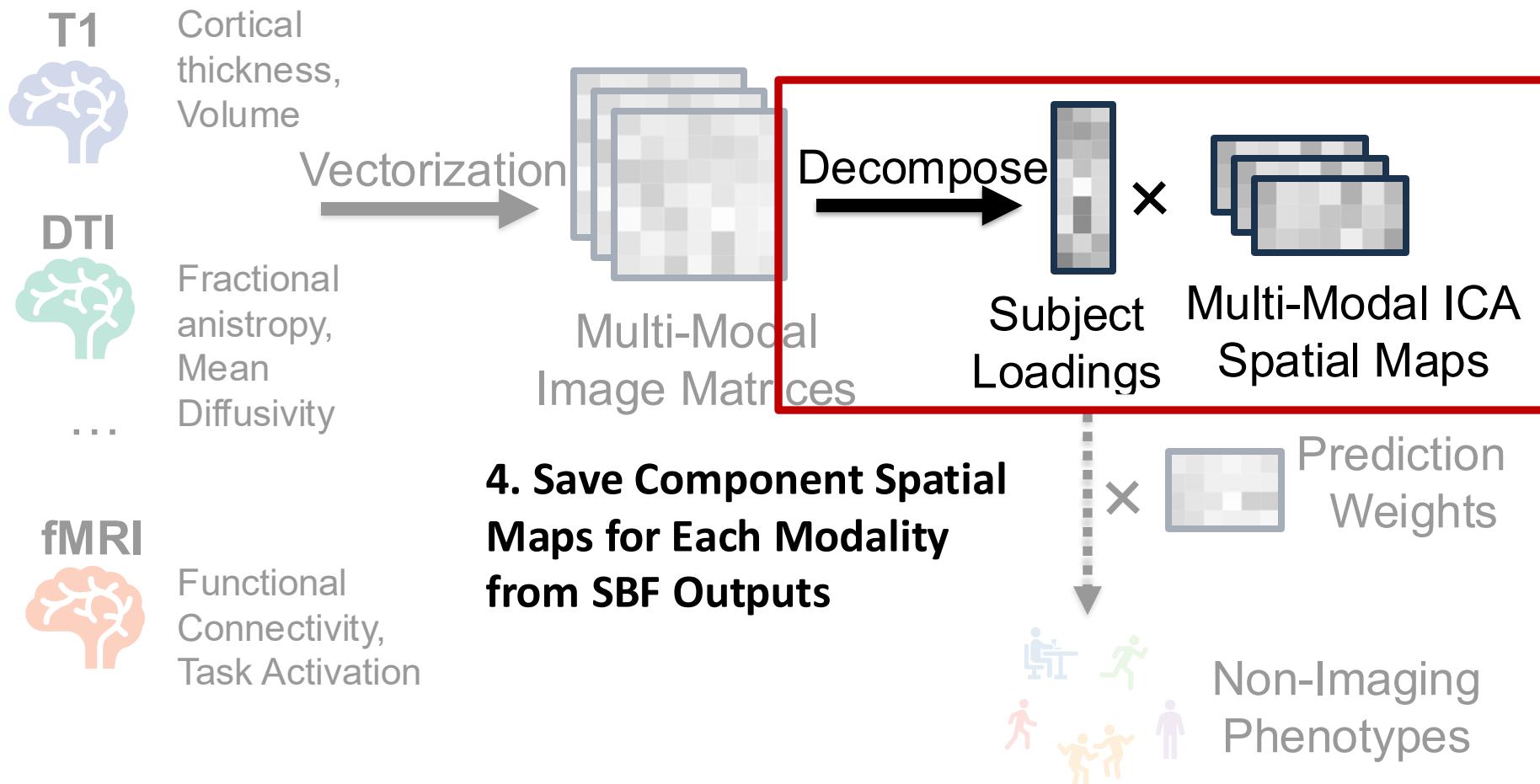
b. Flexible modality selection

c. Load subsets of input data

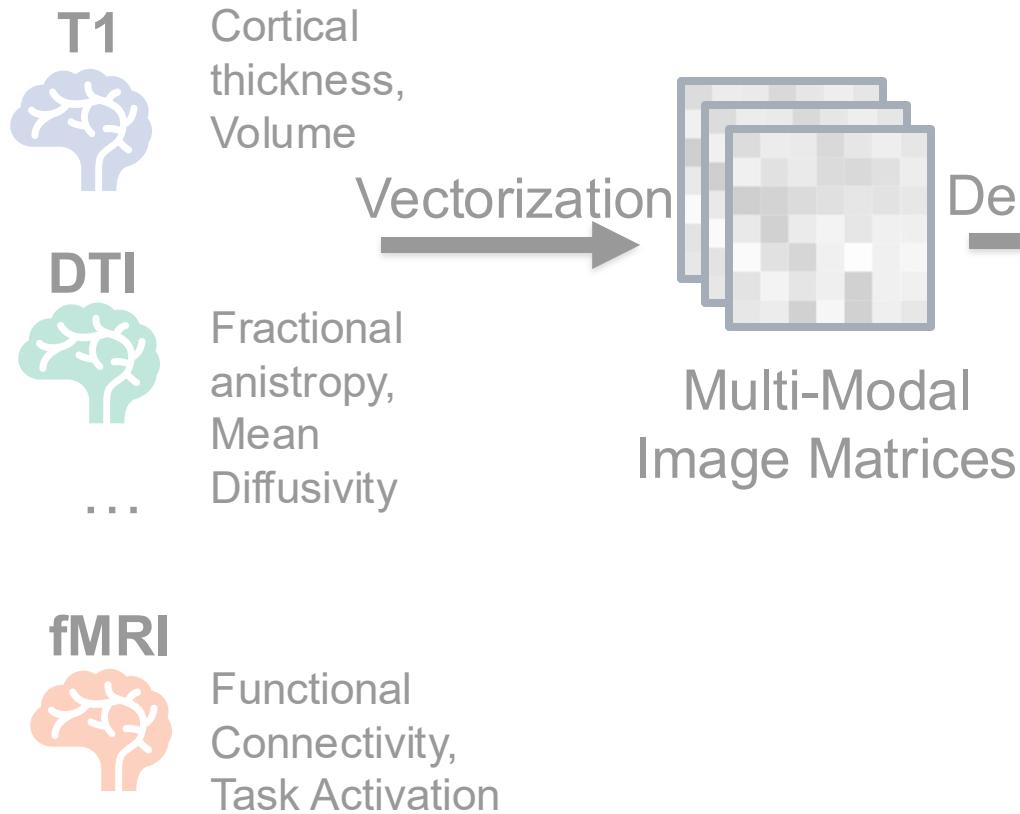
SuperBigFLICA Update



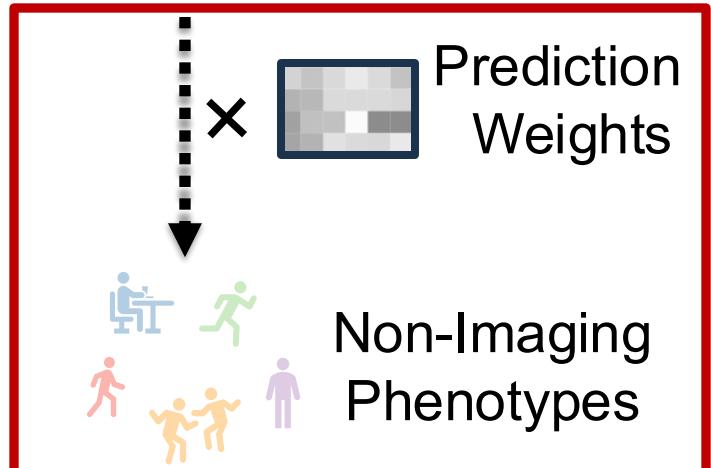
SuperBigFLICA Update



SuperBigFLICA Update



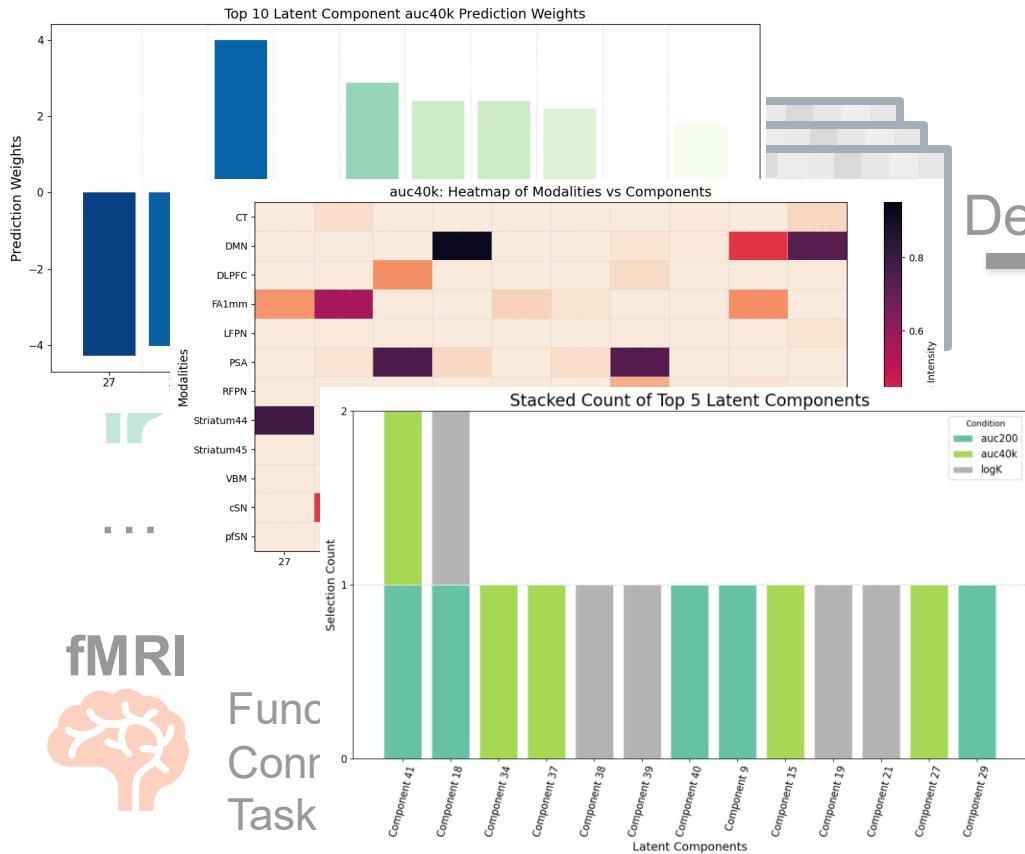
5. New Visualization Tools for Interpretation of Results



SuperBigFLICA Update



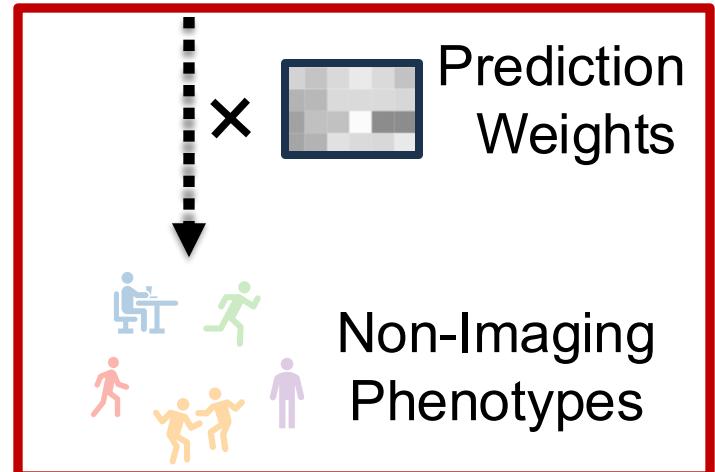
McLean HOSPITAL
HARVARD MEDICAL SCHOOL AFFILIATE



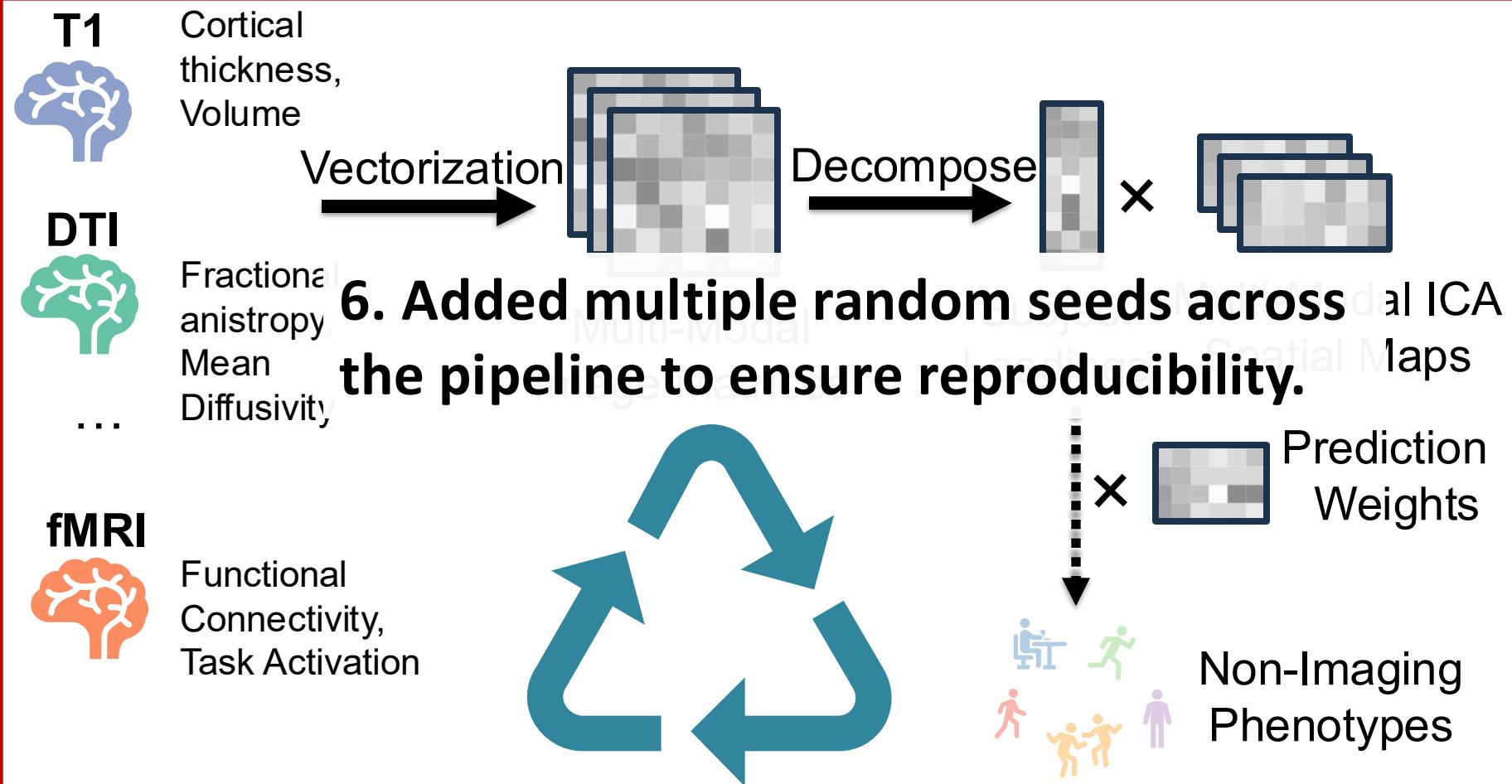
Decompose



5. New Visualization Tools for Interpretation of Results



SuperBigFLICA Update



Summary of SuperBigFLICA Code Modifications

1. Data Load: flexibly import data in common imaging formats
2. Added dictionary learning as a dimensionality reduction step
3. Fixed underflow in data preprocessing (normalization step)
4. Save imaging outputs in common image formats
5. Automated results visualization
6. Enhanced reproducibility

Application 1: Identify multi-modal covariance patterns predictive of delayed discounting



Data: Human Connectome Project – Young Adults (HCP-YA)

12 Imaging Modalities:

- Structural MRI: GM, PSA, CT
- Diffusion MRI: FA
- Resting-state fMRI: DMN, DLPFC, LFPN, RFPN, Striatum 44, Striatum 45, cSN, pfSN

Targets: AUC200, AUC40K, logK, beta

Sample size: 882 (456 Training, 215 Validation, 211 Test)

Application 2: Identify multi-modal covariance patterns predictive of cognitive decline



McLean HOSPITAL
HARVARD MEDICAL SCHOOL AFFILIATE

Data: Alzheimer's Disease Neuroimaging Initiative (ADNI-3)

5 Imaging Modalities:

- Structural MRI: GM, PSA, CT
- Amyloid PET
- Tau PET

Targets: cognitive dementia rating (CDR)

Sample size: 274 (192 Training, 41 Validation, 41 Test)



Future Directions

1. Data Load: adding CIFTI format
2. Prediction: categorical variable (classification)
3. Site effects

Future Directions



Thank you!