

# AI/ML-Readiness for Neuroimaging of Language



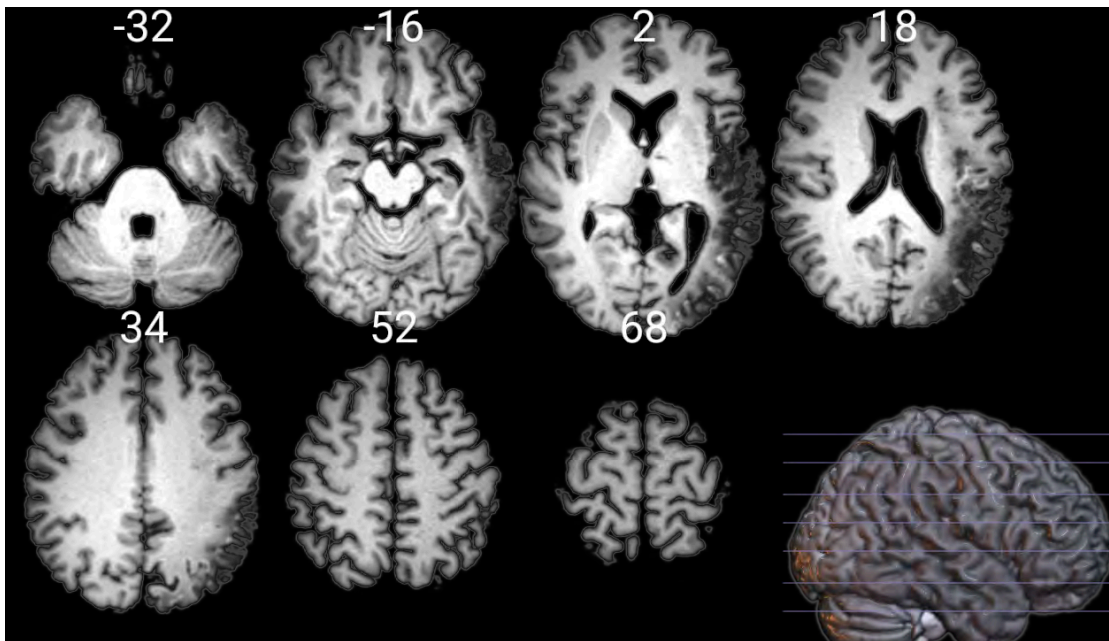
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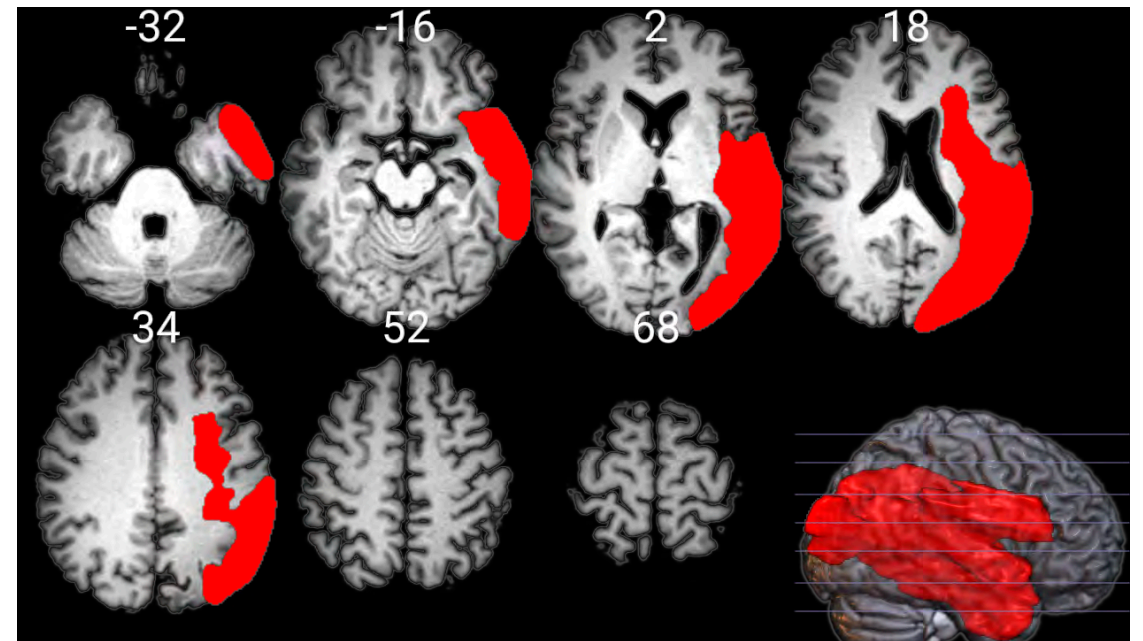


# Stroke Dataset

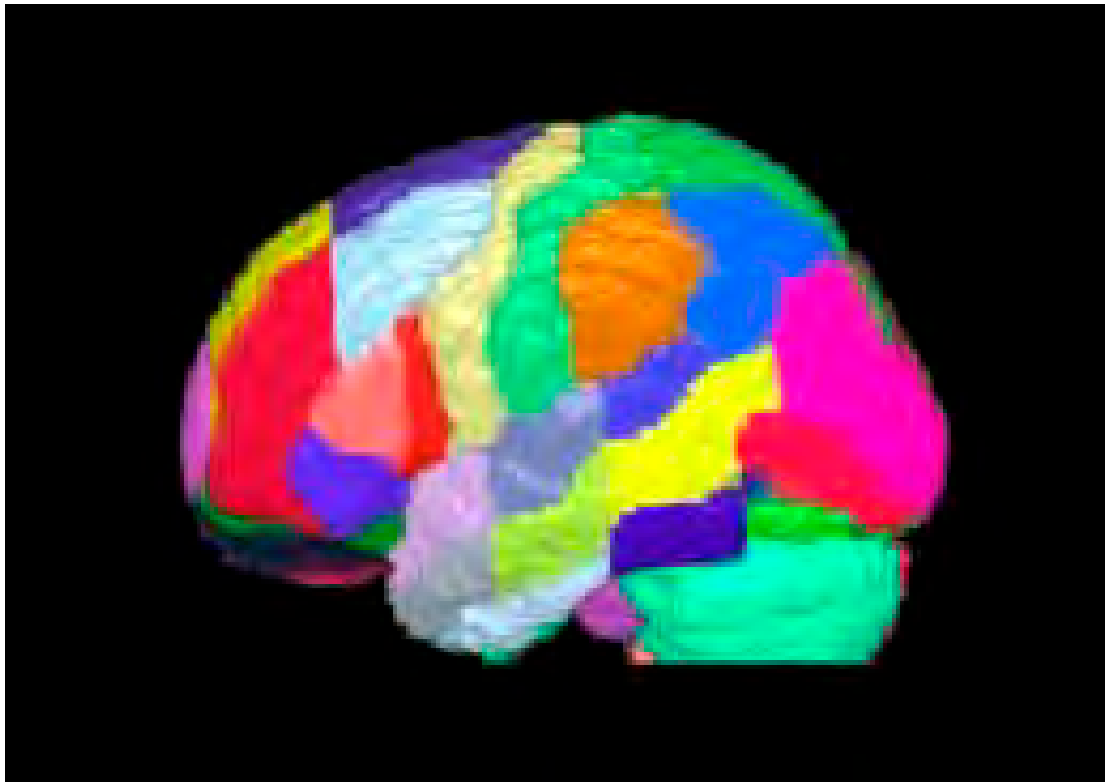
Patient T1



Same patient with lesion marked



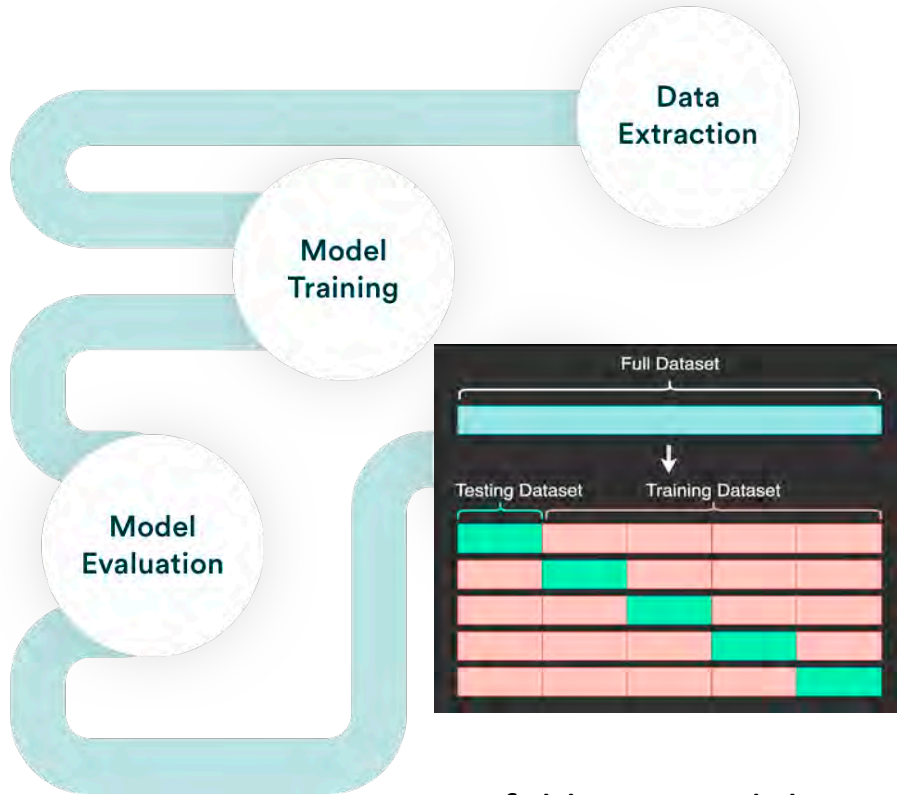
164 stroke survivors



- Left: Johns Hopkins University atlas
  - 189 regions of interest
- Bottom: example feature vectors for 5 patients
  - Features = percent of voxels damaged within each brain region

Patient	IFG_opercularis_L	IFG_triangularis_L	Angular_Gyrus_L	Middle_temporal_gyrus_L	Etc.
M10011.mat	0	0	0	0.0109841	...
M10021.mat	0.974263	0.953753	0.446807	0.349939	...
M10031.mat	0.742146	0.787285	0.367074	0.196827	...
M10041.mat	0.00749154	0	0.999308	0.65694	...
M10051.mat	0.962301	0.894732	0.405718	0.0376123	...

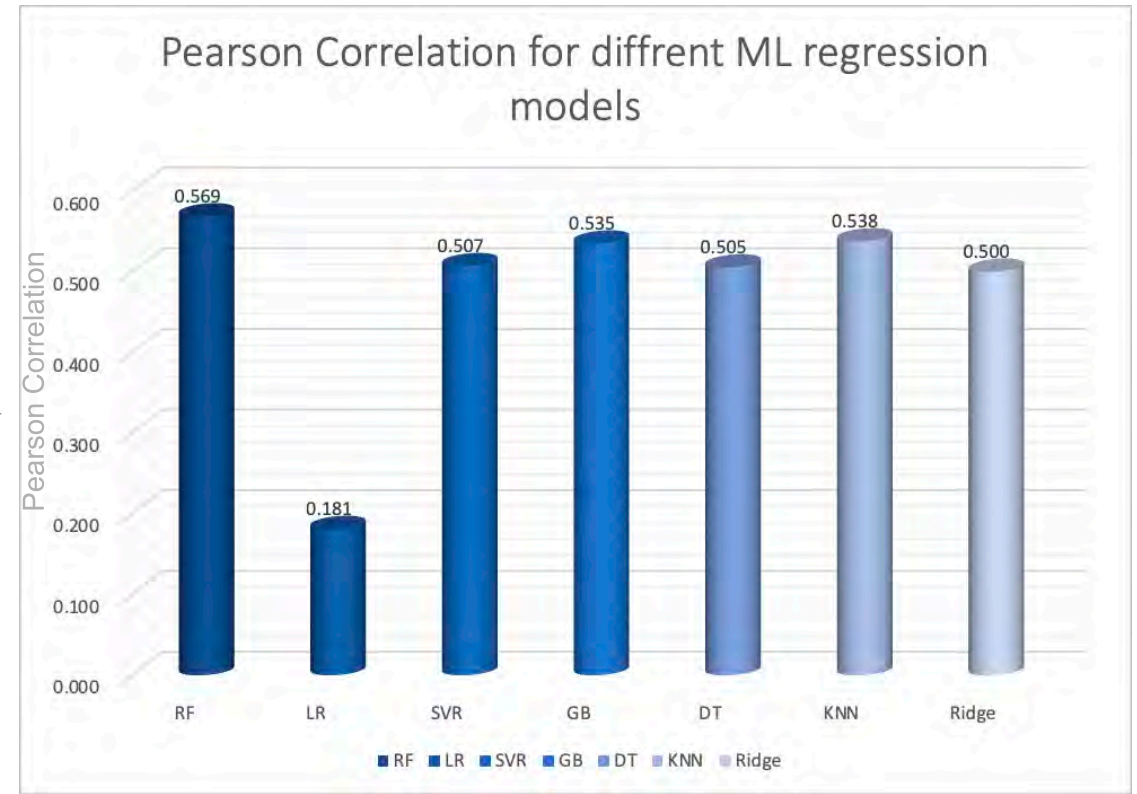
# Predicting Philadelphia Naming Test (PNT) Scores with Machine Learning Models



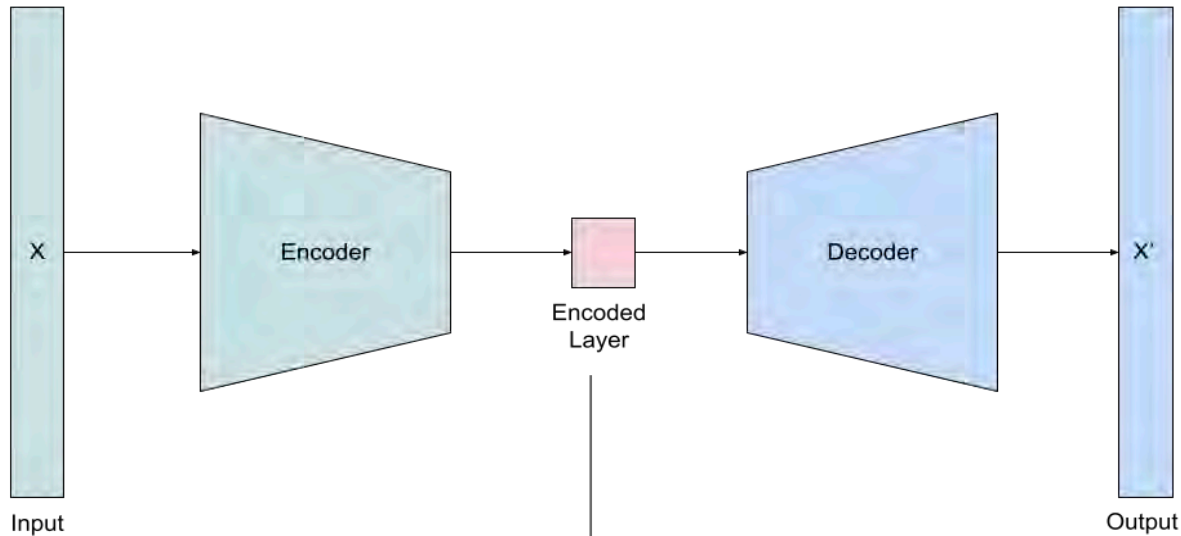
5-fold Cross Validation

n=164

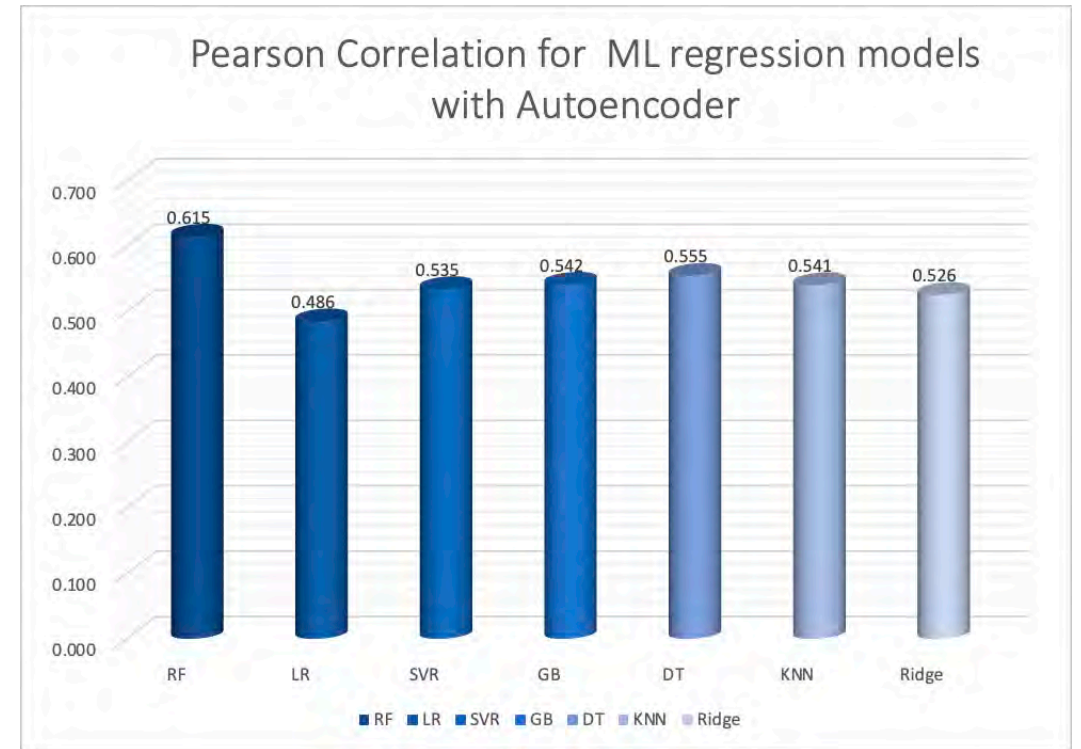
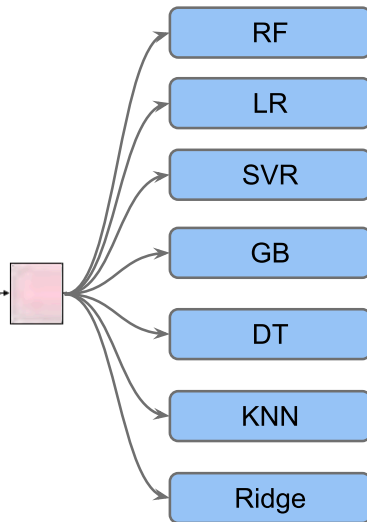
Results



# Regression Model with Autoencoder



- Random Forests
- Linear Regression
- Support Vector Machines
- XGBoost
- Decision Tree
- Neural Net
- Ridge Regression



5-fold Cross Validation

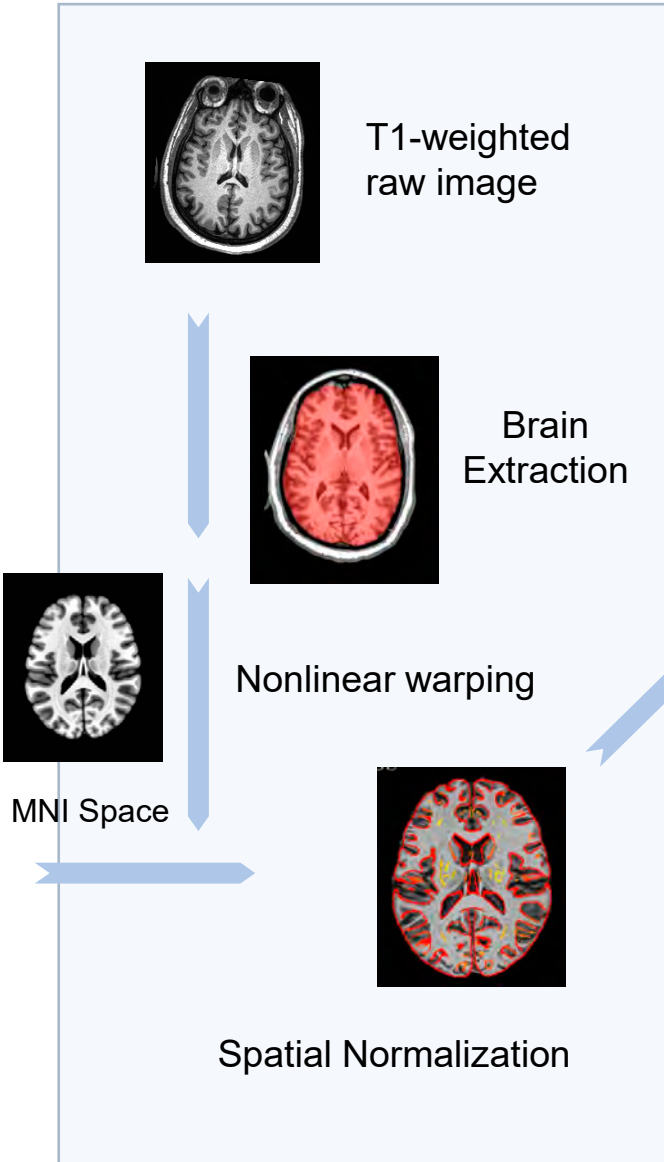
# fMRI Dataset

- 6 min naturalistic story listening paradigm
- ~125 older participants with no history of neurological impairments

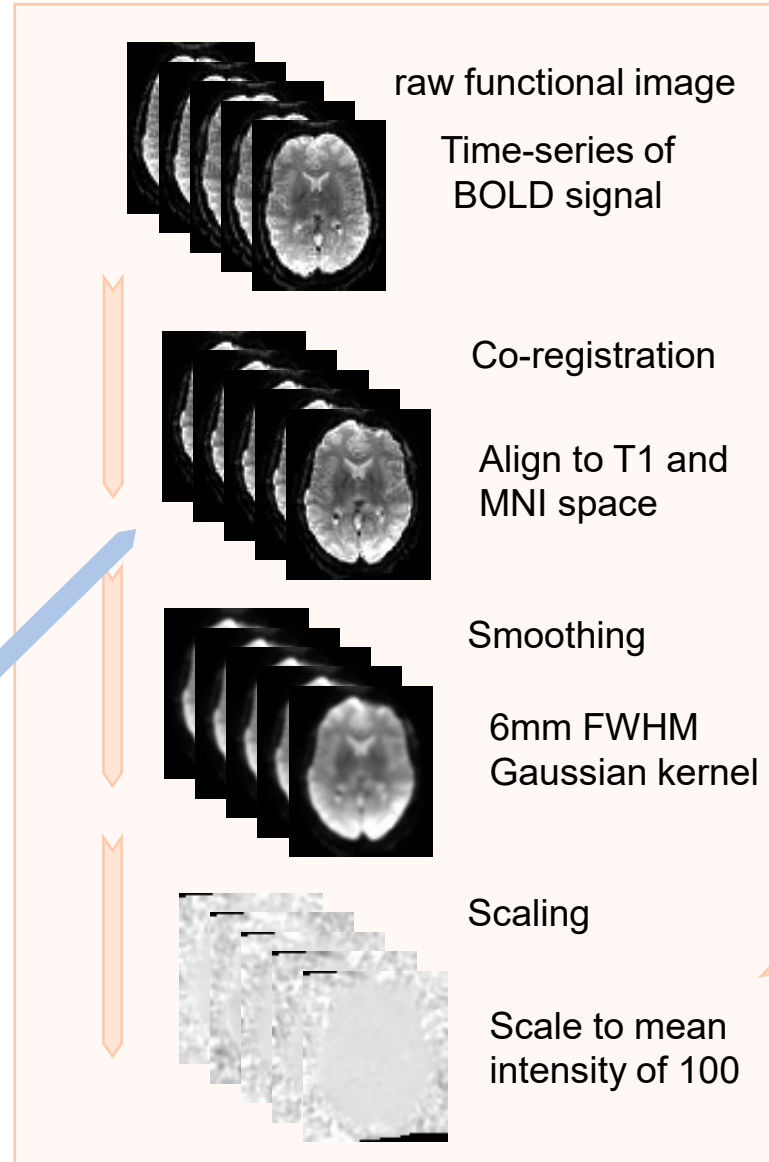


# Analysis Pipeline (Univariate)

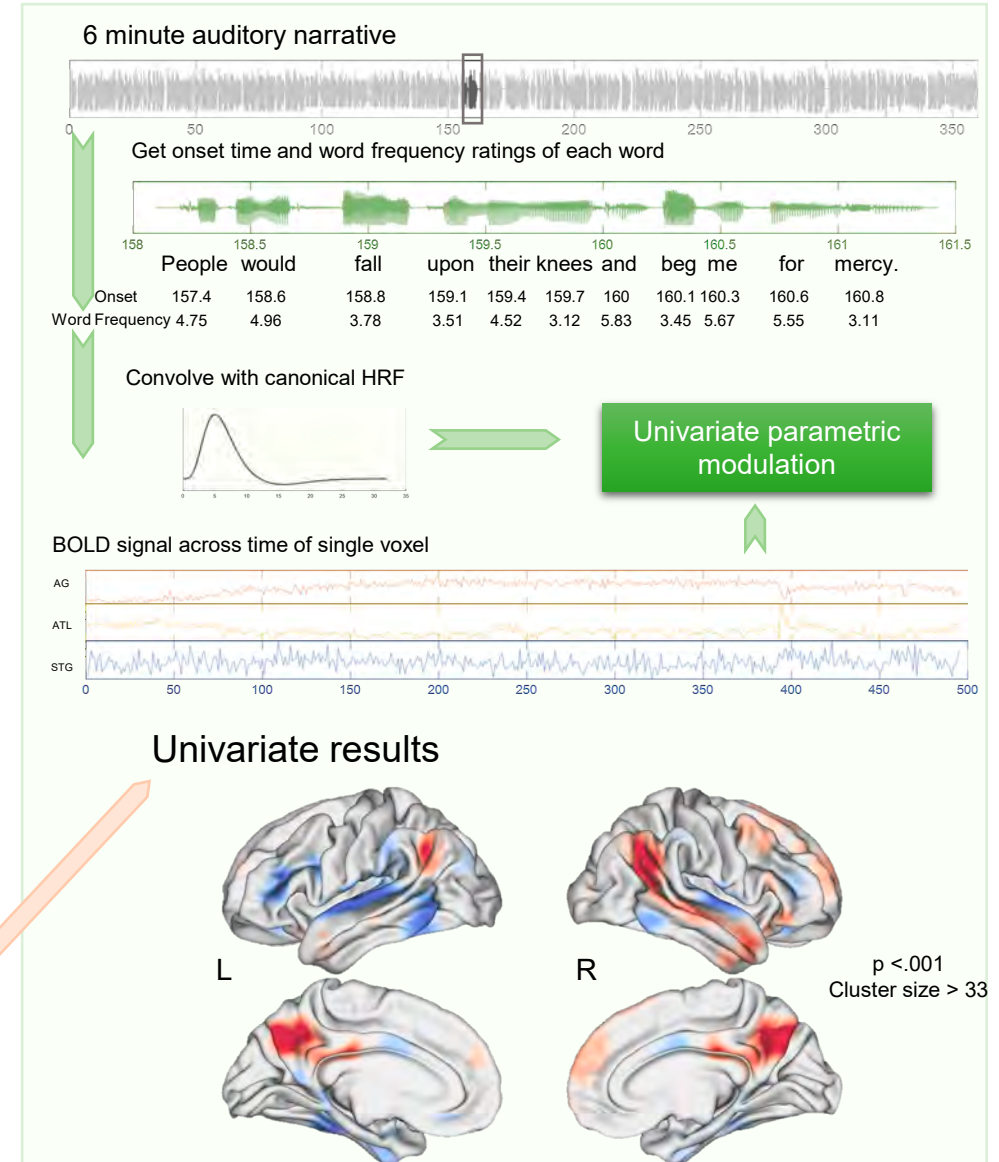
## Anatomical Image Processing



## Functional Image Processing



## Univariate Analysis



# Analysis Pipeline (Multivariate)

