The First TReNDS Neuroimaging Competition: Multiscanner normative age and assessments prediction with brain function, structure, and connectivity

Challenge website: TBD
Main contacts: *Rogers F. Silva rsilva@gsu.edu & Vince D. Calhoun vcalhoun@gsu.edu*

Brief description/Scope

Translational utility is the ability of certain biomedical imaging features to capture useful subject-level characteristics in clinical settings, yielding sensible descriptions and/or predictions for individualized treatment trajectory.

An important step in achieving translational utility is to demonstrate the association between imaging features and individual characteristics, such as sex, age, and other relevant assessments, on a large out-of-sample unaffected population (no diagnosed illnesses). This initial step then provides a strong normative basis for comparison with patient populations in clinical settings. Given the complexity of the human brain, it is likely that a multi-view approach based on features from several imaging modalities will yield the greatest utility and be least prone to biases and confounds such as site/scanner effects.

Task description and materials

The competition is meant to encourage approaches able to predict age plus additional continuous individual-level assessment values, given multimodal brain features such as 3D functional spatial maps from resting-state functional MRI, static functional network connectivity (FNC) matrices, and source-based morphometry (SBM) loading values from structural MRI. For this task, one of the largest datasets of unbiased multimodal brain imaging features will be made available. Given a set of multimodal imaging features, the developed predictors will output age and assessment predictions.

The dataset consists of unbiased multimodal neuroimaging features from nearly 12K unaffected subjects and their associated age and assessment values (using 50/50 train/test split to minimize the test set prediction error). The competition will be hosted with Kaggle in a joint collaborative effort by OHBM, the IEEE SPS Data Science Initiative, and the IEEE Challenges and Data Collections Program. The test results will be evaluated using the mean absolute error (MAE). The total

prize amount will be U$12,000. Interested teams and participants will be considered for presenting/publishing their methods in a peer reviewed venue at the discretion of the evaluation committee. Special attention will be given to submissions achieving good prediction on the data subset coming from a second scanner, with the goal of encouraging methods unbiased by site/scanner effects.

We hope to stir interest and bring together non-imagers and imagers alike towards this common goal, pushing the envelope to assess the limits of current predictive technologies and as gauge the clinical usefulness of neuroimaging features for personalized treatment. This competition is set to start in April and will run for 3 months. Further details and additional information will be made available soon.

Important Dates

- Start date: Mid April 2020 (TBA)
- Entry and team merger deadline: End of May 2020 (TBA)
- End date (preliminary private leaderboard revealed): Mid July 2020 (TBA)
- Code and leaderboard result verification (winners announced): Early August 2020 (TBA)

Contacts

For any further information, please contact us at rsilva@gsu.edu and vcalhoun@gsu.edu. Also, look for the challenge website on www.kaggle.com.

Team that will run the Challenge

- Rogers F. Silva, Research Scientist I, TReNDS Center, Atlanta, USA
- Vince D. Calhoun, Founding Director, TReNDS Center, Atlanta, USA