NANYANG TECHNOLOGICAL UNIVERSITY
SINGAPORE

School of Computer Science and Engineering
College of Engineering

# Predicting Gender via Multi-view GNN

## From structural and functional connectome of the brain

Student: He Yinan  Supervisor: Prof. Jagath Chandana Rajapakse

### Project Objectives:

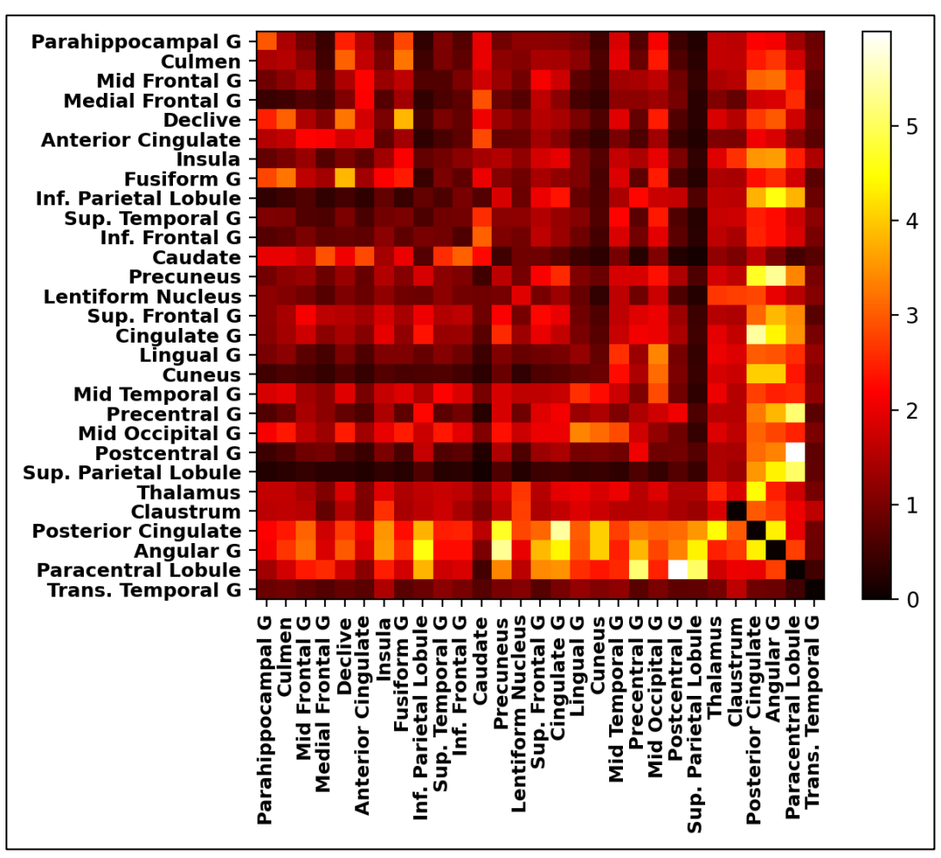
Neuroimaging data can be used for subject gender predictions, but they are high dimensional and scarce. This causes overfitting to be a significant problem during model training, which is detrimental to the generalizability of the trained model. Using multiple modalities can introduce valuable complementary information between different neuroimaging methods, but this further aggravates the overfitting problem. A multi-view architecture that effectively learns subject information in a holistic manner is desired.

### Method:

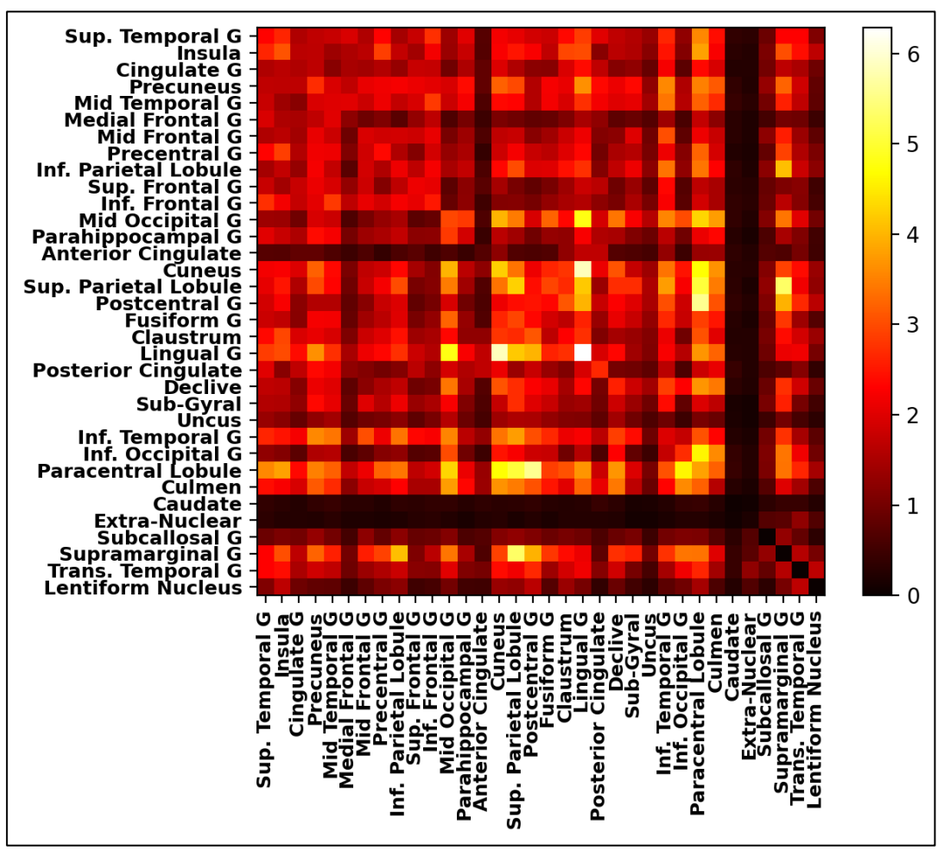
We propose the BrainGAT, an early fusion multi-view graph neural network (GNN) architecture to address this problem. Brain graph constructed using structural connectome (SC) and functional connectome (FC) data is trained to learn an informative subject representation and reduce feature dimension to prevent overfitting. Subsequently, a population graph is trained to incorporate inter-subject relations. Population graph node classification is used for the final subject prediction.

### Conclusion:

Our proposed method shows promising performances on various datasets, which demonstrates the robustness of our method. We decoded our results, analyzed the most salient features, and obtained insights regarding gender prediction using neuroimaging data.




Saliency scores for male subjects (PPMI)




Saliency scores for male subjects (HCP)