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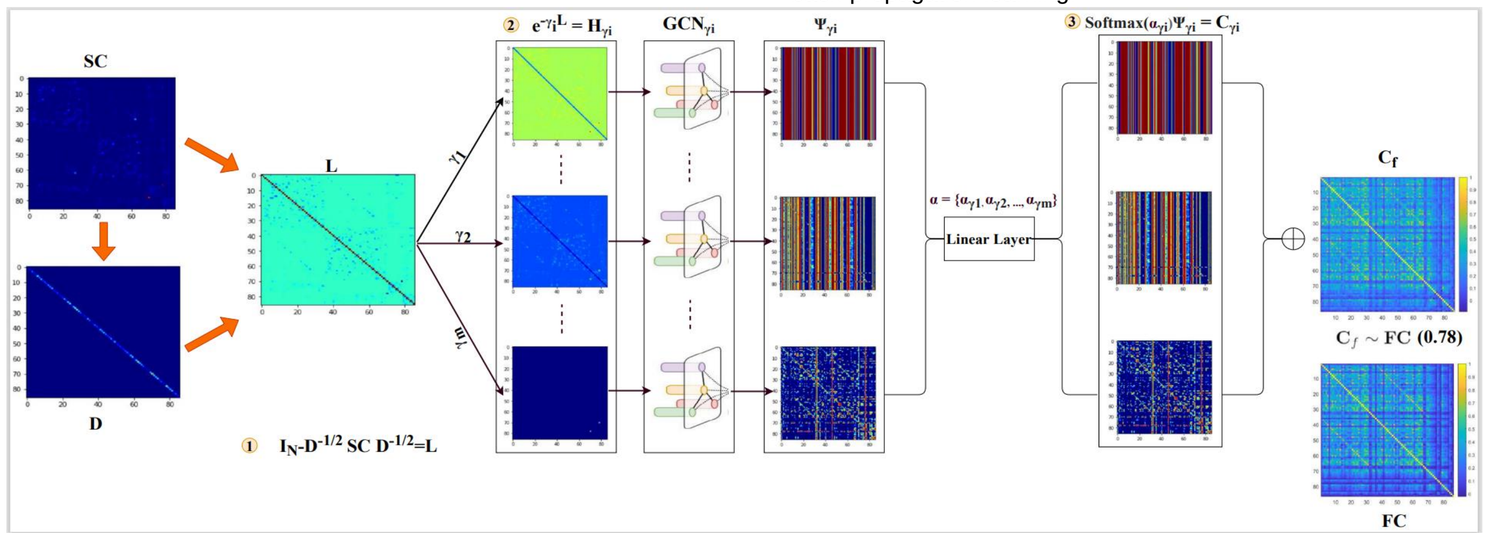
Attention based Fusion of Multiple GraphHeat Networks for Structural to Functional Brain Mapping

ABSTRACT

In this paper, we propose a novel attention based fusion of multiple GraphHeat network (A-GHN) for mapping SC to FC. Training and testing were done using the rsfMRI data of 100 participants from the human connectome project (HCP), and the results establish the viability of the proposed model. Experiments demonstrate that A-GHN outperforms the existing methods in learning the complex nature of human brain function.

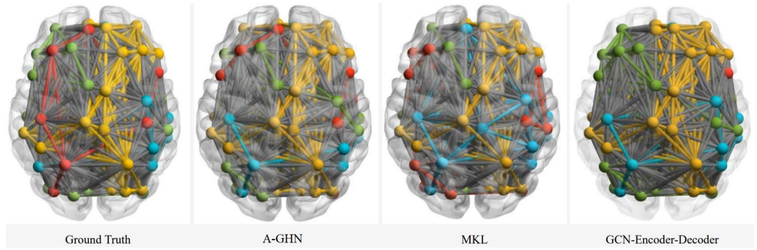
METHOD

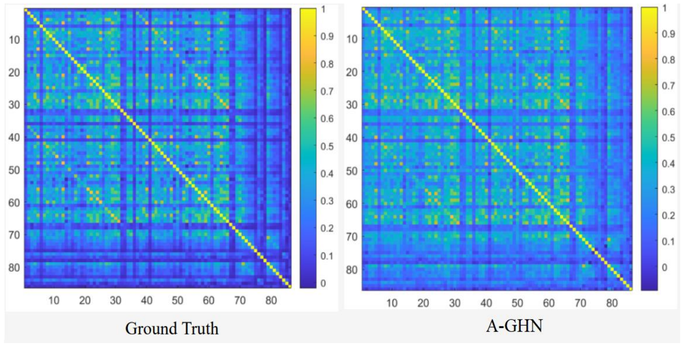
- *m* heat kernel matrices with *m* different scales and the corresponding GCN heat kernels are considered.
- Each GCN outputs a matrix and the softmax of the linear combination of the outputs of all m GCN branches is taken to be the FC estimation.
- The linear combination is found using attention scores of the outputs of *m* GCNs.
- All GCNs and the fully connected layer are trained via end-to-end back-propagation learning.



RESULTS

- The predicted FC were highly correlated with the empirically observed FC.
- Mean person correlation of 0.78 was achieved between predicted and empirical FC.





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