# Classifying Resting and Task State Brain Connectivity Matrices Using Graph Convolutional Networks

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**Presentation Abstract Summary** The past few years has seen an increase in use of graph theoretical measures to study brain connectivity during task execution. One thread of research in this area has focused on using these measures to identify graph characteristics associated with various cognitive states. Our work expands on previous findings by applying graph convolutional networks (GCN) to distinguish between whole brain graphs during resting state or during task execution. GCNs use tools from spectral graph theory to generalize traditional convolutional neural networks (CNN) to be applied to high-dimensional data represented by graphs such as brain connectomes. We found that GCNs were able to distinguish between two cognitive states, resting state and an attentionally demanding stop signal task, with a high degree of accuracy (mean = 73.59%). This work suggests that GCNs are capable of identifying the underlying features important for discriminating between resting and task states.

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