GCN-based Autism Spectrum Disorder Diagnosis via Convolutional Restructuring Attention

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Abstract

Brain function connectivity, derived from functional magnetic resonance imaging (fMRI), has enjoyed high popularity in studies of Autism Spectrum Disorder (ASD) diagnosis. Albeit rapid progress has been made, most studies still suffer from several knotty issues: (1) the hardship of effectively modeling the sophisticated brain neuronal connectivity; (2) the dimensionality explosion resulted from excessive voxels in each fMRI sample; (3) the poor interpretability giving rise to unpersuasive diagnosis. To ameliorate these issues, we propose a GCN-based model, namely ConResNet. Specifically, a convolutional restructuring attention is designed for efficiently ROI-interaction feature extraction. Besides, we embed a salient graph pooling method to sift salient nodes. Extensive experiments conducted on ABIDE dataset demonstrate ConResNet achieves state-of-the-art performance. Moreover, the most salient brain regions predicted by ConResNet are closely consistent with theoretical knowledge in the medical domain, providing potential biomarkers for ASD clinical diagnosis.

In M. Goldwater, F. K. Anggoro, B. K. Hayes, & D. C. Ong (Eds.), *Proceedings of the 45th Annual Conference of the Cognitive Science Society.*