ID # 143: M-GCN: A Multimodal Graph Convolutional Network to Integrate Functional and Structural Connectomics Data to Predict Multidimensional Phenotypic Characterizations

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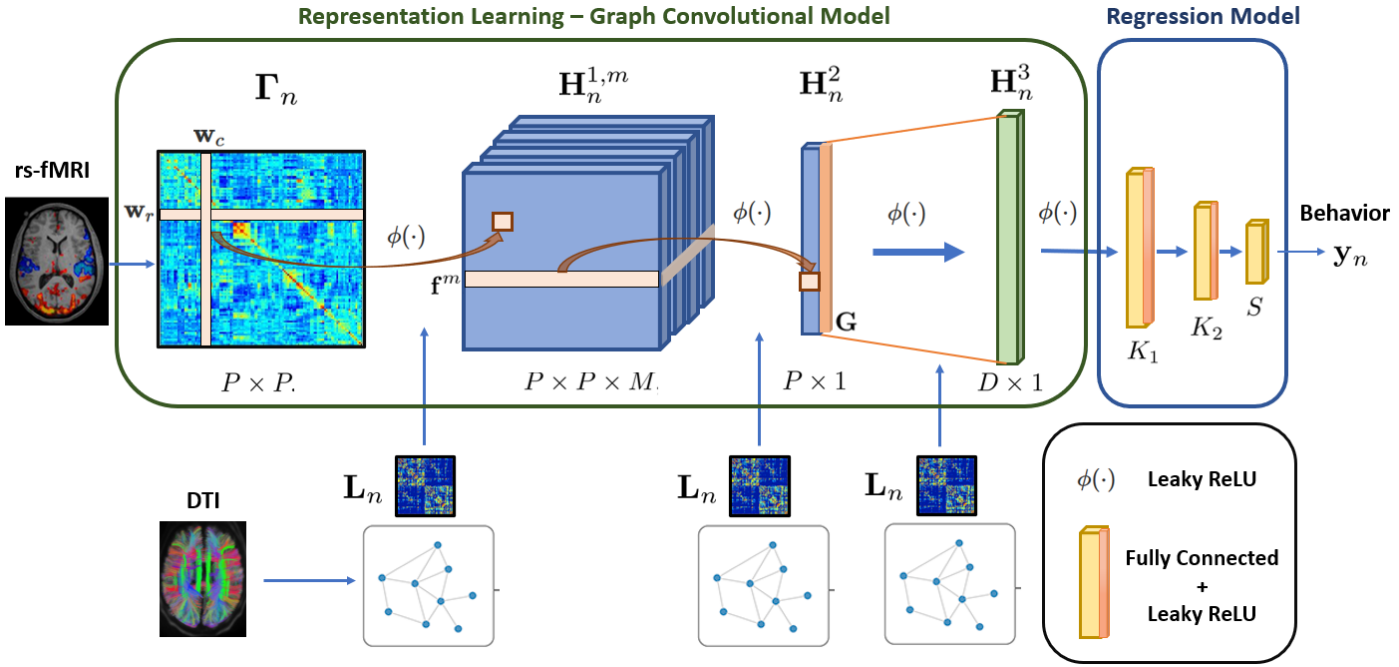
M-GCN



Our Contributions

- Multimodal GCN filters : Integrate functional and structural connectomes
- DTI regularization: structural regularization + sparsity
- Generalization on two separate modest sized datasets

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Results

Meas.	Method	MAE Test	NMI Test	R Stat.
CFIS	Mult. ANN	14.06 ± 10.16	0.61	0.23
	rs-fMRI only GCN	14.16 ± 8.96	0.54	0.23
	BrainNetCNN	17.90 ± 17.55	0.58	0.25
	Dict. Learn. + ANN	15.26 ± 13.99	0.66	0.29
	Dyn. Deep-Gen. Hyb.	16.31 ± 15.43	0.67	0.30
	Our Framework	**12.87 ± 9.65**	**0.73**	**0.41**

Single Score Prediction: HCP Dataset

Meas.	Method	MAE Test	NMI Test	R Stat.
ADOS	Mutl. ANN	2.96 ± 2.30	0.30	0.04
	rs-fMRI only GCN	3.14 ± 2.25	0.41	0.16
	BrainNetCNN	3.50 ± 2.20	0.25	0.41
	Dict. Learn. + ANN	**2.71 ± 2.40**	0.43	**0.50**
	Dyn. Deep-Gen. Hyb.	2.84 ± 2.79	0.34	0.47
	Our Framework	**2.71 ± 2.15**	**0.45**	**0.50**
SRS	Mult. ANN	18.47 ± 11.04	0.60	0.03
	rs-fMRI only GCN	21.34 ± 8.58	0.62	0.16
	BrainNetCNN	18.96 ± 15.65	0.75	0.13
	Dict. Learn. + ANN	16.79 ± 13.83	**0.89**	**0.37**
	Dyn. Deep-Gen. Hyb.	17.81 ± 16.09	0.88	0.30
	Our Framework	**16.50 ± 9.44**	0.85	0.35
Praxis	Mult. ANN	17.12 ± 16.66	0.65	0.25
	rs-fMRI only GCN	16.71 ± 16.66	0.74	0.17
	BrainNetCNN	15.15 ± 11.49	0.19	0.3
	Dict. Learn. + ANN	13.19 ± 10.75	0.82	0.37
	Dyn. Deep-Gen. Hyb.	13.50 ± 11.55	0.85	0.31
	Our Framework	**12.82 ± 12.04**	**0.86**	**0.46**

Multi Score Prediction: KKI Dataset