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EEG-Based Graph Neural Network Classification of Alzheimer's Disease: An Empirical Evaluation of Functional Connectivity Methods

METHODS:

1)EEG-Based Graph Neural Network Classification of Alzheimer's Disease.
2)Functional Connectivity model.

DATA:

The EEG dataset consists of 20 AD patients and 20 healthy control participants (HC) below 70 years.

MAJOR FINDINGS:

- The GNN models perform significantly better than the other baseline models.
- Moreover,using FC measures to estimate brain graphs improves the performance of GNN compared to models trained using a fixed graph based on the spatial distance between the EEG sensors.
- The best GNN reaches 0.984 area under sensitivity-specificity curve (AUC) and 92% accuracy, whereas the best baseline model, a convolutional neural network, has 0.924 AUC and 84.7% accuracy.

CONLUSION:

GNN models are superior to classical machine learning and CNN models for brain graph classification.

FUTURE WORK:

The utilised GNN architecture is a black-box model. Thus, future work should focus on implementing interpretable GNN architectures that achieve similar performance but additionally offer interpretability, such as which nodes, i.e. brain regions, drive the prediction.