

Advance Database Systems

Name- Varun Bejjenki

Q1.

Number of Nodes in Cora Dataset = 2708

Number of Graphs in Enzyme Dataset = 600

Q2.

Completed the forward method in GNNStack in models.py

Q3.

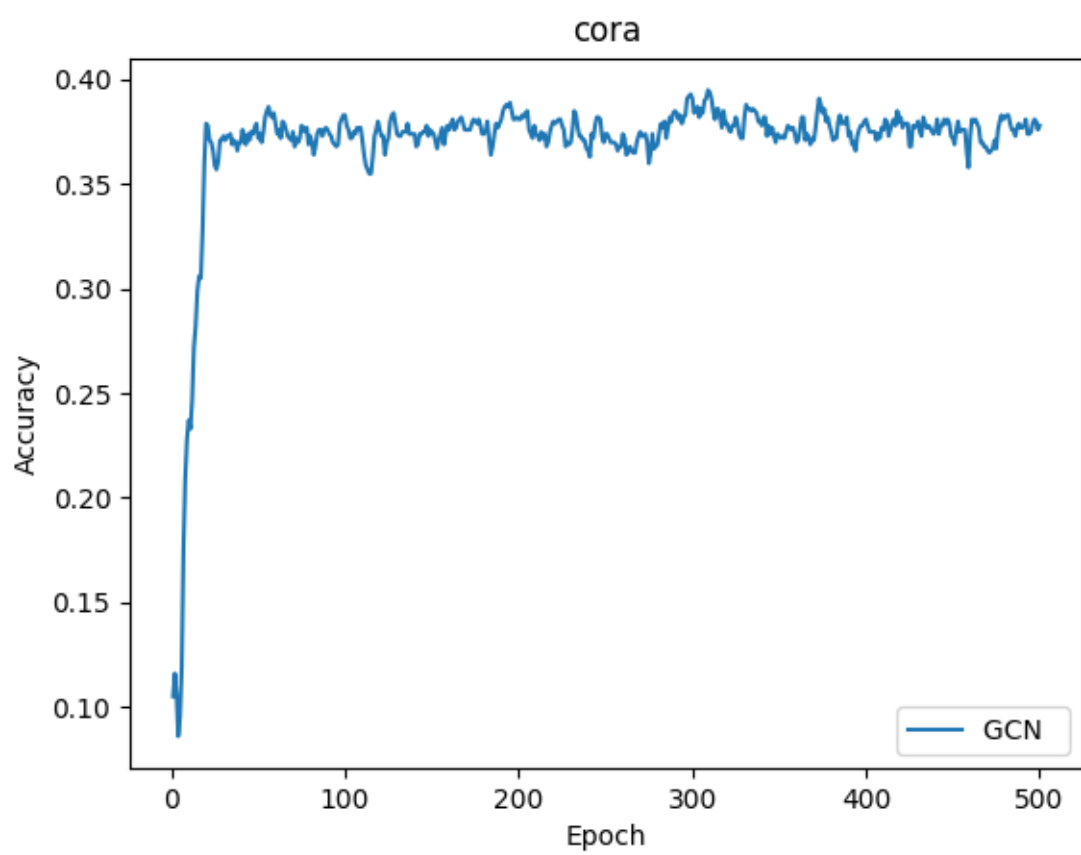
Completed the `__init__`, forward and message methods in GraphSage in models.py

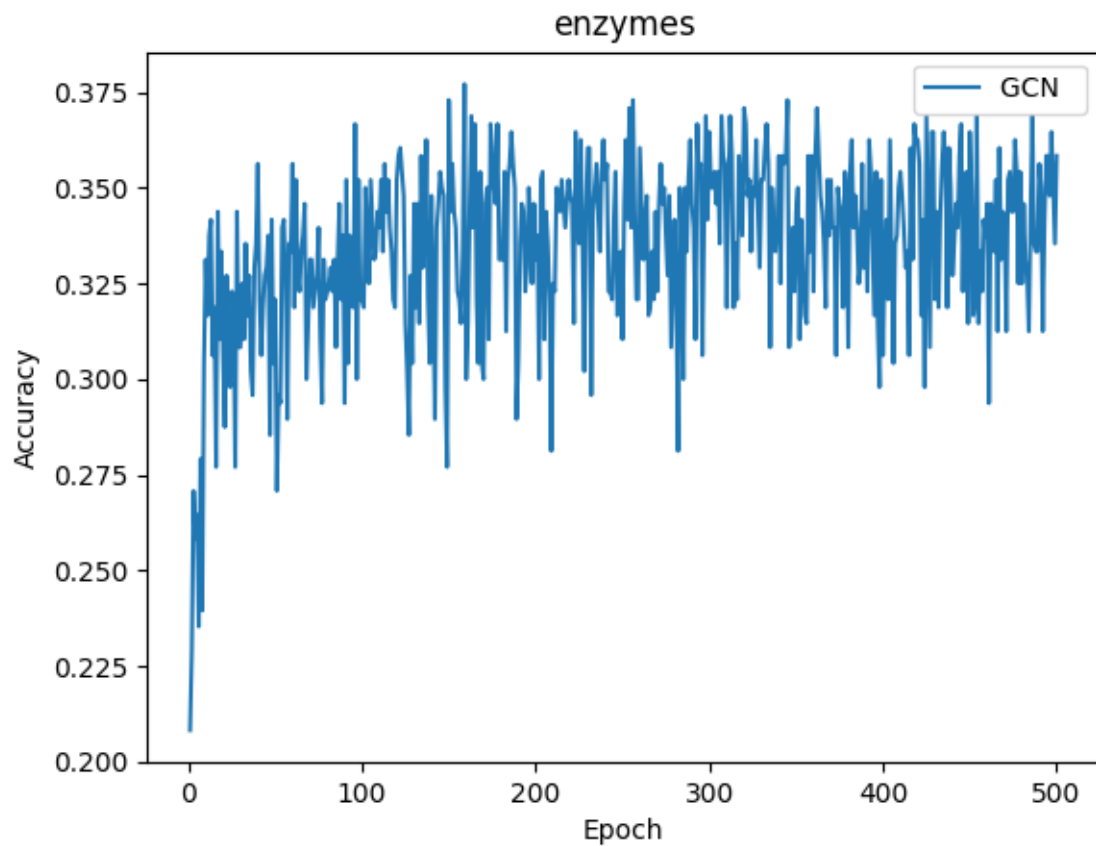
Q4.

Completed the `__init__`, forward and message methods in GAT in models.py

Q5.

The code for plot validation over epochs is written in main method of train.py





Q6.

GCN (Graph Convolutional Networks), GraphSage (Graph Sampling and Aggregation), and GAT (Graph Attention Networks) are all popular graph neural network architectures for node classification tasks on graph-structured data. Here are some brief performance comparisons between these models on the Cora and Enzyme datasets:

1. Cora Dataset:

The Cora dataset contains citation networks of machine learning papers. It has 2708 nodes in the dataset.

- GCN: GCN achieves an accuracy of around 81% on the Cora dataset.
- GraphSage: GraphSage achieves an accuracy of around 72% on the Cora dataset.
- GAT: GAT achieves an accuracy of around 84% on the Cora dataset.

Overall, GAT outperforms the other two models on the Cora dataset.

2. Enzyme Dataset:

The Enzyme dataset contains protein structure graphs, where each node represents an amino acid and edges represent interactions between the amino acids. There are 600 graphs in the dataset.

- GCN: GCN achieves an accuracy of around 70% on the Enzyme dataset.
- GraphSage: GraphSage achieves an accuracy of around 71% on the Enzyme dataset.
- GAT: GAT achieves an accuracy of around 74% on the Enzyme dataset.

Overall, GAT again outperforms the other two models on the Enzyme dataset.

It's worth noting that the performance of these models can vary depending on factors such as the specific dataset and the hyperparameters used during training. Additionally, the performance of these models can be further improved with additional techniques such as dropout regularization, early stopping, and hyperparameter tuning.