

This repository contains the supplementary codes for the paper, "Uncovering Strong Lottery Tickets in Graph Transformers: A Path to Memory Efficient and Robust Graph Learning".

It includes:

1. The baseline implementation based on **NodeFormer**, **GRIT**, and **GraphGPS**.
2. The proposed method introduced in the paper.
3. The requirements.txt to set up the environment.

Runnning the Experiments:

For **NodeFormer**,

```
python -u main.py --dataset cora --metric acc --method nodeformer --lr 0.007 --weight_decay 5e-3 --num_layers 2 --hidden_channels 32 --num_heads 4 --rb_order 2 --rb_trans sigmoid --lamda 1.0 --M 30 --K 10 --use_bn --use_residual --use_gumbel --runs 5 --epochs 1000 --device 0 --rand_split --sm --linear_sparsity 0.5 > ./logs/sparsity/cora_sm_0.5.log 2>&1
```

```
python -u main.py --dataset citeseer --metric acc --method nodeformer --lr 0.003 --weight_decay 5e-3 --num_layers 2 --hidden_channels 32 --num_heads 2 --rb_order 2 --rb_trans sigmoid --lamda 1.0 --M 30 --K 10 --use_bn --use_residual --use_gumbel --runs 5 --epochs 1000 --device 0 --rand_split --sm --linear_sparsity 0.5 > ./logs/sparsity/citeseer_sm_0.5.log 2>&1
```

For **GRIT**,

```
python ./main.py --cfg configs/GRIT/cifar10-GRIT-RRWP.yaml --repeat 5 wandb.use False slt.msa True slt.ffn True slt.encoder False slt.pred False slt.sm True slt.linear_sparsity 0.5 name_tag SLT_sparsity0.5
```

```
python ./main.py --cfg configs/GRIT/pattern-GRIT-RRWP.yaml --repeat 5 wandb.use False slt.msa True slt.ffn True slt.encoder False slt.pred False slt.sm True slt.linear_sparsity 0.5 name_tag SLT_sparsity0.5
```

For **GraphGPS**,

```
python ./main.py --cfg my_configs/cifar10-GPS-SLT.yaml --repeat 5 wandb.use False slt.mpn True slt.msa True slt.ffn True slt.encoder False slt.pred False slt.sm True slt.linear_sparsity 0.5 name_tag SLT_sp0.5
```

```
python ./main.py --cfg my_configs/pattern-GPS-SLT.yaml --repeat 5 wandb.use False slt.mpn True slt.msa True slt.ffn True slt.encoder False slt.pred False slt.sm True slt.linear_sparsity 0.5
```

name_tag SLT_sp0.5

Citation:

For **NodeFormer**,

@inproceedings{wu2022nodeformer,

title = {NodeFormer: A Scalable Graph Structure Learning Transformer for Node Classification},

author = {Qitian Wu and Wentao Zhao and Zenan Li and David Wipf and Junchi Yan},

booktitle = {Advances in Neural Information Processing Systems (NeurIPS)},

year = {2022}

}

For **GRIT**,

@inproceedings{ma2023GraphInductiveBiases,

title = {Graph {Inductive} {Biases} in {Transformers} without {Message} {Passing}},

booktitle = {Proc. {Int}. {Conf}. {Mach}. {Learn}.},

author = {Ma, Liheng and Lin, Chen and Lim, Derek and Romero-Soriano, Adriana and
K. Dokania and Coates, Mark and H.S. Torr, Philip and Lim, Ser-Nam},

year = {2023},

}

For **GraphGPS**,

@article{rampasek2022GPS,

title={{Recipe for a General, Powerful, Scalable Graph Transformer}},

author={Ladislav Ramp{a}sek and Mikhail Galkin and Vijay Prakash Dwivedi and Anh
Tuan Luu and Guy Wolf and Dominique Beaini},

journal={Advances in Neural Information Processing Systems},

volume={35},

year={2022}

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