

Local feature aggregation algorithm based on graph convolutional network

Hao WANG, Liyan DONG, Minghui SUN

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Problems & Ideas

- Problems of the models based on graph convolutional network
 - Longer training time
 - For these models, there is still room for optimization in node classification task to be explored
- Ideas: Based on the idea of GraphSAGE model to optimize the sample of model
 - Implementing a general method that can be used in multiple models based on GCN.
 - Imitating the idea of GraphSAGE, but will not increase training time.
 - Optimizing the classification performance of the model.
 - Realizing the idea (feature aggregation) in the data preprocessing stage to optimize the sample.

Method	Cora	Pubmed
GraphSAGE	29.86s	217.3s
FastGCN	2.8s	32.56s
UA-algorithm	2.81s	32.56s
BA-algorithm	2.8s	32.5s

Training time of FastGCN, GraphSAGE and our methods (BA- and UA-algorithm) on Cora and Pubmed datasets.

Method	Cora	Citeseer	Pubmed
GCN	0.801	0.714	0.793
GCN(BA-algo)	0.816	0.716	0.796
SGCN	0.816	0.711	0.783
SGCN(BA-algo)	0.817	0.721	0.791
FastGCN	0.882	0.787	0.874
FastGCN(BA-algo)	0.885	0.792	0.874

The optimized performance of BA-algo on multiple models and three datasets for node classification

Main Contributions

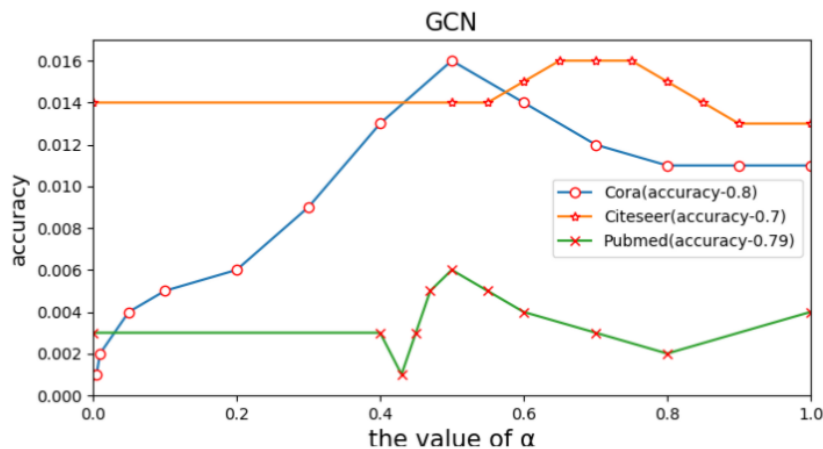
Method	Cora	Citeseer	Pubmed
GCN	0.801	0.714	0.793
GCN(UA-algo)	0.813	0.717	0.795
SGCN	0.816	0.711	0.783
SGCN(UA-algo)	0.818	0.723	0.788
FastGCN	0.882	0.787	0.874
FastGCN(UA-algo)	0.884	0.789	0.876

The optimized performance of UA-algo on multiple models and three datasets for node classification

Method	Cora	Citeseer	Pubmed
SemiEmb	0.59	0.596	0.717
deepwalk	0.672	0.432	0.653
Planetoid	0.757	0.647	0.619
GCN	0.801	0.714	0.793
SGCN	0.816	0.711	0.783
Graphite	0.821	0.71	0.793
FastGCN	0.882	0.787	0.874
BA-algorithm	0.885	0.792	0.874
UA-algorithm	0.884	0.789	0.876

The optimized performance of BA- and UA-algorithm on three datasets for node classification in comparative experiment.

- Coordinating parameter sensitivity in BA-algorithm for node classification.



- Coordinating parameter sensitivity UA-algorithm for node classification.

