Heterogeneous Graph Representation Learning

Yuxiao Dong, Ziniu Hu, Kuansan Wang, Yizhou Sun, Jie Tang

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Can we get rid of the manual design of meta paths?
Heterogeneous Graphs

academic graph

office graph
Heterogeneous Graph Mining

- Classification
  - RankClass, ...
- Clustering
  - RankClus, ...
- Ranking
  - PathSim, ...
- Link Prediction
  - PathPredict, ...
- ...

(a) The schema of heterogeneous academic networks

1. Yizhou Sun, Jiawei Han. Mining Heterogeneous Information Networks: Principles and Methodologies. M & C Publishers, 2012.
Heterogeneous Graph Representation Learning

- Classification
- Clustering
- Ranking
- Link Prediction

heter. graph representation learning
- metapath2vec, PTE, …
- R-GCN, HetGNN, GEM, …
Heterogeneous Graph Representation Learning

Can we get rid of meta paths?

Heterogeneous graph representation learning
- metapath2vec, PTE, ...
- R-GCN, HetGNN, GEM, ...

(a) The schema of heterogeneous academic networks

- Classification
- Clustering
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Heterogeneous Graph Representation Learning

Heterogeneous Graph Transformer (HGT)

- no manual design of meta paths!
- straightforward for (heterogeneous) graph pre-training, e.g., GPT-GNN

# Heterogeneous Graph Representation Learning

![OGB Logo](https://ogb.stanford.edu/)

**Leaderboard for ogbn-mag**

[https://ogb.stanford.edu/](https://ogb.stanford.edu/)  
(as of Dec. 13, 2020)

<table>
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<tr>
<th>Rank</th>
<th>Method</th>
<th>Test Accuracy</th>
<th>Validation Accuracy</th>
<th>Contact</th>
<th>References</th>
<th>#Params</th>
<th>Hardware</th>
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<tbody>
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<td>1</td>
<td>HGT (LADIES Sample)</td>
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<td>Paper, Code</td>
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<td>0.4837 ± 0.0026</td>
<td>Matthias Fey – OGB team</td>
<td>Paper, Code</td>
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<td>Kezhi Kong</td>
<td>Paper, Code</td>
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<td>Matthias Fey – OGB team</td>
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<td>SIGN</td>
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<td>Lingfan Yu (DGL Team)</td>
<td>Paper, Code</td>
<td>3,724,645</td>
<td>Tesla T4 (15GB GPU)</td>
</tr>
</tbody>
</table>

2. Wang et al. Microsoft academic graph: When experts are not enough. Quantitative Science Studies, 2020
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• data&code: https://github.com/HeterogeneousGraph