Meta-learning on Heterogeneous Information Networks for Cold-start Recommendation

Yuanfu Lu¹, Yuan Fang², Chuan Shi¹
¹Beijing University of Posts and Telecommunications, Beijing, China
²Singapore Management University, Singapore

Background

What about a new user or a new item?

Cold-start Problem

- New users or new items
- The interaction data is very sparse

MetaHIN: The Proposed Model

C1: How to model HINs in the meta-learning setting?
- Existing methods model HINs under traditional supervised or unsupervised learning settings

C2: How to model the general knowledge across tasks?
- Previous work: Only adapt to new tasks (e.g., new users) from a globally shared prior
- Our work: there exist multifaceted semantics brought by HINs

MetaHIN alleviates the cold-start problem at both data and model levels.

A semantic-enhanced task constructor to explore rich semantics on HINs in the meta-learning setting.

A co-adaptation meta-learner with semantic- and task-wise adaptations to cope with different semantic facets within each task.

Extensive experiments on three datasets.

Performance

Three cold-start scenarios:
- User Cold-start, i.e., recommendation of existing items for new users;
- Item Cold-start, i.e., recommendation of new items for existing users;
- User-Item Cold-start, i.e., recommendation of new items for new users

One traditional scenario
- recommendation of existing items for existing users

Conclusion

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Existing alleviations

- Data level
- Content-based
- HIN-based
- Model level
- Meta-learning

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More materials in http://shichuan.org or http://www.yfang.site or https://yuanfulu.github.io

How does MetaHIN perform compared to state-of-the-art approaches?

How does MetaHIN benefit from the multifaceted semantic contexts and co-adaptation meta-learner?

How is MetaHIN impacted by its hyper-parameters?