北京郵電大學
Beijing University of Posts and Telecommunications

UIC
UNIVERSITY OF ILLINOIS AT CHICAGO

Recent Developments of Deep Heterogeneous Information Network Analysis --Part V: Conclusion and Future Work

Chuan Shi

shichuan@bupt.edu.cn

Beijing University of Posts and Telecommunications

Philip S. Yu

psyu@uic.edu

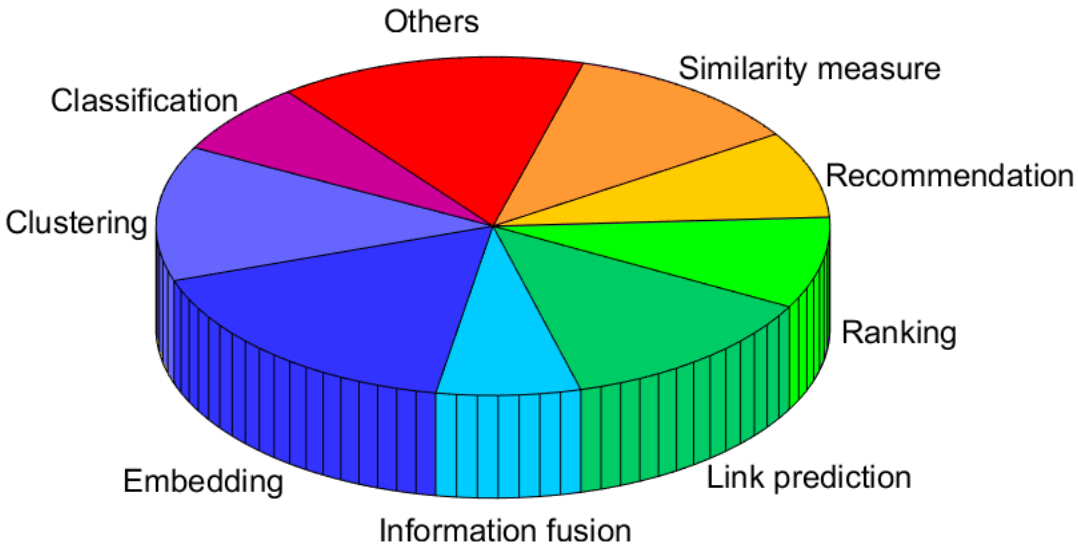
University of Illinois at Chicago

Outline

- Metapath based data mining
- Heterogeneous information network embedding
- Applications
- ✓ **Conclusion and future work**

Summarization

- Heterogeneous Information Network has been widely used in data mining

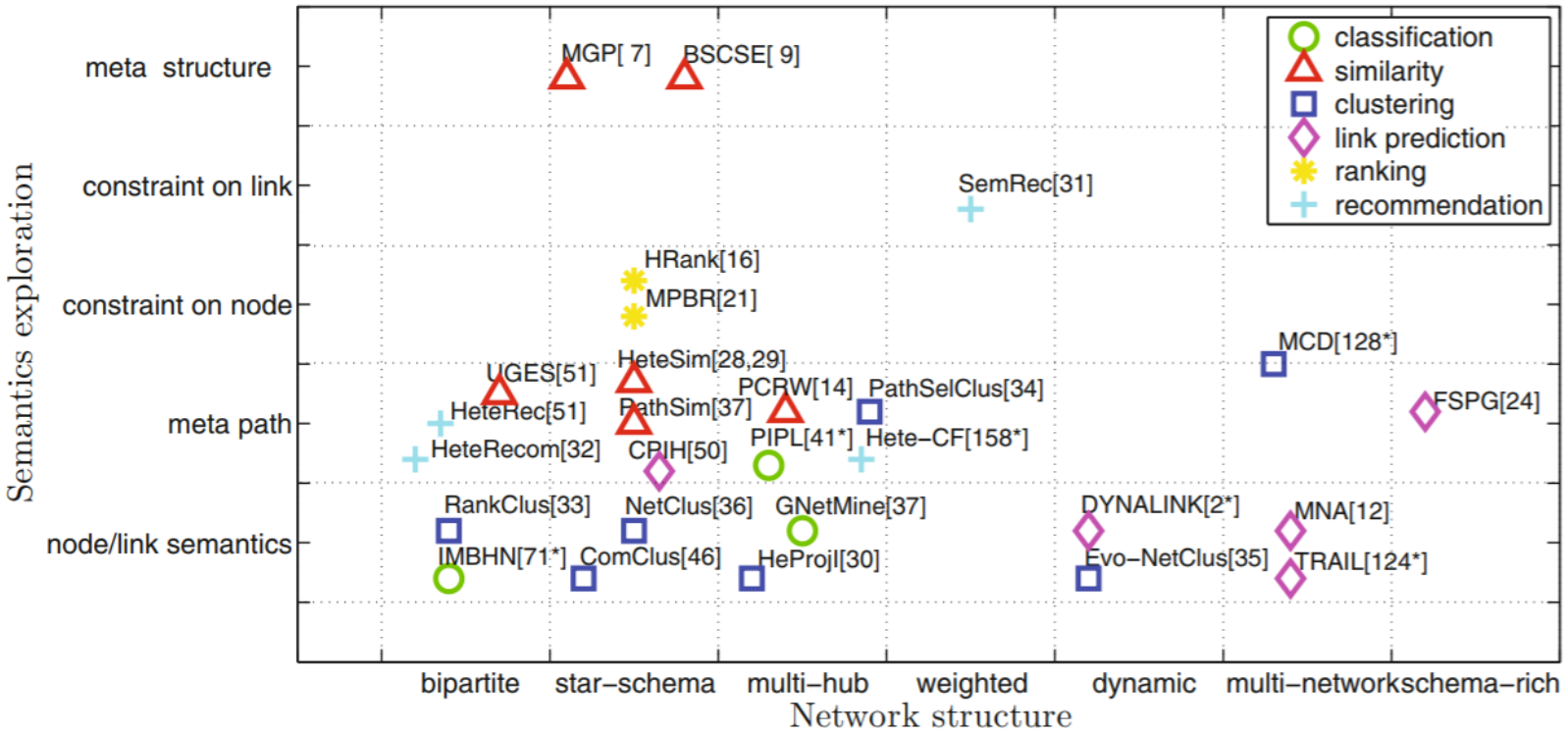


Chuan Shi, Yitong Li, Jiawei Zhang, Yizhou Sun, Philip S. Yu. A survey on Heterogeneous Information Network Analysis. IEEE Transactions on Knowledge and Data Engineering, 29(1), 17-37, 2017

Chuan Shi, Philip S. Yu. Heterogeneous Information Network Analysis and Applications. Springer, 2017

Summarization

- It is still a young and promising research field



Future work

- HIN for Big Data
  - 5V: Volume Velocity Variety Veracity Value
  - HIN may be promising for Variety
- More Challenges
  - More complex -knowledge graph
    - Automatic generation of metapaths
    - Relations of metapaths
  - More powerful -beyond meta path
    - Flexible and powerful semantic capture tool
    - Motif for HIN
  - Bigger data -parallel computing
    - Parallel analysis algorithm for HIN
    - Heterogeneous graph computing platform

Future work

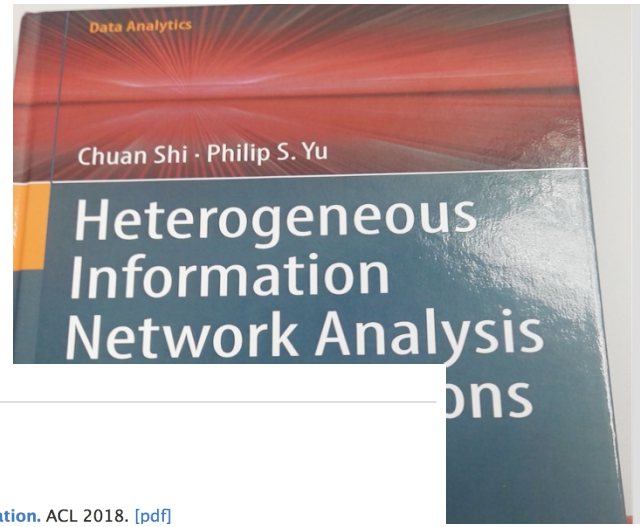
- More opportunities
  - Network construction
    - HIN construction and analysis for non-structural data: text, image
    - HIN analysis framework for multi-mode data: features, graph, text , image
  - Representation
    - Subgraph embedding, e.g., nodes, edges, metapaths, meta-graph, motif
    - Relation of diff.-typed nodes embeddings and edge embeddings
    - Connection of HIN embedding and KG embedding
  - Dynamic
    - Incremental/online computation
    - Stream data, emerging phenomenon
  - Analysis
    - More applications, e-commerce, bioinformatics, security, software, …

More materials

A Survey of Heterogeneous Information Network Analysis

Chuan Shi, *Member, IEEE*, Yitong Li, Jiawei Zhang, Yizhou Sun, *Member, IEEE*, and Philip S. Yu, *Fellow, IEEE*

Abstract—Most real systems consist of a large number of interacting, multi-typed components, while most contemporary researches model them as homogeneous information networks, without distinguishing different types of objects and links in the networks. Recently, more and more researchers begin to consider these interconnected, multi-typed data as heterogeneous information networks, and develop structural analysis approaches by leveraging the rich semantic meaning of structural types of objects and links in the networks. Compared to widely studied homogeneous information network, the heterogeneous information network contains richer structure and semantic information, which provides plenty of opportunities as well as a lot of challenges for data mining. In this



HIN Resource: Paper

[Paper Sort by Time] [Dataset]

Classification

1. Xin Li, Lidong Bing, Wai Lam, Bei Shi. **Transformation Networks for Target-Oriented Sentiment Classification.** ACL 2018. [pdf]
2. Yizhou Zhang, Yun Xiong, Xian
   WWW 2018. [pdf]
3. Doris Xin, Ahmed El-Kishky, D
   ICDM 2018. [pdf]
4. Ralitsa Angelova, Gjergji Kasne
5. Gupta M, Kumar P, Bhasker B.
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6. Phiradet Bangcharoensap, Tsuy
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7. Chenguang Wang, Yangqiu Sor
   2136. [pdf]
8. Mengting Wan, Yunbo Ouyang,
   Network. In Proceedings of the
9. Yann Jacob, Ludovic Denoyer,

HIN Resource: Dataset

[Paper Sort by Topic] [Paper Sort by Time]

Dataset in Our Publications

1. Xiaohuan Cao, Yuyan Zheng, Chuan Shi, Jingzhi Li, Bin Wu. **Meta-path-based link prediction in schema-rich heterogeneous information network.** International Journal of Data Science and Analytics. 2017 [pdf]

   Dataset: Yago [link]
2. Jing Zheng, Jian Liu, Chuan Shi, Fuzhen Zhuang, Jingzhi Li, Bin Wu. **Recommendation in heterogeneous information network via dual similarity regularization.** International Journal of Data Science and Analytics. 2017 [pdf]

   Dataset: Douban movie, Douban book, Yelp [download]

   Douban book: The data set in book domain comprises 792,062 ratings (scales 1-5) by 13,024 users on 22,347 books.
3. Jian Liu, Chuan Shi, Binbin Hu, Shenghua Liu, Philip S. Yu. **Personalized Ranking Recommendation via Integrating Multiple Feedbacks.** PAKDD 2017. [pdf]

   Dataset: Douban book, Dianping [download]

   Douban book: The Douban Book dataset contains 190,590 ratings (1-5 scales) involving 12,850 users and 22,040 books.

- More materials in my webpage: www.shichuan.org

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Our Collaborators

Xiaoli Li

Yanfang Ye

Yuan Fang

Xiangnan Kong

Jiawei Zhang

Yizhou Sun

Xiao Wang

Linmei Hu

Bin Wu

Xin Zhao

Peng Cui

Zhiyuan Liu

Our Collaborators

Binbin Hu

Zhiqiang Zhang

Yitong Li

Jian Liu

Xiaotian Han

Yuyan Zheng

Houye Ji

Yiding Zhang

Shaohua Fan

Yuanfu Lu

Thanks!

Questions?