Si Zhang

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RESEARCH INTERESTS

Large-scale data mining and machine learning on graphs, especially graph alignment, graph representation learning, dense subgraph detection and fraud detection.

EDUCATIONS

University of Illinois at Urbana-Champaign Aug. 2019 – May. 2021 (Expected)
Ph.D. student in Computer Science
Advisor: Dr. Hanghang Tong

Arizona State University Jan. 2016 – Aug. 2019
Ph.D. student in Computer Engineering (CS)
Advisor: Dr. Hanghang Tong

Arizona State University Sep. 2014 – Dec. 2015
M.S. in Computer Engineering (CS)

Xi'an Jiaotong University Sep. 2010 – July. 2014
B.Eng. in Information Engineering

RESEARCH PROJECTS

DARPA - Modeling Complex Adversarial Activities

Research Assistant Sep. 2017 – Present

- Developed several algorithms and a software to merge networks to fuse the multi-sourced information for adversarial activity detection.
- Developed algorithms to identify subgraphs that may represent the adversarial activity templates.
- Papers were accepted to ICDM'17, TKDE'18, WWW'19, BigData'19, TKDD'20, KDD'20.

NSF - BIC Fraud Detection via Visual Analytics

Research Assistant Jan. 2016 – May. 2017

- Developed several novel graph-based algorithms to detect suspicious patterns of financial fraud behaviors, including synthetic identity fraud and money laundering.

- Integrated the algorithms into Apache Spark for large-scale real data.
- Papers were accepted to SDM 2017, KDD 2017.

WORK EXPERIENCES

Research Intern, Facebook AI Applied Research May. 2020 – Aug. 2020

- Proposed a negative sampling strategy for graph embedding, which has better theoretical properties.
- The proposed method outperforms all the existing graph embedding baselines for recommendation.
- Proposed to use graph-based self-supervised loss to pre-train embedding and fine-tune for supervised click-through-rate (CTR) model.
- The proposed graph-based method slightly improves the CTR prediction performance.

Research Intern, Early Warning Inc. May. 2016 – Aug. 2016

- Proposed a hierarchical dense subgraph detection algorithm.
- Worked on Apache Spark to integrate the algorithm into system to detect synthetic identity fraud.

PUBLICATIONS

Journal Papers

4. Dawei Zhou, **Si Zhang**, Mehmet Yigit Yildirim, Scott Alcorn, Hanghang Tong, Hasan Davulcu, Jingrui He. **High-Order Structure Exploration on Massive Graphs: A Local Graph Clustering Perspective.** ACM Transactions on Knowledge Discovery from Data (TKDD), 2020.

3. **Si Zhang**, Hanghang Tong, Jie Tang, Jiejun Xu, Wei Fan. **Incomplete Network Alignment: Problem Definitions and Fast Solutions**. ACM Transactions on Knowledge Discovery from Data (TKDD), 2020.

2. **Si Zhang**, Hanghang Tong, Jiejun Xu, Ross Maciejewski. **Graph Convolutional Networks: A Comprehensive Review**. Computational Social Networks, 2019.

1. **Si Zhang**, Hanghang Tong. **Attributed Network Alignment: Problem Definitions and Fast Solutions.** IEEE Transactions on Knowledge and Data Engineering (TKDE), 2018.

Conference Papers

14. **Si Zhang,** Hanghang Tong, Long Jin, Yinglong Xia, Yunsong Guo. **Balancing Consistency and Disparity in Network Alignment.** ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), 2021.

13. Yuchen Yan, **Si Zhang**, Hanghang Tong. **BRIGHT: A Bridging Algorithm for Network Alignment.** ACM The Web Conference (WWW), 2021.

12. Zhe Xu, **Si Zhang,** Yinglong Xia, Liang Xiong, Hanghang Tong. **Ranking on Network of Heterogeneous Information Networks.** IEEE International Conference on Big Data, 2020.

11. Shane Roach, Connie Ni, Alexei Kopylov, Tsai-Ching Lu, Jiejun Xu, **Si Zhang,** Boxin Du, Dawei Zhou, Jun Wu, Lihui Liu, Yuchen Yan, Jingrui He, Hanghang Tong. **CANON: Complex Analytics of Network of Networks for Modeling Adversarial Activities.** IEEE International Conference on Big Data, 2020.

10. **Si Zhang,** Hanghang Tong. **Network Alignment: Recent Advances and Future Directions.** ACM International Conference on Information and Knowledge Management (CIKM), 2020.

9. **Si Zhang**, Hanghang Tong, Yinglong Xia, Liang Xiong, Jiejun Xu. **NetTrans: Neural Cross-Network Transformation.** ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), 2020.

8. **Si Zhang**, Hanghang Tong, Jiejun Xu, Yifan Hu, Ross Maciejewski. **ORIGIN: Non-Rigid Network Alignment.** IEEE International Conference on Big Data, 2019.

7. **Si Zhang**, Hanghang Tong, Ross Maciejewski, Tina Eliassi-Rad. **Multilevel Network Alignment.** ACM The Web Conference (WWW), 2019.

6. **Si Zhang**, Hanghang Tong, Jiejun Xu, Ross Maciejewski. **Graph Convolutional Networks: Algorithms, Applications and Open Challenges.** IEEE International Conference on Computational Data and Social Networks (CSoNet), 2018. (**Bests of CSoNet 2018**).

5. **Si Zhang**, Hanghang Tong, Jie Tang, Jiejun Xu, Wei Fan. **iNEAT: Incomplete Network Alignment.** IEEE International Conference on Data Mining (ICDM), 2017

4. Dawei Zhou, **Si Zhang**, Mehmet Yigit Yildirim, Scott Alcorn, Hanghang Tong, Hasan Davulcu, Jingrui He. **A Local Algorithm for Structure-Preserving Graph Cut.** ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), 2017

3. Boxin Du, **Si Zhang**, Nan Cao, Hanghang Tong. **FIRST: Fast Interactive Attributed Subgraph Matching.** ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), 2017

2. **Si Zhang**, Dawei Zhou, Mehmet Yigit Yildirim, Scott Alcorn, Jingrui He, Hasan Davulcu, Hanghang Tong, **HiDDen: Hierarchical Dense Subgraph Detection with Applications to Financial Fraud Detection.** SIAM International Conference on Data Mining (SDM), 2017

1. **Si Zhang**, Hanghang Tong, **FINAL: Fast Attributed Network Alignment.** ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), 2016

TUTORIAL TALKS

CIKM 2020: Network Alignment: Recent Advances and Future Directions

TEACHING EXPERIENCES

Teaching Assistant, University of Illinois at Urbana-Champaign

- CS 598, Network Mining, Spring 2020

Teaching Assistant, Arizona State University

- CSE 575 Statistical Machine Learning, Fall 2018
- CSE 575 Statistical Machine Learning, Fall 2017

SKILLS

Programming skills: Python, Matlab, C++, Scala, Latex

Languages: Chinese, English

HONORS AND AWARDS

- IEEE BigData Student Travel Award 2019
- Computational Social Networks on "Bests of CSoNet 2018" 2019
- SDM Student Travel Award 2017
- KDD Student Travel Award 2016

PUBLIC SERVICES

Program Committee: Big Data'18, AAAI'19, PAKDD'19, SDM'19, WWW'19, IJCAI'19, AAAI'20, WWW'20, SDM'20, PAKDD'20, ICML'20, IJCAI'20, ICDM'20, SDM'21, AAAI'21, ICLR'21, WWW'21, ICML'21, IJCAI'21

Journal Reviews: DMKD, TKDD, TKDE, TPAMI, NeuralComputing, TNNLS.