Zhaoxuan Tan

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Research Interests

My primary research interests lie at the intersection of natural language processing and graph mining (especially knowledge graphs and social networks), with a particular focus on language model + graph and computation for social good.

Education

University of Notre Dame, Indiana, United States   2023.08 - ?
Ph.D. in Computer Science and Engineering
Advisor: Prof. Meng Jiang

Xi'an Jiaotong University, Xi'an, Shaanxi, China   2019.08 - 2023.07
B.E. in Computer Science and Technology
Thesis Advisor: Prof. Minnan Luo

Publications (* indicates equal contribution)

[11] **HOFA: Twitter Bot Detection with Homophily-Oriented Augmentation and Frequency Adaptive Attention**
Sen Ye, <u>Zhaoxuan Tan</u>, Zhenyu Lei, Ruijie He, Hongrui Wang, Qinghua Zheng, Minnan Luo.
arXiv preprint 2023.

[10] **Can Language Models Solve Graph Problems in Natural Language?**
Heng Wang, Shangbin Feng, Tianxing He, <u>Zhaoxuan Tan</u>, Xiaochuang Han, Yulia Tsvetkov.
arXiv preprint 2023.

[9] **Detecting Spoilers in Movie Reviews with External Movie Knowledge and User Networks.**
Heng Wang, Wenqian Zhang, Yuyang Bai, <u>Zhaoxuan Tan</u>, Shangbin Feng, Qinghua Zheng, Minnan Luo.
arXiv preprint 2023.

[8] **KALM: Knowledge-Aware Integration of Local, Document, and Global Contexts for Long Document Understanding.**
Shangbin Feng, <u>Zhaoxuan Tan</u>, Wenqian Zhang, Zhenyu Lei, Yulia Tsvetkov.
In *Proceedings of ACL 2023.*

[7] **BotMoE: Twitter Bot Detection with Community-Aware Mixtures of Modal-Specific Experts.**
Yuhan Liu, <u>Zhaoxuan Tan</u>, Heng Wang, Shangbin Feng, Qinghua Zheng, Minnan Luo.
In *Proceedings of SIGIR 2023.*

[6] **KRACL: Contrastive Learning with Graph Context Modeling for Sparse Knowledge Graph Completion.**
<u>Zhaoxuan Tan</u>, Zilong Chen, Shangbin Feng, Qingyue Zhang, Qinghua Zheng, Jundong Li, Minnan Luo.
In *Proceedings of The Web Conference (WWW) 2023.*

[5] **BotPercent: Estimating Twitter Bot Populations from Groups to Crowds.**
<u>Zhaoxuan Tan</u>*, Shangbin Feng*, Melanie Sclar, Herun Wan, Minnan Luo, Yejin Choi, Yulia Tsvetkov
arXiv preprint 2023.

[4] **TwiBot-22: Towards Graph-Based Twitter Bot Detection.**

Shangbin Feng*, <u>Zhaoxuan Tan</u>*, Herun Wan*, Ningnan Wang*, Zilong Chen*, Binchi Zhang*, Qinghua Zheng, Wenqian Zhang, Zhenyu Lei, Shujie Yang, Xinshun Feng, Qingyue Zhang, Hongrui Wang, Yuhan Liu, Yuyang Bai, Heng Wang, Zijian Cai, Yanbo Wang, Lijing Zheng, Zihan Ma, Jundong Li, Minnan Luo. In *Proceedings of the NeurIPS, Datasets and Benchmarks Track 2022.*

[3] **PAR: Political Actor Representation Learning with Social Context and Expert Knowledge.**
Shangbin Feng, <u>Zhaoxuan Tan</u>, Zilong Chen, Peisheng Yu, Qinghua Zheng, Xiaojun Chang, Minnan Luo. In *Proceedings of EMNLP 2022.*

[2] **Heterogeneity-Aware Twitter Bot Detection with Relational Graph Transformers.**
Shangbin Feng, <u>Zhaoxuan Tan</u>, Rui Li, Minnan Luo. In *Proceedings of AAAI 2022.*

[1] **AHEAD: A Triple Attention Based Heterogeneous Graph Anomaly Detection Approach.**
Shujie Yang, Binchi Zhang, Shangbin Feng, <u>Zhaoxuan Tan</u>, Qinghua Zheng, Ziqi Liu, Minnan Luo. *arXiv preprint 2022.*

Research Experience

Research Assistant, TsvetShop @ University of Washington   2022.09 - 2023.01
- Introduced the concept of community-level Twitter bot detection and developed BotPercent, a multi-dataset, multi-model Twitter bot detection pipeline. Utilizing BotPercent, we investigate the presence of bots in various Twitter communities and discovered that bot distribution is heterogeneous in both space and time.
- Worked on KALM, a knowledge-aware language model that jointly incorporates external local, document-level, and global context knowledge for long document understanding.

Advisor: Prof. Yulia Tsvetkov

Research Assistant, Knowledge Engineering Group (KEG) @ Tsinghua University   2022.04 - 2022.11
- Worked on kgTransformer v2: Unifying Architecture and Pre-training for Knowledge Graph Reasoning.
- Achieved the state-of-the-art results and significantly outperformed the previous state-of-the-art (NBFNet) by 14.3% on WN18RR and 5.7% on NELL-995..
- Won 4th place in the OGB-LSC@NeurIPS 2022 competition WikiKG90Mv2 track (CogDL-kgTransformer).

Advisor: Prof. Yuxiao Dong

Research Assistant, Luo lab Undergraduate Division (LUD) @ Xi'an Jiaotong University
- **Member**: Worked on graph-based Twitter bot detection, knowledge graph representation learning, political actor representation learning, and heterogeneous graph anomaly detection.   2021.08 - 2022.06
    - Proposed KRACL, addresses the prevalent sparsity issue in knowledge graph completion using KG context and contrastive learning.
    - Presented TwiBot-22, the largest graph-based Twitter bot detection benchmark to date, offering diverse entities and relations in the Twittersphere with improved annotation quality.
    - Presented the relational graph transformers architecture to capture intrinsic relation heterogeneity and influence heterogeneity for improved Twitter bot detection.
    - Proposed a method to learn political actor representations incorporating social context and expert knowledge and apply these representations to tasks in computational political science.
- **Director**: Promoting undergraduate research by leading a 17-person undergraduate group, and mentoring 9 schoolmates alongside the other senior students.   2022.06 - present

Advisor: Prof. Minnan Luo

Honors and Awards

Best Bachelor Thesis (top 1%), XJTU	2023
AAAI Student Scholarship, AAAI	2022
National Second Prize, CUMCM	2021
Scholarship for Outstanding Students, Second Prize, XJTU	2021, 2020
Dean's List, XJTU	2020, 2021, 2022
Top Project Runner Up, NUS SoC Summer Workshop	2021
Honorable Mentioned Prize (top 15%), MCM	2021

Services

Reviewer for NeurIPS	2023
Virtual Volunteer, EMNLP	2022
Reviewer for NeurIPS, Datasets and Benchmarks Track	2022
Reviewer for Learning on Graphs Conference	2022
Director of the LUD lab	2022

Skills

- Programming Skills: Python, PyTorch, MATLAB, C/C++, bash, HTML/CSS, SQL, LaTeX, Git, ssh
- Language Skills: Mandarin (native), English (TOEFL 107: R 29, L 29, S 22, W 27), Cantonese (native)