

# Zhaoxuan Tan

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## Research Interests

I am broadly interested in knowledge graphs, social network analysis, natural language processing, and graph mining. My previous research includes Twitter bot detection, knowledge graph reasoning, and graph representation learning, with a special focus on **knowledge base reasoning**, **knowledge-enhanced NLP**, and **social network analysis for the common good**.

## Education

**Xi'an Jiaotong University**, Xi'an, Shaanxi, China (member of the C9 league in China) 2019.08 - present

B.E. in Computer Science and Technology

GPA: 89.05 (+3)/100, top 6% [transcript]

Thesis Advisor: Prof. Minnan Luo

## Publications (\* indicates equal contribution)

[1] **KRACL: Contrastive Learning with Graph Context Modeling for Sparse Knowledge Graph Completion.**

Zhaoxuan Tan, Zilong Chen, Shangbin Feng, Qingyue Zhang, Qinghua Zheng, Jundong Li, Minnan Luo.  
*To appear at The Web Conference (WWW), 2023.*

[2] **BotPercent: Estimating Twitter Bot Populations from Groups to Crowds.**

Zhaoxuan Tan\*, Shangbin Feng\*, Melanie Sclar, Herun Wan, Minnan Luo, Yejin Choi, Yulia Tsvetkov  
*arXiv preprint arXiv:2302.00381, 2023.*

[3] **Twibot-22: Towards Graph-Based Twitter Bot Detection.**

Shangbin Feng\*, Zhaoxuan Tan\*, Herun Wan\*, Ningnan Wang\*, Zilong Chen\*, Binchi Zhang\*, Qinghua Zheng, Wenqian Zhang, Zhenyu Lei, Shujie Yang, Xinshun Feng, Qingyue Zhang, Hongrui Wang, Yuhao 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.*

[4] **PAR: Political Actor Representation Learning with Social Context and Expert Knowledge.**

Shangbin Feng, Zhaoxuan Tan, Zilong Chen, Peisheng Yu, Qinghua Zheng, Xiaojun Chang, Minnan Luo.  
*In Proceedings of Conference on Empirical Methods in Natural Language Processing (EMNLP), 2022.*

[5] **Heterogeneity-aware Twitter Bot Detection with Relational Graph Transformers.**

Shangbin Feng, Zhaoxuan Tan, Rui Li, Minnan Luo.  
*In Proceedings of AAAI Conference on Artificial Intelligence (AAAI), 2022.*

[6] **KALM: Knowledge-Aware Integration of Local, Document, and Global Contexts for Long Document Understanding.**

Shangbin Feng, Zhaoxuan Tan, Wenqian Zhang, Zhenyu Lei, Yulia Tsvetkov.  
*arXiv preprint arXiv:2210.04105, 2022.*

[7] **AHEAD: A Triple Attention Based Heterogeneous Graph Anomaly Detection Approach.**

Shujie Yang, Binchi Zhang, Shangbin Feng, Zhaoxuan Tan, Qinghua Zheng, Ziqi Liu, Minnan Luo.  
*arXiv preprint arXiv:2208.08200, 2022.*

## Honors and Awards

Scholarship for Outstanding Students, Third Prize, Xi'an Jiaotong University

2022

AAAI Student Scholarship, Association for the Advancement of Artificial Intelligence	2022
National Second Prize, Contemporary Undergraduate Mathematical Contest in Modeling	2021
Scholarship for Outstanding Students, Second Prize, Xi'an Jiaotong University	2021
Dean's List, Xi'an Jiaotong University	2021
Top Project Runner Up, NUS SoC Summer Workshop	2021
Honorable Mentioned Prize (top 15%), Mathematical Contest in Modeling (MCM)	2021
Scholarship for Outstanding Students, Second Prize, Xi'an Jiaotong University	2020
First Prize in Shaanxi Province, Contemporary Undergraduate Mathematical Contest in Modeling	2020
Dean's List, Xi'an Jiaotong University	2020

## 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. [2]
- Worked on KALM, a knowledge-aware language model that jointly incorporates external local, document-level, and global context knowledge for long document understanding. [6]

Advisor: Prof. Yulia Tsvetkov

**Virtual Collaboration**, CNM @ National University of Singapore 2022.08 - present

- Seeking to understand how the anthropomorphic features of chatbots affect human-chatbot interactions, user engagement, and user experience.
- Crawled data with Twitter API and applied language models to analyze human-chatbot conversations.

Advisor: Prof. Renwen Zhang

**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 4<sup>th</sup> 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 [7]. 2021.08 - 2022.06
  - Proposed KRACL, addresses the prevalent sparsity issue in knowledge graph completion using KG context and contrastive learning. [1]
  - Presented the relational graph transformers architecture to capture intrinsic relation heterogeneity and influence heterogeneity for improved Twitter bot detection. [5]
  - 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. [3]
  - Proposed a method to learn political actor representations incorporating social context and expert knowledge, and apply these representations to tasks in computational political science. [4]
- **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

**Summer Workshop**, SoC @ National University of Singapore (virtual)

2021.05 - 2021.07

- Attended lectures in AI analytics and IoT and built a Twitter bot detection demo.
- Studied the effect of heterogeneity in social networks.

Advisor: Dr. Lek Hsiang Hui

## Services

Program Committee Chair, CSUC22@XJTU

2022

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

Web Chair, CSUC21@XJTU

2021

## Skills

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