Ruijie Wang

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Education

University of Illinois at Urbana Champaion — **Urbana, USA**
Department of Computer Science — *Sept. 2019 – Now*

- Ph.D. candidate, **Advisors**: Prof. Tarek F. Abdelzaher

Shanghai Jiao Tong University — **Shanghai, China**
Department of Computer Science — *Sept. 2015 – Jul. 2019*

- B.S. in Computer Science, **Advisors**: Prof. Xinbing Wang & Prof. Weinan Zhang

Research Interests

- My research interest includes machine learning and deep learning on graph, natural language, and time-series data, with applications on social network analysis, knowledge graph, and dynamic systems.

Industrial Experiences

Amazon Search (A9) Query Understanding Team — **Palo Alto, CA**
Applied Scientist Intern, Host: Dr. Bing Yin and Dr. Zheng Li — *May 2022 – Now*

- Work on cross-lingual temporal knowledge graph reasoning to boost performance on low-resource languages.

Amazon Search (A9) Query Understanding Team — **Palo Alto, CA**
Applied Scientist Intern, Host: Dr. Zheng Li and Dr. Danqing Zhang — *May 2021 – Oct. 2021*

- Work on temporal event forecasting model for joint product and query recommendation on Amazon platform.

Turing Sense — **Nanjing, Jiangsu**
Machine Learning Engineer, Host: Prof. Pingzhong Tang , Tsinghua University — *Feb. 2019 – June 2019*

- Work on deep vision models for real-time luxury appraisal.

Selected Publications (Google Scholar)

- **Ruijie Wang**, Zheng Li, Dachun Sun, Shengzhong Liu, Jinning Li, Bing Yin, Tarek Abdelzaher. "Learning to Sample and Aggregate: Few-shot Reasoning over Temporal Knowledge Graph". **NeurIPS** 2022.
- **Ruijie Wang**, Zheng Li, Danqing Zhang, Qingyu Yin, Tong Zhao, Bing Yin, Tarek Abdelzaher. "RETE: Retrieval-Enhanced Temporal Event Forecasting on Unified Query Product Evolutionary Graph". The Web Conference (**WWW**), 2022.
- **Ruijie Wang**, Zijie Huang, Shengzhong Liu, Huajie Shao, Dongxin Liu, Jinyang Li, Tianshi Wang, Tarek Abdelzaher. "DyDiff-VAE: A Dynamic Variational Framework for Information Diffusion Prediction". The 44th International Conference on Research and Development in Information Retrieval (**SIGIR**), 2021.
- **Ruijie Wang** Yuchen Yan, Jialu Wang, Yuting Jia, Weinan Zhang, Xinbing Wang. "AceKG: A Large-scale Knowledge Graph for Academic Data Mining". The 27th International Conference on Information and Knowledge Management (**CIKM**), 2018.
- Chaoqi Yang, **Ruijie Wang**, Shuochao Yao, Tarek Abdelzaher. "Semi-supervised Hypergraph Node Classification on Hypergraph Line Expansion". The 31th ACM International Conference on Information and Knowledge Management (**CIKM**), 2022.
- Haiwen Wang, **Ruijie Wang** Chuan Wen, Shuhao Li, Yuting Jia, Weinan Zhang, Xinbing Wang. "Author Name Disambiguation on Heterogeneous Information Network with Adversarial Representation Learning". The Thirty-Fourth AAAI Conference on Artificial Intelligence (**AAAI**), 2020.
- Jinning Li, Huajie Shao, Dachun Sun, **Ruijie Wang**, Yuchen Yan, Jinyang Li, Shengzhong Liu, Hanghang Tong, Tarek Abdelzaher. "Unsupervised Belief Representation Learning in Polarized Networks with Information-Theoretic Variational Graph Auto-Encoders". The International Conference on Research and Development in

Information Retrieval (**SIGIR**), 2022

- Dachun Sun, Chaoqi Yang, Jinyang Li, **Ruijie Wang**, Shuochao Yao, Huajie Shao, Dongxin Liu, Shengzhong Liu, Tianshi Wang, Tarek F Abdelzaher. "Computational Modeling of Hierarchically Polarized Groups by Structured Matrix Factorization". Frontiers in Big Data, 2021.
- Dongxin Liu, Tianshi Wang, Shengzhong Liu, **Ruijie Wang**, Shuochao Yao, Tarek Abdelzaher. "Contrastive self-supervised representation learning for sensing signals from the time-frequency perspective". The International Conference on Computer Communications and Networks (**ICCCN**), 2021.
- Tianshi Wang, Shuochao Yao, Shengzhong Liu, Jinyang Li, Dongxin Liu, Huajie Shao, **Ruijie Wang**, Tarek Abdelzaher. "Audio Keyword Reconstruction from On-Device Motion Sensor Signals via Neural Frequency Unfolding". The ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (**IMWUT/UbiComp**), 2021.
- Chaoqi Yang, Jinyang Li, **Ruijie Wang**, Shuochao Yao, Huajie Shao, Dongxin Liu, Shengzhong Liu, Tianshi Wang, Tarek Abdelzaher. "Hierarchical Overlapping Belief Estimation by Structured Matrix Factorization". International Conference on Advances in Social Networks Analysis and Mining (**ASONAM**), 2020.
- Huajie Shao, Shuochao Yao, Andong Jing, Shengzhong Liu, Dongxin Liu, Tianshi Wang, Jinyang Li, Chaoqi Yang, **Ruijie Wang** and Tarek Abdelzaher. "Misinformation Detection and Adversarial Attack Cost Analysis in Directional Social Networks". The 29th International Conference on Computer Communications and Networks (**ICCCN**), 2020.
- Shengzhong Liu, Shuochao Yao, Yifei Huang, Dongxin Liu, Huajie Shao, Yiran Zhao, Jinyang Li, Tianshi Wang, **Ruijie Wang**, Chaoqi Yang, Tarek Abdelzaher. "Handling Missing Sensors in Topology-aware IoT Applications with Gated Graph Neural Networks". The ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (**IMWUT/UbiComp**), 2020.

Manuscripts

- **Ruijie Wang**, Zheng Li, Jingfeng Yang, Tianyu Cao, Chao Zhang, Huajie Shao, Bing Yin, Tarek Abdelzaher. "Cross-lingual Reasoning on Temporal Knowledge Graphs". In submission.
- **Ruijie Wang**, Yichen Lu, Baoyu Li, Tarek Abdelzaher. "Robust Graph Learning on Noisy Dynamic Graphs". In submission.
- **Ruijie Wang***, Chaoqi Yang*, Fangwei Gao, Dachun Sun, Jiawei Tang, Tarek Abdelzaher. "Analyzing the Design Space of Re-opening Policies and COVID-19 Outcomes in the US". In submission.
- Chaoqi Yang, **Ruijie Wang**, Shuochao Yao, Shengzhong Liu, Tarek Abdelzaher. "Revisiting 'Over-smoothing' in Deep GCNs". arXiv:2003.13663.

Research Experiences

Dynamic Social Sensing System and Graph Learning **UIUC**

Research Assistant with Prof. Tarek Abdelzaher *Sept.2019 - Now*

- We design a novel diffusion model, DyDiff-VAE, for information diffusion prediction on social media, which jointly models co-evolution of user belief and propagated cascades. Paper is accepted by SIGIR 2021.
- We design a neural relational inference model for dynamic social sensing systems, which aims to jointly extrapolate dynamic time-series and infer the unobservable graph structure among users.
- We design a line expansion for hypergraph learning and give theoretical analysis. The proposed expansion could allow an elegant generalization of GCNs to hypergraphs.
- We revisit the oversmoothing issue of GCNs from an optimization perspective and analyze that GCNs can actually learn anti-oversmoothing, whereas overfitting is the real obstacle in deep GCNs.
- We propose a universal multi-belief structure under certain socail topics and build a new class of NMF approaches to disentangle hierarchical beliefs from user-generated text. Paper is accepted by ASONAM 2020.

Temporal Event Forecasting on E-commerce **Amazon QU Team**

Applied Scientist Intern with Dr. Zheng Li, Danqing Zhang, Qingyu Yin, Tong Zhao. *May 2021 - Oct. 2021*

- We build temporal event forecasting model for joint product and query recommendation on Amazon platform,

which address the temporal issue and over-smoothing issue on evolutionary product-query graph. Paper is accepted by WWW 2022.

SocialSim: Social Simulation System for Social Streams **UIUC**
Research Assistant with Prof. Tarek Abdelzaher & Prof. Jiawei Han *Sept.2019 - Now*

- We build simulation core to analyze how external event affects the information propagation on social media, and predict how information propagate in social networks (e.g., Twitter, Youtube, Reddit). We rank the top in the DARPA challenges three times.
- We implement a social response pipeline. Paper is accepted by WSC 2021.

INCAS: INfluence Campaign Awareness and Sensemaking Program **UIUC**
Research Assistant with Prof. Tarek Abdelzaher, Jiawei Han, Hanghang Tong and Ji Heng *Sept.2021 - Now*

- We work to characterize how different foreign populations respond to influence campaigns as a first step towards development of effective countermeasures.

Academic Data Mining and Data Systems **SJTU**
Research Assistant with Prof. Xinbing Wang & Prof. Weinan Zhang *Nov.2017 - Jun. 2019*

- We bulid Academic Knowledge Graph (AceKG), a large-scale (3.13 billion triples) knowledge graph in academic domain. We implemented the Knowledge Graph System based on Apache Jena consisting of TDB database and SPARQL engine. We further perform entity alignment and rule based inferences to enrich the knowledge graph, which provides benchmark for NRL task. Paper is accepted by CIKM 2018.
- We propose a novel adversarial representation learning model for heterogeneous information network in the academic domain, to deal with author name disambiguation task. A generative adversarial module and self-training strategy are proposed for efficient and effective modeling. Paper is accepted by AAAI 2020.

Selected Projects

COVID-19 Prediction Tools **UIUC**
Advisor: Prof. Tarek Abdelzaher *Mar. 2020 - June. 2020*

- A COVID-19 prediction system, working for predicting number of cases under various reopening policies.

Distributed MapReduce System **UIUC**
Advisor: Prof. Indranil Gupta *Sept. 2019 - Dec. 2019*

- A simple distributed MapReduce-like system consisting of a naïve scheduler, a gossip-style heartbeating protocol and a reliable simple distributed file system.

Acemap: Academic Map System **SJTU**
Advisor: Prof. Xinbing Wang *Oct. 2017 - Jun. 2018*

- A novel academic system (Acemap), working for data analysis and visualization of scholarly networks.

Services

- **PC Member and Reviewer**: ESWC 2021&2022, AAAI 2021&2020, KDD 2020.
- **Teaching Assistant for EE448, SJTU**: Big Data Mining .

Honors and Awards

- **Outstanding Graduates in Shanghai Jiao Tong University**. 2019
- **Rong Chang Innovation Scholarship**. (Top 20 student scholars in SJTU) 2018
- **Chunstung Scholar**. (Top 50 student scholars in SJTU) 2018
- **Meritorious Winner, Mathematics Contest in Modeling (MCM)**. (Top 8% globally) 2018
- **EIC Education Scholarship.** (Top 2% in CS Department) 2017
- **Samsung Scholarship**. (Top 2% in CS Department) 2017
- **Bronze Medal & First Prize, Chinese Physics Olympiad**. (CPhO, less than 0.1% nationally) 2014

Skills

- **Programming Language**: Proficient in Python, famaliar with C/C++, JAVA, Matlab.
- **Tools**: PyTorch, Tensorflow, LaTex, Vim, Git, Markdown.