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
○ Outstanding Graduates in Shanghai Jiao Tong University

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.

Research Experiences

Knowledge-enhanced Social Sensing System **CyPhy Group, UIUC**
Research Assistant with Prof. Tarek Abdelzaher *Sept.2019 - Now*

○ We study how to utilize scarce, noisy, and temporally evolving knowledge to facilitate social sensing system, with applications in information diffusion, user behavior modeling, and knowledge graph reasoning.
○ <u>SocialSim</u>: We build simulation core to analyze how external event affects the information propagation on social media, and predict how information propagate in social networks. We rank the top 1 in the DARPA challenges three times. Paper is accepted by WSC 2021, collaborated with Prof. Jiawei Han.
○ <u>INCAS</u>: We study how different foreign populations respond to influence campaigns as a first step towards development of effective countermeasures, collaborating with Prof. Jiawei Han, Hanghang Tong and Ji Heng.
○ <u>SocialMath</u>: We theoretically analyze the grounding equation and control mechanism of information propagation on social media, collaborating with Prof. Christian Lebiere, Naira Hovakimyan and Evangelos Theodorou.

Temporal Knowledge Graphs on E-commerce **QU Team, Amazon A9**
Applied Scientist Intern with Bing Yin and Zheng Li. *May 2021 - Oct. 2021*

○ We build mutually-paced self-training framework for cross-lingual temporal knowledge graph reasoning to boost performance in low-resource languages.
○ We build temporal event forecasting model for joint product and query recommendation on Amazon platform.

Academic Data Mining and Data Systems **IIOT, 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.

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.

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**: ICLR 2023, AAAI 2023&2022&2021, ESWC 2022&2021, KDD 2020.
- **Teaching Assistant for EE448, SJTU**: Big Data Mining .

Honors and Awards

- **CIKM NSF Travel Award**.   2022
- **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 Languages**: Proficient in Python, famaliar with C/C++, JAVA, Matlab.
- **Tools**: PyTorch, Tensorflow, LaTex, Vim, Git, Markdown.
- **Hobbies**: Basketball, Skiing, Photography.