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Xin Liu

**Research Interests:** Data Mining, Machine Learning, Graph Reasoning, Natural Language Understanding

## Education

- Aug. 2018 – Now    **Ph.D. Candidate** at Department of Computer Science and Engineering, Hong Kong University of Science and Technology, Hong Kong SAR, supervised by **Prof. Yangqiu Song**    GPA:3.9/4.3
- Aug. 2014 – June 2018    **B.E. Degree** at Department of Computer Science, Sun Yat-sen University, China, supervised by **Prof. Rong Pan**    Outstanding Graduate Honor with 3 National Scholarships    GPA:4.2/5.0

## Publications

\* means equal contribution.

### Journal Articles

- 1 Hongming Zhang\*, **Xin Liu\***, Haojie Pan\*, Haowen Ke, Jiefu Ou, Tianqing Fang and Yangqiu Song. 'ASER: Towards Large-scale Commonsense Knowledge Acquisition via Higher-order Selectional Preference over Eventualities'. *Artificial Intelligence (AIJ)*, 2022.

### Conference Publications

- 1 Chunkit Chan\*, **Xin Liu\***, Jiayang Cheng, Zihan Li, Yangqiu Song, Ginny Y. Wong and Simon See. 'DiscoPrompt: Path Prediction Prompt Tuning for Implicit Discourse Relation Recognition'. In *Findings of Annual Meeting of the Association for Computational Linguistics (Findings of ACL)*. 2023.
- 2 Changlong Yu, Weiqi Wang, **Xin Liu**, Jiaxin Bai, Yangqiu Song, Zheng Li, Yifan Gao, Tianyu Cao and Bing Yin. 'FolkScope: Intention Knowledge Graph Construction for Discovering E-commerce Commonsense'. In *Findings of Annual Meeting of the Association for Computational Linguistics (Findings of ACL)*. 2023.
- 3 Huiru Xiao, **Xin Liu**, Yangqiu Song, Ginny Y. Wong and Simon See. 'Complex Hyperbolic Knowledge Graph Embeddings with Fast Fourier Transform'. In *Proceedings of Conference on Empirical Methods in Natural Language Processing (EMNLP)*. 2022.
- 4 **Xin Liu**, Jiayang Cheng, Yangqiu Song and Xin Jiang. 'Boosting Graph Structure Learning with Dummy Nodes'. In *Proceedings of International Conference on Machine Learning (ICML)*. 2022.
- 5 **Xin Liu** and Yangqiu Song. 'Graph Convolutional Networks with Dual Message Passing for Subgraph Isomorphism Counting and Matching'. In *Proceedings of AAAI Conference on Artificial Intelligence (AAAI)*. 2022.
- 6 **Xin Liu**, Jiefu Ou, Yangqiu Song and Xin Jiang. 'Exploring Discourse Structures for Argument Impact Classification'. In *Proceedings of Annual Meeting of the Association for Computational Linguistics (ACL)*. 2021.
- 7 **Xin Liu**, Haojie Pan, Mutian He, Yangqiu Song, Xin Jiang and Lifeng Shang. 'Neural Subgraph Isomorphism Counting'. In *Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD)*. 2020.
- 8 **Xin Liu**, Jiefu Ou, Yangqiu Song and Xin Jiang. 'On the Importance of Word and Sentence Representation Learning in Implicit Discourse Relation Classification'. In *Proceedings of International Joint Conference on Artificial Intelligence (IJCAI)*. 2020.
- 9 Hongming Zhang\*, **Xin Liu\***, Haojie Pan\*, Yangqiu Song and Cane Wing-Ki Leung. 'ASER: A Large-scale Eventuality Knowledge Graph'. In *The Web Conference (WWW)*. 2020.
- 10 Huiru Xiao, **Xin Liu** and Yangqiu Song. 'Efficient Path Prediction for Semi-Supervised and Weakly Supervised Hierarchical Text Classification'. In *The Web Conference (WWW)*. 2019.
- 11 Jie Huang, **Xin Liu** and Yangqiu Song. 'Hyper-Path-Based Representation Learning for Hyper-Networks'. In *Proceedings of ACM International Conference on Information and Knowledge Management (CIKM)*. 2019.
- 12 Yan Liang, **Xin Liu**, Jianwen Zhang and Yangqiu Song. 'Relation Discovery with Out-of-Relation Knowledge Base as Supervision'. In *Proceedings of Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (NAACL)*. 2019.

- 13 Ziqian Zeng, Wenxuan Zhou, **Xin Liu** and Yangqiu Song. 'A Variational Approach to Weakly Supervised Document-Level Multi-Aspect Sentiment Classification'. In *Proceedings of Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (NAACL)*. 2019.
- 14 Ziqian Zeng\*, **Xin Liu\*** and Yangqiu Song. 'Biased Random Walk based Social Regularization for Word Embeddings'. In *Proceedings of International Joint Conference on Artificial Intelligence (IJCAI)*. 2018.

## Preprints and Manuscripts

- 1 **Xin Liu**, Zheng Li, Yifan Gao, Jingfeng Yang, Tianyu Cao, Zhengyang Wang, Bing Yin and Yangqiu Song. 'Session-based Recommendations with Frequent Attribute Pattern Augmentation'. 2023 (**Underreview**).
- 2 **Xin Liu**, Weiqi Wang, Jiaxin Bai and Yangqiu Song. 'Towards Subgraph Isomorphism Counting with Graph Kernels'. 2023 (**Underreview**).
- 3 Jiaxin Bai, **Xin Liu**, Weiqi Wang, Chen Luo and Yangqiu Song. 'Complex Eventuality Reasoning with Implicit Logical Constraints'. 2023 (**Underreview**).
- 4 Chunkit Chan, **Xin Liu**, Tsz Ho Chan, Jiayang Cheng, Yangqiu Song, Ginny Y. Wong and Simon See. 'Self-Consistency Narrative Prompts on Abductive Natural Language Inference'. 2023 (**Underreview**).
- 5 Changlong Yu, **Xin Liu**, Zheng Li, Jefferson Maia, Tianyu Cao, Yifan Gao, Yana Petrova et al. 'COSMO: Distill Common Sense Knowledge for Amazon from Large Language Models and Massive User Behaviors'. 2023 (**Underreview**).
- 6 Jiayang Cheng, Lin Qiu, **Xin Liu**, Yangqiu Song and Zheng Zhang. 'Narrative Reasoning by Grounding to Event-centric Knowledge Graphs'. 2023 (**Underreview**).
- 7 Zhongwei Wan, Benyou Wang, **Xin Liu**, Jiezhong Qiu and Guangyong Chen. 'Spatio-Temporal Contrastive Learning Enhanced GNNs for Session-based Recommendation'. 2023 (**Underreview**).
- 8 Ziqian Zeng, Weimin Ni, Wenxuan Zhou, **Xin Liu**, Zizheng Lin, Yangqiu Song, Michael David Kuo and Wan Hang Keith Chiu. 'A Variational Approach to Weakly Supervised Sentiment Analysis'. 2023 (**Underreview**).
- 9 Hejie Cui, Xinyu Fang, Zihan Zhang, Ran Xu, Xuan Kan, **Xin Liu**, Manling Li, Yangqiu Song and Carl Yang. 'Open Visual Knowledge Extraction via Relation-Oriented Multimodality Model Prompting'. 2023 (**Underreview**).
- 10 Weiqi Wang\*, Tianqing Fang\*, Wenxuan Ding, Baixuan Xu, **Xin Liu**, Yangqiu Song and Antoine Bosselut. 'CAR: Conceptualization-Augmented Reasoner for Zero-Shot Commonsense Question Answering'. 2023. arXiv: 2305.14869.
- 11 Chunkit Chan, Jiayang Cheng, Weiqi Wang, Yuxin Jiang, Tianqing Fang, **Xin Liu** and Yangqiu Song. 'ChatGPT Evaluation on Sentence Level Relations: A Focus on Temporal, Causal, and Discourse Relations'. 2023. arXiv: 2304.14827.

## Awards

2022	<ul style="list-style-type: none"> <li>■ HKUST RedBird Academic Excellence Award for Continuing PhD Students</li> </ul>
2020	<ul style="list-style-type: none"> <li>■ HKUST CSE Professor Samuel Chanson Best Teaching Assistant Award</li> <li>■ HKUST SENG Academic Award for Continuing PhD Students</li> </ul>
2018	<ul style="list-style-type: none"> <li>■ SYSU Outstanding Graduate</li> <li>■ SYSU Outstanding Graduate Thesis</li> <li>■ The First Prize, Guangdong Collegiate Programming Contest</li> </ul>
2017	<ul style="list-style-type: none"> <li>■ Top 10, Tencent social advertising college algorithm competition</li> <li>■ Meritorious Winner, Mathematical Contest in Modeling / Interdisciplinary Contest in Modeling</li> </ul>
2015, 2016, 2017	<ul style="list-style-type: none"> <li>■ National Scholarship ×3</li> </ul>

## Experience

### Internship

- June 2022 – Dec. 2022    ■ **Research Intern (Recommendation)** [Mentor: [Dr. Zheng Li](#)], Search Mission Understanding, Amazon Search, Palo Alto, United States.

## Experience (continued)

- Jan. 2018 - July 2018 ■ **Research Assistant (Text Mining)** [Mentor: [Prof. Yangqiu Song](#)], Knowledge Computation Group, Hong Kong University of Science and Technology, Hong Kong SAR.
- June 2017 - Dec. 2017 ■ **Research Intern (Cloud Graph Database)** [Mentor: [Dr. Liang Jeff Chen](#)], Cloud & Mobile Group, Microsoft Research Asia, Beijing, China.

## Teaching Assistant

- Feb. 2022 - May 2022 ■ **Teaching Assistant**, Natural Language Processing (MSBD5018), Hong Kong University of Science and Technology, Hong Kong SAR
- Feb. 2021 - June 2021 ■ **Teaching Assistant**, Natural Language Processing (MSBD6000H), Hong Kong University of Science and Technology, Hong Kong SAR
- Feb. 2020 - June 2020 ■ **Teaching Assistant**, Big Data Mining (COMP4332/RMBI4310), Hong Kong University of Science and Technology, Hong Kong SAR
- Feb. 2019 - May 2019 ■ **Teaching Assistant**, Big Data Mining (COMP4332/RMBI4310), Hong Kong University of Science and Technology, Hong Kong SAR
- Sept. 2018 - Dec. 2018 ■ **Teaching Assistant**, Machine Learning for Natural Language Processing (COMP4901K/MATH4824B), Hong Kong University of Science and Technology, Hong Kong SAR

## Leadership

- July 2016 - June 2017 ■ **Monitor** of SYSU-CS Class 1
- Oct. 2015 - Sept. 2016 ■ **Chairman** of SYSU-Baidu Club

## Academic

- **Journal Reviewer**: DMKD'23, TKDE'22,23
- **Program Committee Member**: CIKM'19,21,22 IJCAI'21,22,23 AAAI'21,22,23 NAACL'22 ACL ARR'22,23 ICML'22 SIGKDD'22,23 NeurIPS'22,23
- **External Reviewer**: ACL'19 EMNLP'19 IJCAI'19,20 SIGKDD'19,20,21
- **Volunteer**: Baidu World Conference'16 IJCAI'18,19,20 NAACL'19 SIGKDD'20

## Projects

- 2022 ■ **FolkScope** (open-source version on [GitHub](#)): the first commonsense knowledge graph for Amazon built upon co-purchase data (during the internship at Amazon Search)
- 2019-2022 ■ **ASER** ([GitHub](#), [Homepage](#)): the first large-scale eventuality knowledge graph based on discourse relations (during the PhD study at HKUST)
- 2017 ■ **GraphView** (open-source version on [GitHub](#)): the first distributed graph database, which is an important part of Microsoft Azure (during the internship at MSRA)

## Skills

- Programming ■ Python, C++, Java, C#, matlab
- Software ■ PyTorch, TensorFlow, DGL, PYG, Spark, SQL