Xiang Ren

Assistant Professor, Computer Science Department, University of Southern California

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Employment History

University of Southern California   *Los Angeles, CA*

Assistant Professor, Computer Science Department
Research Team Leader, Information Science Institutes (by courtesy)   *02/ 2018 - present*
Director, USC Intelligence and Knowledge Discovery Research Lab

Allen Institute for Artificial Intelligence   *Los Angeles, CA*

Visiting Research Scientist (20%)   *04/ 2022 - present*

ACM SIGKDD   *Los Angeles, CA*

Information Director, Appointed Chair   *01/ 2019 - present*

Snap Inc.   *Santa Monica, CA*

Data Science Advisor, Data Science Team   *03/ 2018 - 03/ 2019*

Stanford University   *Stanford, CA*

Research Scholar, NLP Group & SNAP Group   *05/ 2017 - 02/ 2018*

Research Interests

Natural language processing

- Neural-symbolic models for building interpretable and faithful systems
- Explanation-based model learning, debugging, and refinement
- Label efficient methods with weak/ distant supervisions
- Continual learning & rapid task generalization

Machine learning

- Graph representation learning, graph neural networks
- Inductive biases for sequence modeling
- Interpretability; Post-hoc model explanation

Artificial intelligence

- Commonsense knowledge acquisition, representation, and reasoning
- Knowledge graphs: construction & reasoning

Education History

Ph.D. in Computer Science

University of Illinois Urbana-Champaign, IL, 08/ 2012 - 02/ 2018

Advisor: Jiawei Han
Committee members: Chengxiang Zhai, Heng Ji, Tarek Abdelzaher
2018 ACM SIGKDD Doctoral Dissertation Award, C. W. Gear Outstanding Graduate Student Award

M.Sc. in Computer Science

University of Illinois Urbana-Champaign, IL, 04/ 2016

2016 David J. Kuck Outstanding M.S. Thesis Award (given to 1 student from the computer science department)

B.Eng. in Computer Science

Zhejiang University, Hangzhou, China, 05/ 2008 - 06/ 2012

Excellence Senior Thesis Award, Computer Science Department,   Graduate with honors, Chu Kochen Honors College

Honors and Awards

2022	NAACL Outstanding Paper Award
2022	Amazon Alexa Fairness in AI Award
2022	Google Research Scholar Award
2021	NSF CAREER Award
2021	Facebook Faculty Research Award

2021	Best Paper Award, NAACL TrustNLP Workshop
2020	Best Paper Award Honorable Mention, The Web Conference (WWW)
2020	*Runner-up*, Best Paper Award, NeurIPS 2020 KR2ML Workshop
2020	Sony Faculty Research Award
2020	Snapchat Faculty Research Award
2019	Forbes' Asia 30 Under 30, Healthcare & Science
2019	JP Morgan AI Research Award
2019	Amazon Faculty Research Award
2019	Adobe Data Science Research Award
2018	Google Faculty Research Award
2018	*Winner*, ACM SIGKDD Doctoral Dissertation Award
2017	*Winner*, David J. Kuck Outstanding Thesis Award
2016	Google PhD Fellowship

Top Five Cited Papers

[1] Hierarchical Graph Representation Learning with Differentiable Pooling (**Citations: 904**)
Rex Ying, Jiaxuan You, Chris Morris, **Xiang Ren**, William L. Hamilton, Jure Leskovec
Annual Conference on Neural Information Processing Systems (**NIPS**), 2018

[2] Personalized Entity Recommendation: A Heterogeneous Information Network Approach (**Citations: 639**)
X. Yu, **X. Ren**, Y. Sun, Q. Gu, B. Sturt, U. Khandelwal, B. Norick, J. Han
7th ACM International Conference on Web Search and Data Mining (**WSDM**), 2014

[3] GraphRNN: A Deep Generative Model for Graphs (**Citations: 591**)
Jiaxuan You, Rex Ying, **Xiang Ren**, William L. Hamilton, Jure Leskovec
International Conference on Machine Learning (**ICML**), 2018

[4] Dynamic Network Embedding by Modeling Triadic Closure Process (**Citations: 346**)
Lekui Zhou, Yang Yang, **Xiang Ren**, Fei Wu, Yueting Zhuang
The AAAI Conference on Artificial Intelligence (**AAAI**), 2018

[5] Kagnet: Knowledge-aware graph networks for commonsense reasoning (**Citations: 239**)
Bill Yuchen Lin, Xinyue Chen, Jamin Chen, **Xiang Ren**.
Conference on Empirical Methods in Natural Language Processing **EMNLP**), 2019

Research Grants, Sponsorship, Gifts

Total funding (own share) ≈ $4.8 million

[9] **NSF CAREER**: *Teaching Machine through Human Explanations for Information Extraction*.
- **sole PI**, award# 2048211 (05-15-2021 - 04-30-2026), $513,058 (total)
- **Role:** Build and maintain domain-specific information extraction systems with human explanations.

[8] **NSF SciSIP**: *Modeling the Invention, Dissemination, and Translation of Scientific Concepts*.
- **PI**, award# 1829268 (08-01-2018 – 08-31-2020), $239,988 (own share); $503,974 (total). **Co-PI**: Daniel MacFarland
- **Role:** Develop neural models for measuring and modeling processes of scientific innovation.

[7] **DARPA Machine Commonsense (MCS)**: *Multi-modal Open World Grounded Learning and Inference (MOWGLI)*.
- **Co-PI** (06-01-2019 – 05-31-2023), $1,026,796 (own share); $8.6M (total).
- **PI**: Pedro Szekely. **Other Co-PIs**: Jay Pujara, Jure Leskovec, Sameer Singh, Deborah McGuinness
- **Role:** Address the challenge of machine common sense by reading the web and modeling structured knowledge.

[6] **DARPA Knowledge Management at Scale and Speed (KMASS)**: *LKNIC: Knowledge Needed in Context*.
- **Co-PI** (03-01-2022 – 02-31-2024), $526,613 (own share); $4.5M (total).
- **PI**: Jay Pujara. **Other Co-PIs**: Jonathan May, David Truam, Elizabeth Boschee
- **Role:** Revolutionize knowledge management through the use of a cognitively-inspired organization of multimodal background knowledge, a dialogue-driven agent for knowledge capture and dissemination.

[5] **DARPA Grounded Artificial Intelligence Language Acquisition (GAILA)**: *Learning Language from Image and Video Entities*.
- **Co-PI** (07-01-2019 – 5-31-2022), $372,747 (own share); $925k (total). **PI**: Ram Nevatia; **Other Co-PI**: Yan Liu.
- **Role:** Develop continual learning algorithms for vision-language models.

[4] **Schmidt Family Foundation Grant**: *Using Artificial Intelligence to Support Cognitive Task Analysis*.
- **Co-investigator** (06-15-2019 – 09-30-2020), $173k (own share); $340k (total). **PI**: Kenneth Yates; **Co-PI**: Rao Machiraju
- **Role:** Automatic construction of procedure knowledge graphs from interview transcripts.

[3] **IARPA Better Extraction from Text Towards Enhanced Retrieval (BETTER)**: *Cross-Lingual Event & Argument Retrieval*.
- **Co-investigator** (06-01-2019 – 11-30-2022), $479,682 (own share); $7.28M (total)
- **PI**: Elizabeth Boschee. **Other Co-PIs**: Scott Miller, James Allan
- **Role:** Develop enhanced methods for personalized, multilingual semantic extraction and retrieval from text.

[2] **DARPA Influence Campaign Awareness and Sensemaking (INCAS)**
- **Co-investigator**, (8-15-2021 – 12-31-2025), $464,803 (own share); $4.2M (total)
- **PI**: Emilio Ferrara. **Other Co-PIs**: Alessandro Flammini, Jacob Shapiro, Jonathan May
- **Role:** Develop explanation-based learning methods for campaign prediction models.

[1] **DARPA Systematizing Confidence in Open Research and Evidence (SCORE)**: *Macroscopic models for Reproducibility and Replicability of Research Claims in the Social and Behavioral Sciences*.
- **Co-PI**, (10-01-2019 – 12-31-2021), $274,104 (own share); $1.83M (total). **PI**: Jay Pujara. **Other Co-PI**: Kristina Lerman
- **Role:** Develop human-in-the-loop learning interfaces for information extraction from scientific papers.

[0] **Gift awards from Industry (sole PI, $750k+)**: Google Research Scholar Award ($60k), Facebook Sponsored Research Award ($150k), Amazon Trust ML grant ($70k), JP Morgan AI research award ($150k), Sony faculty innovation award ($100k), Google faculty research award ($80k), Amazon research award ($80k), Adobe data science award ($80k), Snapchat gifts ($20k)

Selected Media Coverage

2021	**Communications of the ACM** "*The Best of NLP*"
2020	**The Register** While text-generating AI can write like humans, it lacks common sense
2020	**TechXplore** New test reveals AI still lacks common sense
2020	**Radio.com** AI still lacks common sense according to new research
2020	**Teachzine** Study finds that an AI's machine language still lacks common sense
2020	**OneZero** An A.I. Tool Has Been Passing Its Bias to Algorithms for Almost Two Decades
2020	**Digital Trends** Human moderators can't stop online hate speech alone
2020	**Science Daily** Context reduces racial bias in hate speech detection algorithms.
2019	**USC News** Want to Know the Secret of a Good Idea? It Could be Hidden in Language.

Service

COMMUNITY: K-12 OUTREACH

Project pitch panel, Linked Learning Engineering Pathway at STEM Academy Hollywood, Los Angeles, 03/ 2021
Project advising, Linked Learning Engineering Pathway at Theodore Roosevelt High School, Los Angeles, 03/ 2021
Guest lecture, Theodore Roosevelt High School, Los Angeles, 02/ 2021
Guest lecture, USC Viterbi Summer High School Intensive in Next-Generation Engineering (SHINE) program, 07/ 2020

PROFESSIONAL: ORGANIZER / CHAIR ON EXTERNAL ACTIVITIES

ACM SIGKDD Information Director, Sep 2018 - present
Commonsense Representation and Reasoning (**CRR**), Workshop Co-chair, co-located with ACL 2022
Federated Learning for NLP (**FedNLP**), Workshop Co-chair, co-located with ACL 2022
Deep Learning for Low-resource NLP (**DeepLo**), Workshop Co-chair, co-located with NAACL 2022
Trustworthy NLP (**TrustNLP**) Workshop Co-chair, co-located with NAACL 2021
The 2nd Learning from Limited Labeled Data Workshop (**LLD**), Workshop Co-chair, co-located with ICLR 2019
The 4th Workshop on Representation Learning for NLP (**Rep4NLP**), Workshop Co-chair, co-located with ACL 2019
EMNLP Workshop on Deep Learning for Low-resource NLP (**DeepLo**), Workshop Co-chair, co-located with EMNLP 2019
WWW Workshop on Knowledge Graph Technology and Applications, Workshop Co-chair, 2019
First Conference on Automated Knowledge Base Construction (**AKBC**), Workshop Co-chair, 2018
First Workshop on Knowledge Base Construction, Reasoning and Mining (**KBCOM**), Co-organizer, 2018

PROFESSIONAL: AREA CHAIR / SENIOR PC FOR INTERNATIONAL CONFERENCES

Conference on Empirical Methods in Natural Language Processing (**EMNLP**), Senior Area Chair, 2022
International Conference on Machine Learning (**ICML**), Area Chair, 2022
The International Conference on Learning Representations (**ICLR**), Area Chair, 2020-2022
Conference on Empirical Methods in Natural Language Processing (**EMNLP**), Area Chair, 2018-2021
Annual Meeting of the Association for Computational Linguistics (**ACL**), Area Chair, 2019-2021
Annual Conference of the North American Chapter of the ACL (**NAACL**), Area Chair, 2021
The Thirty-Fourth AAAI Conference on Artificial Intelligence (**AAAI**), Senior Area Chair, 2020
The Thirty-Fourth AAAI Conference on Artificial Intelligence (**AAAI**), Area Chair, 2019

PROFESSIONAL: PROGRAM COMMITTEE FOR INTERNATIONAL CONFERENCES

ACM SIGKDD Conference on Knowledge Discovery and Data Mining (**KDD**): 2015-21
Conference on Neural Information Processing Systems (**NeurIPS**): 2019-21
International Conference on Machine Learning (**ICML**): 2019-20
Annual Meeting of the Association for Computational Linguistics (**ACL**): 2017-19
Conference on Empirical Methods in Natural Language Processing (**EMNLP**): 2015-18
International World Wide Web Conference (**WWW**): 2017-20
The AAAI Conference on Artificial Intelligence (**AAAI**): 2018-19
International Joint Conference on Artificial Intelligence (**IJCAI**): 2018-19
ACM International Conference on Web Search and Data Mining (**WSDM**): 2017-19
Annual Conference of the North American Chapter of the Association for Computational Linguistics (**NAACL**): 2018-19
ACM SIGIR Conference on Research and Development in Information Retrieval (**SIGIR**): 2017-18
ACM Conference on Information and Knowledge Management (**CIKM**): 2017

PROFESSIONAL: JOURNAL REVIEWER

Transactions of the Association for Computational Linguistics (**TACL**)
IEEEs Transactions on Knowledge and Data Engineering (**TKDE**)
ACM Transactions on Knowledge Discovery from Data (**TKDD**)

Teaching

Classes taught at USC

Spring22	**Instructor,** CSCI 566: Deep Learning and its Applications	*USC*
Fall21	**Instructor,** CSCI 699: Representation Learning for NLP	*USC*
Fall120	**Instructor,** CSCI 699: Representation Learning for NLP	*USC*
Fall2019	**Instructor,** CSCI 699: Advanced Topics in Representation Learning for NLP	*USC*
Spring19	**Instructor,** CSCI 699: Machine Learning for Knowledge Extraction and Reasoning	*USC*
Fall18	**Instructor,** CSCI 699: Introduction to Information Extraction.	*USC*

Conference tutorials

[10] Knowledge-Augmented Methods for Natural Language Processing
The Annual Conference of the Association for Computational Linguistics (**ACL**), 2022.

[9] Scalable Construction and Reasoning of Massive Knowledge Bases
The Annual Conference of the North American Chapter of the Association for Computational Linguistics (**NAACL**), 2018.

[8] Scalable Construction and Querying of Massive Knowledge Bases
27th International World Wide Web Conference (**WWW**), 2018.

[7] Construction and Querying of Large-scale Knowledge Bases
ACM Conference on Information and Knowledge Management (**CIKM**), 2017.

[6] Mining Entity-Relation-Attribute Structures from Massive Text Corpora
23th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD**), 2017.

[5] Building Structured Databases of Factual Knowledge from Massive Text Data
2017 International Conference on Management of Data (**SIGMOD**), 2017.

[4] Constructing Structured Information Networks from Massive Text Corpora
26th International World Wide Web Conference (**WWW**), 2017.

[3] Automatic Entity Recognition and Typing in Massive Text Data
2016 International Conference on Management of Data (**SIGMOD**), 2016.

[2] Automatic Entity Recognition and Typing in Massive Text Corpora
25th International World Wide Web Conference (**WWW**), 2016.

[1] Automatic Entity Recognition and Typing from Massive Text Corpora: A Phrase and Network Mining Approach
21th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD**), 2015.

Invited Talks

[25] Allen Institute for Artificial Intelligence, Mar 2022.

[24] AKBC Commonsense Workshop, Oct 2021.

[23] Intel, Sep 2021.

[23] Amazon Alexa NU Summit, April 2021.

[22] UIUC NLP Seminar, Mar 2021.

[21] Google X, Sep 2020.

[20] CMU LTI Colloquium, Feb 2020.

[19] UT Austin, Jan 2019.

[18] Bloomberg, May 2019.

[17] JP Morgan, May 2019.

[16] IBM Research, Almaden, May 2019.

[15] Stanford NLP Seminar, May 2019.

[14] The Web Conference, Apr 2018.

[13] Singapore Management University, Nov 2017.

[12] Stanford University, Aug 2017.

[11] Peking University, Computer Science Department, Jun 2017.

[10] Microsoft Research Asia, Jun 2017.

[9] Tsinghua University, Computer Science Department, Jun 2017.

[8] IBM Research Almaden, Jun 2017.

[7] Duke University, Computer Science Department, March 2017.

[6] University of California, Los Angeles, Computer Science Department, March 2017.

[5] UC Davis, Computer Science Department, March 2017.

[4] Georgia Tech, School of Computer Science, March 2017.

[3] University of Southern California, Computer Science, Feb. 2017.

[2] Google Research, August 2016.

[1] Microsoft Research, Redmond, August 2015.

Mentoring

PhD students advised at USC: Aaron Chan (CS, 2017-present, sole advisor; **Expected graduation date:** December of 2022; **Placement**: Full-time research scientist at Meta AI), Yuchen Lin (CS, 2018-present, sole advisor; **Expected graduation date:** December of 2022; **Placement**: Postdoc scholar at University of Washington Seattle and Allen Institute of Artificial Intelligence), Shushan Arakelyan (CS, 2017-present, sole advisor), Woojeong Jin (CS, 2018-present, sole advisor), Qinyuan Ye (CS, 2019-present, sole advisor), Pei Zou (CS, 2019-present, co-advised w/ Jay Pujara, primary advisor), Xisen Jin (CS, 2019-present, sole advisor), Jun Yan (CS, 2019-present, sole advisor), Peifeng Wang (CS, 2019-present, co-advised w/ Pedro Szekely, secondary co-advisor), Soumya Sanyal (CS, 2020-present, sole advisor), Jacob Bremerman (CS, 2021-present, co-advised w/ Jonathan May, primary advisor), Brihi Joshi (CS, 2021-present, sole advisor), Albert Xu (CS, 2021-present, co-advised w/ Robin Jia, primary advisor)

PhD thesis committee member at USC: Sahil Garg (CS, 2014), Yaguang Li (CS, 2014), Fenxiao Chen (EE, 2014), Fenxiao Chen (EE, 2014), Akira Matsui (CS, 2017), Yilei Zeng (CS, 2017), Alana Shine (CS, 2017), Yu-Chuan Yen (CS, 2017); Tae Jin Park (ECE, 2015); Nazgol Tavabi (CS, 2015), Minh Pham (CS 2018), Rujun Han (CS 2018), Yury Zemlyanskiy (CS 2018), Akira Matsui (CS 2017), Aida Davani (CS, 2017), Brendan Kennedy (CS, 2016), Chaoyang He (CS, 2018), Thamme Gowda (CS, 2017)

Master students advised at USC (sole advisor): Hongtao Lin (CS, 2017-2018), Yozen Liu (CS, 2017-2018), Junyi Du (CS, 2017-2019), Ouyu Lan (CS, 2018-2019), Dongho Lee (CS, 2018-2020), Seyeon Lee (CS, 2019-present), Suji Kim (CS, 2019-present), Rahul Khanna (CS, 2019-present), Ravi Kiran Selvam, (CS, 2020-2021), Mahak Agarwal (CS, 2020-2021), Akshen Kadakia (CS, 2021-2022), Juan Zha (CS, 2021-present), Ziyi Liu (CS, 2021-present), Junfeng Liu (CS, 2021-present)

Undergraduate students advised at USC: Hao Chen (CS, 2018-2019), Yu Cao (CS progressive degree, 2018-2019, *USC Undergraduate Research Award*), Jamin Chen (CS, 2019-2020), Priya Irukulapati (CS, 2019-2020), Kelly Dickson (CS, 2019-2020), Ryan Moreno (CS, 2019-2020, *USC Undergraduate Research Award*, *Best Undergraduate Thesis Award*), Boyuan Long (CS, 2020-2021), Raymond Cheung (CS, 2020-2021), Wardah Jabeen (CS, 2020-2021), Adeline Liou (CS, 2020-2021), Jiashu Xu (CS, 2020-2021), Jordan McWilliams (CS, 2020-2021), Lindsey Feng (CS, 2021-2022), Kangmin Tan (CS, 2021-2022)

Publications

Book

Mining Structures of Factual Knowledge from Text: An Effort-Light Approach
Xiang Ren and Jiawei Han
Morgan & Claypool Publishers, 2018

Refereed conference articles

[123] Unsupervised Cross-Task Generalization via Retrieval Augmentation
Bill Yuchen Lin, Kangmin Tan, Chris Miller, Beiwen Tian, **Xiang Ren**
Conference on Neural Information Processing Systems (**NeurIPS**), 2022

[122] NS3: Neuro-Symbolic Semantic Code Search
Shushan Arakelyan, Anna Hakhverdyan, Miltiadis Allamanis, Christophe Hauser, Luis Antonio Garcia, **Xiang Ren**
Conference on Neural Information Processing Systems (**NeurIPS**), 2022

[121] UniREx: A Unified Learning Framework for Language Model Rationale Extraction
Aaron Chan, Maziar Sanjabi, Lambert Mathias, Liang Tan, Shaoliang Nie, Xiaochang Peng, **Xiang Ren**, Hamed Firooz
International Conference on Machine Learning (**ICML**), 2022

[120] Lifelong Pretraining: Continually Adapting Language Models to Emerging Corpora
Xisen Jin, Dejiao Zhang, Henghui Zhu, Wei Xiao, Shang-Wen Li, Xiaokai Wei, Andrew Arnold, **Xiang Ren**
Conference of the North American Chapter of the Association for Computational Linguistics (**NAACL**), 2022

[119] Sparse Distillation: Speeding Up Text Classification by Using Bigger Models
Qinyuan Ye, Madian Khabsa, Mike Lewis, Sinong Wang, **Xiang Ren**, Aaron Jaech
Conference of the North American Chapter of the Association for Computational Linguistics (**NAACL**), 2022

[118] FedNLP: A Research Platform for Federated Learning in Natural Language Processing
Bill Yuchen Lin, Chaoyang He, Zihang Zeng, Hulin Wang, Yufen Huang, Mahdi Soltanolkotabi, **Xiang Ren**, Salman Avestimehr
Conference of the North American Chapter of the Association for Computational Linguistics (**Findings of NAACL**), 2022

[117] On the Robustness of Reading Comprehension Models to Entity Renaming
Jun Yan, Yang Xiao, Sagnik Mukherjee, Bill Yuchen Lin, Robin Jia, **Xiang Ren**
Conference of the North American Chapter of the Association for Computational Linguistics (**NAACL**), 2022

[116] NewsEdits: A Dataset of News Article Revision Histories and a Novel Document-Level Reasoning Challenge
Alexander Spangher, **Xiang Ren**, Jonathan May, Nanyun Peng
Conference of the North American Chapter of the Association for Computational Linguistics (**NAACL**), 2022.
NAACL Outstanding Paper Award

[115] FaiRR: Faithful and Robust Deductive Reasoning over Natural Language
Soumya Sanyal, Harman Singh, **Xiang Ren**
Annual Meeting of the Association for Computational Linguistics (**ACL**), 2022

[114] A Good Prompt Is Worth Millions of Parameters?: Low-resource Prompt-based Learning for Vision-Language Models
Woojeong Jin, Yu Cheng, Yelong Shen, Weizhu Chen, **Xiang Ren**
Annual Meeting of the Association for Computational Linguistics (**ACL**), 2022

[113] Fixing Errors in the Wild: On Continual Model Refinement in Out-of-Distribution Data Streams
Bill Yuchen Lin, Sida Wang, Xi Victoria Lin, Robin Jia, Lin Xiao, **Xiang Ren**, Scott Yih
Annual Meeting of the Association for Computational Linguistics (**ACL**), 2022

[112] Good Examples Make A Faster Learner: Simple Demonstration-based Learning for Low-resource NER
Dong-Ho Lee, Mahak Agarwal, Akshen Kadakia, Jay Pujara, **Xiang Ren**
Annual Meeting of the Association for Computational Linguistics (**ACL**), 2022

[111] Think Before You Speak: Using Self-talk to Generate Implicit Commonsense Knowledge for Response Generation
Pei Zhou, Karthik Gopalakrishnan, Behnam Hedayatnia, Seokhwan Kim, Jay Pujara, **Xiang Ren**, Yang Liu, Dilek Hakkani-Tur
Annual Meeting of the Association for Computational Linguistics (**ACL**), 2022

[110] Leveraging Visual Knowledge in Language Tasks: An Empirical Study on Intermediate Pre-training for Cross-Modal Knowledge Transfer
Woojeong Jin, Dong-Ho Lee, Chenguang Zhu, Jay Pujara, **Xiang Ren**
Annual Meeting of the Association for Computational Linguistics (**ACL**), 2022

[109] KG-FiD: Infusing Knowledge Graph in Fusion-in-Decoder for Open-Domain Question Answering
Donghan Yu, Chenguang Zhu, Yuwei Fang, Wenhao Yu, Shuohang Wang, Yichong Xu, **Xiang Ren**, Yiming Yang, Michael Zeng
Annual Meeting of the Association for Computational Linguistics (**ACL**), 2022

[108] Contextualized Scene Imagination for Generative Commonsense Reasoning
Peifeng Wang, Jonathan Zamora, Junfeng Liu, Filip Ilievski, Muhao Chen, **Xiang Ren**
International Conference on Representation Learning (**ICLR**), 2022

[107] Refining Language Models with Compositional Explanations
Huihan Yao, Ying Chen, Qinyuan Ye, Xisen Jin, **Xiang Ren**
Annual Conference on Neural Information Processing Systems (**NeurIPS**), 2021 (**Spotlight**, ac rate: 3%)

[106] SalKG: Learning From Knowledge Graph Explanations for Commonsense Reasoning
Aaron Chan, Boyuan Long, Jiashu Xu, Soumya Sanyal, Tanishq Gupta, **Xiang Ren**
Annual Conference on Neural Information Processing Systems (**NeurIPS**), 2021 (ac rate: 26%)

[105] Gradient Based Memory Editing for Task-Free Continual Learning
Xisen Jin, Arka Sadhu, Junyi Du, **Xiang Ren**
Annual Conference on Neural Information Processing Systems (**NeurIPS**), 2021 (ac rate: 26%)

[104] **CrossFit**: A Few-shot Learning Challenge for Cross-task Generalization in NLP
Qinyuan Ye, Yuchen Lin, **Xiang Ren**
The Conference on Empirical Methods in Natural Language Processing (**EMNLP**), 2021 (ac rate: 24.6%)

[103] **RICA**: Evaluating Robust Inference Capabilities Based on Commonsense Axioms
Pei Zhou, Rahul Khanna, Bill Yuchen Lin, Daniel Ho, Jay Pujara, **Xiang Ren**
The Conference on Empirical Methods in Natural Language Processing (**EMNLP**), 2021 (ac rate: 24.6%)

[102] *Learn Continually, Generalize Rapidly*: Lifelong Knowledge Accumulation for Few-shot Learning
Xisen Jin, Bill Yuchen Lin, Mohammad Rostami, **Xiang Ren**
The Conference on Empirical Methods in Natural Language Processing (**Findings of EMNLP**), 2021

[101] Discretized Integrated Gradients for Explaining Language Models
Soumya Sanyal, **Xiang Ren**
The Conference on Empirical Methods in Natural Language Processing (**EMNLP**), 2021 (ac rate: 24.6%)

[100] On the Influence of Masking Policies in Intermediate Pre-training
Qinyuan Ye, Belinda Z. Li, Sinong Wang, Benjamin Bolte, Hao Ma, Wen-tau Yih, **Xiang Ren**, Madian Khabsa
The Conference on Empirical Methods in Natural Language Processing (**EMNLP**), 2021 (ac rate: 24.6%)

[99] *Lawyers are Dishonest?* : Quantifying Representational Harms in Commonsense Knowledge Resources
Ninareh Mehrabi, Pei Zhou, Fred Morstatter, Jay Pujara, **Xiang Ren**, Aram Galstyan
The Conference on Empirical Methods in Natural Language Processing (**EMNLP**), 2021 (ac rate: 24.6%)

[98] Probing Commonsense Explanation in Dialogue Response Generation
Pei Zhou, Pegah Jandaghi, Hyundong Cho, Bill Yuchen Lin, Jay Pujara, **Xiang Ren**
The Conference on Empirical Methods in Natural Language Processing (**EMNLP**), 2021 (ac rate: 24.6%)

[97] ECONET: Effective Continual Pretraining of Language Models for Event Temporal Reasoning
Rujun Han, **Xiang Ren**, Nanyun Peng
The Conference on Empirical Methods in Natural Language Processing (**EMNLP**), 2021 (ac rate: 24.6%)

[96] Extract, Denoise and Enforce: Evaluating and Improving Concept Preservation for Text-to-Text Generation
Yuning Mao, Wenchang Ma, Deren Lei, Jiawei Han, **Xiang Ren**
The Conference on Empirical Methods in Natural Language Processing (**EMNLP**), 2021 (ac rate: 24.6%)

[95] Cross-Attention is All You Need: Adapting Pretrained Transformers for Machine Translation
Mozhdeh Gheini, **Xiang Ren**, Jonathan May
The Conference on Empirical Methods in Natural Language Processing (**EMNLP**), 2021 (ac rate: 24.6%)

[94] MSD: Saliency-aware Knowledge Distillation for Multimodal Understanding
Woojeong Jin, Maziar Sanjabi, Shaoliang Nie, Liang Tan, **Xiang Ren**, Hamed Firooz
The Conference on Empirical Methods in Natural Language Processing (**Findings of EMNLP**), 2021

[93] **RockNER**: Evaluating the Robustness of Named Entity Recognition with Natural Adversarial Attacks
Bill Yuchen Lin, Wenyang Gao, Jun Yan, Ryan Moreno, **Xiang Ren**
The Conference on Empirical Methods in Natural Language Processing (**EMNLP**), 2021 (ac rate: 24.6%)

[92] **ForecastQA**: A Question Answering Challenge for Event Forecasting
Woojeong Jin, Rahul Khanna, Suji Kim, Dong-Ho Lee, Fred Morstatter, Aram Galstyan, **Xiang Ren**
Annual Meeting of the Association for Computational Linguistics (**ACL**), 2021 (ac rate: 21.3%)

[91] Learning to Generate Task-specific Adapters from Task Description
Qinyuan Ye, **Xiang Ren**
Annual Meeting of the Association for Computational Linguistics (**ACL**), 2021 (ac rate: 21.3%)

[90] *Common Sense Beyond English*: Evaluating and Improving Multilingual Language Models for Common Sense Reasoning
Bill Yuchen Lin, Seyeon Lee, Xiaoyang Qiao, **Xiang Ren**
Annual Meeting of the Association for Computational Linguistics (**ACL**), 2021 (ac rate: 21.3%)

[89] AdaTag: Multi-Attribute Value Extraction from Product Profiles with Adaptive Decoding
Jun Yan, Nasser Zalmout, Yan Liang, Christan Grant, **Xiang Ren**, Xin Luna Dong
Annual Meeting of the Association for Computational Linguistics (**ACL**), 2021 (ac rate: 21.3%)

[88] Learning Contextualized Knowledge Structures for Commonsense Reasoning
Jun Yan, Mrigank Raman, Aaron Chan, Tianyu Zhang, Ryan Rossi, Handong Zhao, Sungchul Kim, Nedim Lipka, **Xiang Ren**
Annual Meeting of the Association for Computational Linguistics (**Findings of ACL**), 2021

[88] **RiddleSense**: A Challenge Dataset for Answering Riddle-Style Commonsense Questions
Bill Yuchen Lin, Ziyi Wu, Yichi Yang, Dong-Ho Lee, **Xiang Ren**
Annual Meeting of the Association for Computational Linguistics (**Findings of ACL**), 2021

[87] Do Language Models Perform Generalizable Commonsense Inference?
Peifeng Wang, Filip Ilievski, Muhao Chen, **Xiang Ren**
Annual Meeting of the Association for Computational Linguistics (**Findings of ACL**), 2021

[86] Semi-Automated Protocol Disambiguation and Code Generation
Jane Yen, Tamás Lévai, Qinyuan Ye, **Xiang Ren**, Ramesh Govindan, Barath Raghavan
Annual conference of ACM SIGCOMM (**SIGCOMM**), 2021

[85] Pre-training Text-to-Text Transformers for Concept-centric Common Sense
Wangchunshu Zhou, Dong-Ho Lee, Ravi Kiran Selvam, Seyeon Lee, Bill Yuchen Lin, **Xiang Ren**
International Conference on Representation Learning (**ICLR**), 2021

[84] Learning to Deceive Knowledge Graph Augmented Models via Targeted Perturbation
Mrigank Raman, Siddhant Agarwal, Peifeng Wang, Aaron Chan, Hansen Wang, Sungchul Kim, Ryan Rossi, Handong Zhao, Nedim Lipka, **Xiang Ren**
International Conference on Representation Learning (**ICLR**), 2021
Best Paper Award Runner-up at NeurIPS 2020 KR2ML Workshop

[83] Differentiable Open-Ended Commonsense Reasoning
Bill Yuchen Lin, Haitian Sun, Bhuwan Dhingra, Manzil Zaheer, **Xiang Ren**, William W. Cohen
Conference of the North American Chapter of the Association for Computational Linguistics (**NAACL**), 2021 (ac rate: 26%)

[82] On Transferability of Bias Mitigation Effects in Language Model Fine-Tuning
Xisen Jin, Francesco Barbieri, Brendan Kennedy, Aida Mostafazadeh Davani, Leonardo Neves, **Xiang Ren**
Conference of the North American Chapter of the Association for Computational Linguistics (**NAACL**), 2021 (ac rate: 26%)

[81] X-METRA-ADA: Cross-lingual Meta-Transfer learning Adaptation to Natural Language Understanding
Meryem M'hamdi, Doo Soon Kim, Franck Dernoncourt, Trung Bui, **Xiang Ren**, Jonathan May
Conference of the North American Chapter of the Association for Computational Linguistics (**NAACL**), 2021 (ac rate: 26%)

[80] TaxoClass: Hierarchical Multi-Label Text Classification Using Only Class Names
Jiaming Shen, Wenda Qiu, Yu Meng, Jingbo Shang, **Xiang Ren**, Jiawei Han
Conference of the North American Chapter of the Association for Computational Linguistics (**NAACL**), 2021 (ac rate: 26%)

[79] IsoBN: Fine-Tuning BERT with Isotropic Batch Normalization
Wenxuan Zhou, Bill Yuchen Lin, **Xiang Ren**
The AAAI Conference on Artificial Intelligence (**AAAI**), 2021

[78] Time-Series Event Prediction with Evolutionary State Graph
Wenjie Hu, Yang Yang, Ziqiang Cheng, Carl Yang, **Xiang Ren**
ACM International Web Search and Data Mining conference (**WSDM**), 2021

[77] Visually Grounded Continual Learning of Compositional Phrases
Xisen Jin, Junyi Du, Arka Sadhu, Ram Nevatia, **Xiang Ren**
The 2020 Conference on Empirical Methods in Natural Language Processing **EMNLP**), 2020 (ac rate: 22.4%)

[76] Scalable Multi-Hop Relational Reasoning for Knowledge-Aware Question Answering
Yanlin Feng, Xinyue Chen, Bill Yuchen Lin, Peifeng Wang, Jun Yan, **Xiang Ren**
The 2020 Conference on Empirical Methods in Natural Language Processing **EMNLP**), 2020 (ac rate: 22.4%)

[75] Recurrent Event Network: Autoregressive Structure Inference over Temporal Knowledge Graphs
Woojeong Jin, Meng Qu, Xisen Jin, **Xiang Ren**
The 2020 Conference on Empirical Methods in Natural Language Processing **EMNLP**), 2020 (ac rate: 22.4%)

[74] Birds have four legs?! NumerSense: Probing Numerical Commonsense Knowledge of Pre-trained Language Models
Bill Yuchen Lin, Seyeon Lee, Rahul Khanna, **Xiang Ren**
The 2020 Conference on Empirical Methods in Natural Language Processing **EMNLP**), 2020 (ac rate: 22.4%)

[73] Learning Collaborative Agents with Rule Guidance for Knowledge Graph Reasoning
Deren Lei, Gangrong Jiang, Xiaotao Gu, Kexuan Sun, Yuning Mao, **Xiang Ren**
The 2020 Conference on Empirical Methods in Natural Language Processing **EMNLP**), 2020 (ac rate: 22.4%)

[72] Multi-document Summarization with Maximal Marginal Relevance-guided Reinforcement Learning
Yuning Mao, Yanru Qu, Yiqing Xie, **Xiang Ren**, Jiawei Han
The 2020 Conference on Empirical Methods in Natural Language Processing **EMNLP**), 2020 (ac rate: 22.4%)

[71] SynSetExpan: An Iterative Framework for Joint Entity Set Expansion and Synonym Discovery
Jiaming Shen, Wenda Qiu, Jingbo Shang, Michelle Vanni, **Xiang Ren**, Jiawei Han
The 2020 Conference on Empirical Methods in Natural Language Processing **EMNLP**), 2020 (ac rate: 22.4%)

[70] Teaching Machine Comprehension with Compositional Explanations
Qinyuan Ye, Xiao Huang, **Xiang Ren**
The 2020 Conference on Empirical Methods in Natural Language Processing (**EMNLP** Findings), 2020

[69] CommonGen: A Constrained Text Generation Challenge for Generative Commonsense Reasoning
Bill Yuchen Lin, Ming Shen, Pei Zhou, Chandra Bhagavatula, Yejin Choi, **Xiang Ren**
The 2020 Conference on Empirical Methods in Natural Language Processing (**EMNLP** Findings), 2020

[68] RICA: Evaluating Robust Inference Capabilities Based on Commonsense Axioms
Pei Zhou, Rahul Khanna, Bill Yuchen Lin, Daniel Ho, Jay Pujara, **Xiang Ren**
The 2020 Conference on Empirical Methods in Natural Language Processing (**EMNLP** Findings), 2020

[67] Connecting the Dots: A Knowledgeable Path Generator for Commonsense Question Answering
Peifeng Wang, Nanyun Peng, Pedro Szekely, **Xiang Ren**
The 2020 Conference on Empirical Methods in Natural Language Processing (**EMNLP** Findings), 2020

[66] Will this Idea Spread Beyond Academia? Understanding Knowledge Transfer of Scientific Concepts across Text Corpora
Hancheng Cao, Mengjie Cheng, Zhepeng Cen, Daniel McFarland, **Xiang Ren**
The 2020 Conference on Empirical Methods in Natural Language Processing (**EMNLP** Findings), 2020

[65] Learning to Contextually Aggregate Multi-Source Supervision for Sequence Labeling
Ouyu Lan*, Xiao Huang*, Bill Yuchen Lin, He Jiang, Liyuan Liu, X. Ren
Annual Meeting of the Association for Computational Linguistics **ACL**), 2020 (ac rate: 22.7%)

[64] Facet-Aware Evaluation for Extractive Summarization
Yuning Mao, Liyuan Liu, Qi Zhu, X. Ren, Jiawei Han
Annual Meeting of the Association for Computational Linguistics **ACL**), 2020 (ac rate: 22.7%)

[63] TriggerNER: Learning with Entity Triggers as Explanation for Named Entity Recognition
Bill Yuchen Lin, Dongho Lee, Ming Shen, Xiao Huang, Ryan Moreno, Prashant Shiralkar, X. Ren.
Annual Meeting of the Association for Computational Linguistics **ACL**), 2020 (ac rate: 22.7%)

[62] Contextualizing Hate Speech Classifiers with Post-hoc Explanation
Brendan Kennedy*, Xisen Jin*, Aida Mostafazadeh Davani, Morteza Dehghani, X. Ren.
Annual Meeting of the Association for Computational Linguistics **ACL**), 2020 (ac rate: 22.7%)

[61] Temporal Attribute Prediction via Joint Modeling of Multi-Relational Structure Evolution
Sankalp Garg*, Navodita Sharma*, Woojeong Jin, **Xiang Ren**.
International Joint Conference on Artificial Intelligence (**IJCAI**), 2020

[60] Alleviate Dataset Shift Problem in Fine-grained Entity Typing with Virtual Adversarial Training
Haochen Shi, Siliang Tang, Xiaotao Gu, Bo Chen, **Xiang Ren**.
International Joint Conference on Artificial Intelligence (**IJCAI**), 2020

[59] Learning from Explanations with Neural Execution Tree
Ziqi Wang, Yujia Qin, Wenxuan Zhou, Jun Yan, Qinyuan Ye, Leonardo Neves, Zhiyuan Liu, **Xiang Ren**.
International Conference on Representation Learning (**ICLR**), 2020 (ac rate: 26.5%)

[58] Towards Hierarchical Importance Attribution: Explaining Compositional Semantics for Neural Sequence Models
Xisen Jin, Junyi Du, Zhongyu Wei, Xiangyang Xue, **Xiang Ren**.
International Conference on Representation Learning (**ICLR**), 2020 (**Spotlight**)

[57] NERO: A Neural Rule Grounding Framework for Label-Efficient Relation Extraction
Wenxuan Zhou, Hongtao Lin, Bill Yuchen Lin, Ziqi Wang, Junyi Du, Leonardo Neves, **Xiang Ren**.
The Web Conference (**WWW**), 2020. **Runner-up of Best Paper Award**

[56] KagNet: Learning to Answer Commonsense Questions with Knowledge-Aware Graph Networks
Bill Yuchen Lin, Xinyue Chen, Jamin Chen, **Xiang Ren**.
Conference on Empirical Methods in Natural Language Processing **EMNLP**), 2019 (ac rate: 24.6%)

[55] Collaborative Policy Learning for Open Knowledge Graph Reasoning
Cong Fu, Tong Chen, Meng Qu, Woojeong Jin, **Xiang Ren**.
Conference on Empirical Methods in Natural Language Processing **EMNLP**), 2019 (ac rate: 24.6%)

[54] Looking Beyond Label Noise: Shifted Label Distribution Matters in Distantly Supervised Relation Extraction
Qinyuan Ye, Liyuan Liu, Maosen Zhang, **Xiang Ren**.
Conference on Empirical Methods in Natural Language Processing **EMNLP**), 2019 (ac rate: 24.6%)

[53] Learning Dynamic Context Augmentation for Global Entity Linking
Xiyuan Yang, Xiaotao Gu, Sheng Lin, Siliang Tang, Yueting Zhuang, Fei Wu, Zhigang Chen, Guoping Hu, **Xiang Ren**.
Conference on Empirical Methods in Natural Language Processing **EMNLP**), 2019 (ac rate: 24.6%)

[52] Hierarchical Text Classification with Reinforced Label Assignment
Yuning Mao, Jingjing Tian, Jiawei Han, **Xiang Ren**.
Conference on Empirical Methods in Natural Language Processing **EMNLP**), 2019 (ac rate: 24.6%)

[51] HMEAE: Hierarchical Modular Event Argument Extraction
Xiaozhi Wang, Ziqi Wang, Xu Han, Zhiyuan Liu, Juanzi Li, Peng Li, Maosong Sun, Jie Zhou, **Xiang Ren**.
Conference on Empirical Methods in Natural Language Processing **EMNLP**), 2019 (ac rate: 24.6%)

[50] Reporting the Unreported: Event Extraction for Analyzing the Local Representation of Hate Crimes
A. M. Davani, L. Yeh, M. Atari, B. Kennedy, G. P. Wightman, E. Gonzalez, N. Delong, R. Bhatia, A. Mirinjian, X. Ren and M. Dehghani.
Conference on Empirical Methods in Natural Language Processing **EMNLP**), 2019 (ac rate: 24.6%)

[49] Eliciting Knowledge from Experts: Automatic Transcript Parsing for Cognitive Task Analysis
J. Du, H. Jiang, J. Shen, X. Ren.
Annual Meeting of the Association for Computational Linguistics (**ACL**), 2019

[48] Improving Distantly-supervised Entity Typing with Compact Latent Space Clustering
B. Chen, X. Gu, Y. Hu, S. Tang, Y. Zhuang, X. Ren.
2019 Conference of the North American Chapter of the Association for Computational Linguistics (**NAACL**), 2019

[47] Posterior-regularized REINFORCE for Instance Selection in Distant Supervision
Q. Zhang, S. Tang, F. Wu, S. Pu, Y. Zhuang, X. Ren.
2019 Conference of the North American Chapter of the Association for Computational Linguistics (**NAACL**), 2019

[46] Characterizing and Forecasting User Engagement with In-App Action Graphs: A Case Study of Snapchat
Y. Liu, X. Shi, L. Pierce, X. Ren.
ACM SIGKDD International Conference on Knowledge (**KDD**), 2019

[45] AtSNE: Efficient and Robust Visualization on GPU through Hierarchical Optimization
C. Fu, Y. Zhang, D. Cai, X. Ren.
ACM SIGKDD International Conference on Knowledge (**KDD**), 2019

[44] Mining Entity Synonyms with Efficient Neural Set Generation
J. Shen, R. Lyu, X. Ren, M. Vanni, B. Sadler, J. Han.
The AAAI Conference on Artificial Intelligence (**AAAI**), 2019

[43] Cross-relation Cross-bag Attention for Distantly-supervised Relation Extraction
Y. Yuan, L. Liu, S. Tang, Z. Zhang, Y. Zhuang, F. Wu, X. Ren.
The AAAI Conference on Artificial Intelligence (**AAAI**), 2019

[42] Learning Dual Retrieval Module for Semi-supervised Relation Extraction
Hongtao Lin, Jun Yan, Qu Meng, **Xiang Ren**.
The Web Conference (**WWW**), 2019

[41] Jointly Learning Explainable Rules for Recommendation with Knowledge Graph
Weizhi Ma, Min Zhang, Yue Cao, Woojeong Jin, Chenyang Wang, Yiqun Liu, Shaoping Ma, **Xiang Ren**.
The Web Conference (**WWW**), 2019

[40] Integrating Local Context and Global Cohesiveness for Open Information Extraction
Qi Zhu, **Xiang Ren**, Jingbo Shang, Yu Zhang, Ahmed El-Kishky, Jiawei Han.
ACM International Conference on Web Search and Data Mining (**WSDM**), 2019

[39] Open-Schema Event Profiling for Massive News Corpora
Quan Yuan, **Xiang Ren**, Wenqi He, Chao Zhang, Xinhe Geng, Lifu Huang, Heng Ji, Chin-Yew Lin, Jiawei Han.
ACM Conference on Information and Knowledge Management (**CIKM**), 2018

[38] Hierarchical Graph Representation Learning with Differentiable Pooling
Rex Ying, Jiaxuan You, Chris Morris, **Xiang Ren**, William L. Hamilton, Jure Leskovec
Annual Conference on Neural Information Processing Systems (**NIPS**), 2018

[37] Efficient Contextualized Representation: Language Model Pruning for Sequence Labeling
Lucas Liu, **Xiang Ren**, Jingbo Shang, Jian Peng, Jiawei Han
Conference on Empirical Methods in Natural Language Processing (**EMNLP**), 2018

[36] Learning Named Entity Tagger using Domain-Specific Dictionary
Jingbo Shang, Lucas liu, Xiaotao Gu, **Xiang Ren**, Teng Ren, Jiawei Han
Conference on Empirical Methods in Natural Language Processing (**EMNLP**), 2018

[35] GraphRNN: A Deep Generative Model for Graphs
Jiaxuan You, Rex Ying, **Xiang Ren**, William L. Hamilton, Jure Leskovec
International Conference on Machine Learning (**ICML**), 2018 (**Spotlight**)

[34] End-to-End Reinforcement Learning for Automatic Taxonomy Induction
Yuning Mao, **Xiang Ren**, Jiaming Shen, Xiaotao Gu, Jiawei Han
Annual Meeting of the Association for Computational Linguistics (**ACL**), 2018

[33] HiExpan: Task-Guided Taxonomy Construction by Hierarchical Tree Expansion
J. Shen, Z. Wu, D. Lei, C. Zhang, <u>X. Ren</u>, M. T. Vanni, B. M. Sadler, J. Han.
ACM SIGKDD International Conference on Knowledge (**KDD**), 2018

[32] Weakly-supervised Relation Extraction by Pattern-enhanced Embedding Learning
Meng Qu, **Xiang Ren**, Yu Zhang, Jiawei Han
The Web Conference (**WWW**), 2018

[31] Open Information Extraction with Global Structure Constraints
Qi Zhu, **Xiang Ren**, Jingbo Shang, Yu Zhang, Frank Xu, Jiawei Han
The Web Conference (**WWW**), poster paper, 2018
Runner-up of Best Poster Award

[30] Indirect Supervision for Relation Extraction using Question-Answer Pairs
Ellen Wu, **Xiang Ren**, Frank Xu, Ji Li, Jiawei Han
ACM International Conference on Web Search and Data Mining (**WSDM**), 2018

[29] Empowering Sequence Labeling with Task-Aware Neural Language Model
L. Liu, J. Shang, <u>X. Ren</u>, F. Xu, H. Gui, J. Peng, J. Han.
The AAAI Conference on Artificial Intelligence (**AAAI**), 2018
Open-sourced software received over 350 stars on Github as of May 2018

[28] Dynamic Network Embedding by Modeling Triadic Closure Process
Lekui Zhou, Yang Yang, **Xiang Ren**, Fei Wu, Yueting Zhuang
The AAAI Conference on Artificial Intelligence (**AAAI**), 2018

[27] Heterogeneous Supervision for Relation Extraction: A Representation Learning Approach
L. Liu, <u>X. Ren</u>, Q. Zhu, S. Zhi, H. Gui, H. Ji, J. Han.
2017 Conference on Empirical Methods in Natural Language Processing (**EMNLP**), 2017

[26] An Attention-based Collaboration Framework for Multi-View Network Representation Learning
M. Qu, J. Tang, J. Shang, <u>X. Ren</u>, M. Zhang, J. Han
26th ACM International on Conference on Information and Knowledge Management (**CIKM**), 2017

[25] Automatic Synonym Discovery with Knowledge Bases
M. Qu, <u>X. Ren</u>, J. Han
23nd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD**), 2017

[24] MetaPAD: Meta Pattern-driven Attribute Discovery in Massive Text Corpora
M. Jiang, J. Shang, T. Cassidy, <u>X. Ren</u>, L. M. Kaplan, T. P. Hanratty, J. Han
23nd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD**), 2017

[23] CoType: Joint Extraction of Typed Entities and Relations with Knowledge Bases
<u>X. Ren</u>, Z. Qiu, W. He, M. Qu, C. R. Voss, H. Ji, T .F.Abdelzaher, J. Han
26th International Conference on World Wide Web (**WWW**), 2017.

[22] Comparative Document Analysis for Large Text Corpora
<u>X. Ren</u>, Y. Lv, K. Wang, J. Han.
10th ACM International Conference on Web Search and Data Mining (**WSDM**), 2017

[21] AFET: Automatic Fine-Grained Entity Typing by Hierarchical Partial-Label Embedding
<u>X. Ren</u>, W. He, M. Qu, H. Ji, C. R. Voss, J. Han.
2016 Conference on Empirical Methods in Natural Language Processing (**EMNLP**), 2016, Pages 1369-1378

[20] Label Noise Reduction in Entity Typing by Heterogeneous Partial-Label Embedding
<u>X. Ren</u>, W. He, M. Qu, H. Ji, C. R. Voss, J. Han.
22nd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD**), 2016, Pages 1825-1834

[19] FacetGist: Collective Extraction of Document Facets in Large Technical Corpora
T. A. Siddiqui*, <u>X. Ren</u>*, A. Parameswaran, J. Han
25th ACM International on Conference on Information and Knowledge Management (**CIKM**), 2016, Pages 871-880

[18] Representing Documents via Latent Keyphrase Inference
J. Liu, <u>X. Ren</u>, J. Shang, T. Cassidy, C. R. Voss, J. Han
25th International Conference on World Wide Web (**WWW**), 2016, Pages 1057-1067

[17] Precision Matrix Estimation in High Dimensional Gaussian Graphical Models with Faster Rates
L. Wang, <u>X. Ren</u>, Q. Gu
19th International Conference on Artificial Intelligence and Statistics (**AISTATS**), 2016, Pages 177–185

[16] ClusType: Effective Entity Recognition and Typing by Relation Phrase-Based Clustering
X. Ren, A. El-Kishky, C. Wang, F. Tao, C. R. Voss, H. Ji, J. Han
21st ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD**), 2015, Pages 995-1004

[15] Synonym Discovery for Structured Entities on Heterogeneous Graphs
X. Ren, and T. Cheng
24th International Conference on World Wide Web (**WWW**), 2015, Pages 443-453

[14] Mining Quality Phrases from Massive Text Corpora
J. Liu, J. Shang, C. Wang, X. Ren, J. Han
2015 ACM SIGMOD International Conference on Management of Data (**SIGMOD**), 2015, Pages 1729-1744
Won grand prize of Yelp Data Challenges in 2015.

[13] ClusCite: Effective Citation Recommendation by Information Network-Based Clustering
X. Ren, J. Liu, X. Yu, U. Khandelwal, Q. Gu, L. Wang, J. Han
20th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD**), 2014, Pages 821-830

[12] Heterogeneous Graph-Based Intent Learning from Queries, Web Pages and Wikipedia Concepts
X. Ren, Y. Wang, X. Yu, J. Yan, Z. Chen, J. Han
7th ACM International Conference on Web Search and Data Mining (**WSDM**), 2014, Pages 23-32

[11] Personalized Entity Recommendation: A Heterogeneous Information Network Approach
X. Yu, X. Ren, Y. Sun, Q. Gu, B. Sturt, U. Khandelwal, B. Norick, J. Han
7th ACM International Conference on Web Search and Data Mining (**WSDM**), 2014, Pages 283-292
Most cited paper in WSDM 2014

[10] Automatic Construction and Ranking of Topical Keyphrases on Collections of Short Documents
M. Danilevsky, C. Wang, N. Desai, X. Ren, J. Guo, J. Han
2014 SIAM International Conference on Data Mining (**SDM**), 2014, Pages 398-406

[9] Semantic Frame-Based Document Representation for Comparable Corpora
H. Kim, X. Ren, Y. Sun, C. Wang, J. Han
IEEE 13th International Conference on Data Mining (**ICDM**), 2013, Pages 350-359
(Acceptance rate: 94/809 = 11.6%)

[8] HeteRec: Entity Recommendation in Heterogeneous Information Networks with Implicit User Feedback
X. Yu, X. Ren, Y. Sun, B. Sturt, U. Khandelwal, Q. Gu, B. Norick, J. Han
7th ACM Recommender Systems Conference (**RecSys**), 2013, Pages 347-350

[7] Repairing Sparse Low Rank Texture
X. Liang, X. Ren, Z. Zhang, Y. Ma
14th European Conference on Computer Vision (**ECCV**), 2012, Pages 482-495

[6] A Non-convex Relaxation Approach to Sparse Dictionary Learning
J. Shi*, X. Ren*, G. Dai, J. Wang, Z. Zhang
2011 IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2011, Pages 1809-1816

Refereed journal articles

[5] Automated Phrase Mining from Massive Text Corpora
J. Shang, J. Liu, M. Jiang, X. Ren, J. Han
IEEE Transactions on Knowledge and Data Engineering (**TKDE**), 2018 (**IF: 8.78**)

[4] Linearized Alternating Direction Method with Adaptive Penalty and Warm Starts for Fast Solving Transform Invariant Low-Rank Textures
X. Ren and Z. Lin
International Journal of Computer Vision (**IJCV**), Volume 104 Issue 1, August 2013, Pages 1-14 (**IF: 13.21**)

Other scholarly publications

[3] LEAN-LIFE: A Label-Efficient Annotation Framework Towards Learning from Annotator Explanation
D. Lee, R. Khanna, B. Lin, S. Lee, Q. Ye, E. Boschee, L. Neves, X. Ren
2020 Annual Meeting of the Association for Computational Linguistics (**ACL**) Demo track, 2020

[2] LifeNet: A Structured Network-Based Knowledge Exploration and Analytics System for Life Sciences
X. Ren, J. Shen, M. Qu, X. Wang, Z. Wu, Q. Zhu, M. Jiang, F. Tao, S. Sinha, D. Liem, P. Ping, R. Weinshilboum, J. Han
2017 Annual Meeting of the Association for Computational Linguistics (**ACL**) Demo track, 2017

[1] Cross-media Event Extraction and Recommendation
D. Lu, C. R. Voss, F. Tao, X. Ren, R. Guan, R. Korolov, T. Zhang, D. Wang, H. Li, T. Cassidy, H. Ji, S, Chang, J. Han, W. Wallace, J. Hendler, M. Si, L. Kaplan
2016 Conference of the North American Chapter of the Association for Computational Linguistics (**NAACL**) Demo track, 2016