Bingsheng "Arthur" Yao

5th-year Ph.D. Student in Computer Science

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Research Focus

My research interests lie at the intersection of **NLP** and **HCI**. My primary focus is to **actively enhance machine reasoning with human rationales**. I further commit to investigate and address **real-world human needs** across a range of professional domains, with the ultimate goal of fostering **human-centered AI collaborations**.

Education

Ph.D. in Computer Science (Advisor: Prof. Jim Hendler)
Rensselaer Polytechnic Institute
📅 Sep 2019 - present

MS in Information Technology and Web Science
Rensselaer Polytechnic Institute
📅 Sep 2018 - May 2019

BS in Computer Science
Rensselaer Polytechnic Institute
📅 Sep 2014 - May 2018

Professional Experience

Postdoctoral Scholar (PI: Prof. Dakuo Wang)
📅 Starting in early 2024

Northeastern University

Artificial Intelligence Research Collaboration Fellowship
📅 Aug 2022 - Aug 2023

Rensselaer Polytechnic Institute   IBM Research

- Proposed a novel metric upon the Simulatability Score to faithfully evaluate human-annotated natural language explanations   [P.5]
- Designed a novel Active Learning framework and a similarity-based data selector for natural language explanations generation   [P.7]
- Facilitated LLM's few-shot in-context demonstration weak-supervision and selection   [P.17]

Summer Research Externship
📅 May 2022 - Aug 2022

Rensselaer Polytechnic Institute   IBM Research

- Implemented a novel QA-pair Generation (QAG) pipeline with a heuristics-based answer extraction module, a BART QG model, and a DistilBERT ranking module.   [P.2]
- Proposed FairytaleQA, a large-scale, experts-annotated dataset with 10,580 QA-pairs on 278 fairytale stories, targeting children's reading comprehension   [P.3]
- Developed an interactive story-telling web application built upon our QAG system with a user study on 12 pairs of parents and children   [P.4]

Honors

Member of **Upsilon Pi Epsilon**
The International Honor Society for the Computing and Information Disciplines
📅 Sep 2019 - present

Member of **Gamma Nu Eta**
The National Information Technology Honor Society
📅 Sep 2019 - present

Publications (Peer-Reviewed)

[P.7]   **Beyond Labels: Empowering Human with Natural Language Explanations through a Novel Active-Learning Architecture**
Bingsheng Yao, Ishan Jindal, Lucian Popa, Yannis Katsis, Sayan Ghosh, Lihong He, Yuxuan Lu, Shashank Srivastava, James Hendler, Dakuo Wang
EMNLP 2023 Findings

[P.6]   **`Don't Get Too Technical with Me': A Discourse Structure-Based Framework for Automatic Science Journalism**
Ronald Cardenas, *Bingsheng Yao*, Dakuo Wang, Yufang Hou
EMNLP 2023

[P.5]   **Are Human Explanations Always Helpful? Towards Objective Evaluation of Human Natural Language Explanations**
Bingsheng Yao, Prithviraj Sen, Lucian Popa, James Hendler, Dakuo Wang
ACL 2023 Oral Presentation

[P.4]   **StoryBuddy: A Human-AI Collaborative Chatbot for Parent-Child Interactive Storytelling with Flexible Parental Involvement**
Zheng Zhang*, Ying Xu*, Yanhao Wang, *Bingsheng Yao*, Daniel Ritchie, Tongshuang Wu, Mo Yu, Dakuo Wang, Toby Jia-Jun Li
CHI 2022 - Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems

[P.3]   **Fantastic Questions and Where to Find Them: FairytaleQA -- An Authentic Dataset for Narrative Comprehension**
Ying Xu*, Dakuo Wang*, Mo Yu*, Daniel Ritchie*, *Bingsheng Yao*, Tongshuang Wu, Zheng Zhang, Toby Jia-Jun Li, Nora Bradford, Branda Sun, Tran Bao Hoang, Yisi Sang, Yufang Hou, Xiaojuan Ma, Diyi Yang, Nanyun Peng, Zhou Yu, Mark Warschauer
ACL 2022 - Proceedings of the 60th Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers)

[P.2]   **It is AI's Turn to Ask Humans a Question: Question-Answer Pair Generation for Children's Story Books**
Bingsheng Yao, Dakuo Wang*, Tongshuang Wu, Tran Hoang, Branda Sun, Toby Jia-Jun Li, Mo Yu, Ying Xu
ACL 2022 - Proceedings of the 60th Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers)

[J.1]   **Narrative Question Answering with Cutting-Edge Open-Domain QA Techniques: A Comprehensive Study**
Xiangyang Mou*, Chenghao Yang*, Mo Yu*, *Bingsheng Yao*, Xiaoxiao Guo, Saloni Potdar, Hui Su
TACL 2021 - Transactions of the Association for Computational Linguistics, Volume 9

[P.1]   **Trust in AutoML: exploring information needs for establishing trust in automated machine learning systems**
Jaimie Drozdal, Justin Weisz, Dakuo Wang, Gaurav Dass, *Bingsheng Yao*, Changruo Zhao, Michael Muller, Lin Ju, Hui Su
IUI 2020 - Proceedings of the 25th International Conference on Intelligent User Interfaces

Publications (In Submission)

[P.17] **More Samples or More Prompt Inputs? Exploring Effective In-Context Sampling for LLM Few-Shot Prompt Engineering**
Bingsheng Yao, Guiming Chen, Ruishi Zou, Yuxuan Lu, Jiachen Li, Shao Zhang, Sijia Liu, James Hendler, Dakuo Wang
In Submission

[P.16] **Human Still Wins over LLM: An Empirical Study of Active Learning on Domain-Specific Annotation Tasks**
Yuxuan Lu, *Bingsheng Yao*, Shao Zhang, Yun Wang, Peng Zhang, Tun Lu, Toby Jia-Jun Li, Dakuo Wang
In Submission

[P.15] **"Mango Mango, How to Let The Lettuce Dry Without A Spinner?'': Exploring User Perceptions of Using An LLM-Based Conversational Assistant Toward Cooking Partner**
Szeyi Chan, Jiachen Li, *Bingsheng Yao*, Amama Mahmood, Chien-Ming Huang, Holly Jimison, Elizabeth D Mynatt, Dakuo Wang
In Submission to CHI 2024 - Under Review

[P.14] **LLM-Powered Conversational Voice Assistants: Interaction Patterns, Opportunities, Challenges, and Design Guidelines**
Amama Mahmood, Junxiang Wang, *Bingsheng Yao*, Dakuo Wang, Chien-Ming Huang
In Submission to CHI 2024 - Under Review

[P.13] **"It's a Fair Game", or Is It? Examining How Users Navigate Disclosure Risks and Benefits When Using LLM-Based Conversational Agents**
Zhiping Zhang, Michelle Jia, Hao-Ping (Hank) Lee, *Bingsheng Yao*, Sauvik Das, Ada Lerner, Dakuo Wang, Tianshi Li
In Submission to CHI 2024 - Under Review

[P.11] **Rethinking Human-AI Collaboration in Complex Medical Decision Making: A Case Study in Sepsis Diagnosis**
Shao Zhang, Jianing Yu, Xuhai Xu, Changchang Yin, Yuxuan Lu, *Bingsheng Yao*, Melanie Tory, Lace M. Padilla, Jeffrey Caterino, Ping Zhang, Dakuo Wang
In Submission to CHI 2024 - Under Review

[P.10] **Talk2Care: Facilitating Asynchronous Patient-Provider Communication with Large-Language-Model**
Ziqi Yang, Xuhai Xu, *Bingsheng Yao*, Shao Zhang, Ethan Rogers, Stephen Intille, Nawar Shara, Dakuo Wang
In Submission to CHI 2024 - Under Review

[P.9] **Mental-LLM: Leveraging Large Language Models for Mental Health Prediction via Online Text Data**
Xuhai Xu, *Bingsheng Yao*, Yuanzhe Dong, Saadia Gabriel, Hong Yu, James Hendler, Marzyeh Ghassemi, Anind K Dey, Dakuo Wang
In Submission to IMWUT 2023 - Under Review

[P.8] **FairytaleCQA: A Dataset for Narrative Comprehension with External Commonsense Knowledge for Children Education**
Jiaju Chen, Yuxuan Lu, Shao Zhang, *Bingsheng Yao*, Yuanzhe Dong, Ying Xu, Yunyao Li, Dakuo Wang, Yuling Sun
In Submission