

AI + Knowledge: Unleashing the Power of Domain Knowledge for Advanced Artificial Intelligence



Invited Speaker

Zijun Cui

Michigan State University

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Biography

Zijun Cui is an Assistant Professor at Michigan State University. Prior to that, she was a postdoctoral research fellow at the University of Southern California. She received the Ph.D. degree from the Department of ECSE at Rensselaer Polytechnic Institute in 2022. Dr. Cui has worked on deep learning, computer vision, and probabilistic graphical models. Her research interests lie in leveraging domain knowledge to advance deep learning, include physics-informed deep learning and neural-symbolic integration. Her research applications include computer vision, healthcare, and natural language processing. Her work appears in conferences such as CVPR, NeurIPS, AAAI, IJCAI, UAI, AISTATS, MICCAI and journals such as IEEE Transaction on Neural Networks and Learning Systems and npj Digital Medicine. From 2019 to 2022, she was awarded the Rensselaer-IBM Artificial Intelligence Research Collaboration Scholarship. Learn more about Dr. Cui at <https://zijunjl.github.io/>.

Abstract

Current artificial intelligence (AI) has made substantial progress across various fields, such as computer vision and natural language processing. However, limitations of current AI persist in its dependency on data quantity and quality, lack of transparency, and absence of general intelligence. These issues become particularly apparent when considering the adaptability and comprehension of humans. My research in AI + Knowledge aims to leverage valuable domain-specific human expertise for advanced AI, seeking to enhance the data efficiency, generalizability, and interpretability of existing deep learning models. In this talk, I will begin by introducing my research framework on AI + Knowledge, providing insight into its three major tasks, applications, and my contributions. I will then delve into several use cases to introduce novel AI + Knowledge techniques and demonstrate their impact in domains like computer vision, healthcare, and beyond. Specifically, I will highlight the significance of leveraging biomechanics to improve both the accuracy and interpretability of human motion understanding covering face, body, and hand in both 2D and 3D. Concluding the talk, I will outline future research directions, which include advancing synergy between domain knowledge and AI, fostering the continual growth of both knowledge and AI, and adapting AI + Knowledge techniques to address the real-world challenges.