

Kai Yan

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Research Interest

My research interest is deep learning for better decision making. I have worked on the following fields: 1) reinforcement learning with demonstrations / imitation learning, 2) multi-agent reinforcement learning, 3) prediction-and-optimization algorithms, 4) decision transformer, 5) LLM agent, 6) LLM many-shot in-context learning.

Education

University of Illinois Urbana-Champaign

Ph.D. in Computer Science

Urbana, Illinois, US

Sept 2021 - Current

Peking University

B.S. in Computer Science

Beijing, China

Sept 2017 - Jun 2021

- Member of the Turing Class honor program; graduate with *Summa Cum Laude*
- Serve as the vice president of the student union for the school of EECS; organize multiple large events with hundreds of participants

Academic Experience

University of Illinois Urbana-Champaign

Graduate Research Assistant (Co-advised by Prof. Alexander G. Schwing and Prof. Yuxiong Wang)

Urbana, Illinois, US

Sept 2021 - 15th May, 2026 (Estimated)

- Work on demonstration-guided reinforcement learning, imitation learning and Large Language Model reasoning / decision-making
- Experience in normalizing flows, convex optimization, optimal transport, decision transformer and LLM with MCTS search

Robotics Institute @ Carnegie Mellon University

Visiting Student for Summer Research (Advised by Prof. Changliu Liu)

Remote

Jun 2020 - Jan 2021

- Build a pandemic simulator with reinforcement learning agents as individuals
- Design algorithm for million-level multi-agent training; use Cython for parallelization & acceleration

National Engineering Laboratory for Video Technology @ Peking University

Undergraduate Research Student (Advised by Prof. Zongqing Lu)

Beijing, China

Jun 2019 - Feb 2020

- Work on adversarial agent in multi-agent systems
- Extensively read papers in reinforcement learning, multi-agent systems and algorithmic game theory, and implement RL algorithms from scratch
- Write a survey on algorithmic game theory and reinforcement learning

AILab @ Peking University

Undergraduate Research Student (Advised by Prof. Wenxin Li)

Beijing, China

Nov 2018 - Mar 2019

- Study *Introduction to Reinforcement Learning* and papers on Reinforcement Learning
- Program the judge for the game *Tank2* on Botzone, an AI platform for education and the judge is extensively used for freshmen's course projects

Industry Experience

ByteDance US

Student Researcher (Advised by Dr. Jiecao Chen)

San Jose, US

Jun 2024 -

- Working on building many-shot in-context learning benchmarks and supervised finetuning for LLM self-plan

Microsoft Research Asia

Research Intern (Co-advised by Dr. Jie Yan and Dr. Chuan Luo)

Beijing, China

Sept 2020 - Jun 2021

- Design an prediction-and-optimization surrogate framework for linear/quadratic optimization problems with $\max(\cdot, 0)$ operator, where the parameterized objective needs to be predicted from data
- Awarded *Stars of Tomorrow* title

Teaching Experience

University of Illinois Urbana-Champaign

Teaching Assistant (Computational Photography)

Urbana, Illinois, US

Jan 2024 - May 2024

- Host Office hours every week, grade homework and set up midterm exam

- Host a 2-hour seminar of 15 students each week, revising classes and introducing cutting-edge applications of the knowledge taught in class
- Teach how to write & organize lecture notes; grade homework every week

Publications & Preprints

Conference

- **Kai Yan**, Alexander G. Schwing and Yuxiong Wang. Reinforcement Learning Gradients as Vitamin for Online Finetuning Decision Transformers. In NeurIPS, 2024. ([Spotlight](#); [top 2% submission](#))
- Andy Zhou, **Kai Yan**, Michal Shlapentokh-Rothman, Haohan Wang, Yuxiong Wang. Language Agent Tree Search Unifies Reasoning Acting and Planning in Language Models, In ICML, 2024. ([Github > 700 Stars](#); [integrated in LangChain](#); [invited talk @ Autogen Discord](#))
- **Kai Yan**, Alexander G. Schwing and Yuxiong Wang. Offline Imitation from Observation via Primal Wasserstein State Occupancy Matching. In ICML, 2024.
- **Kai Yan**, Alexander G. Schwing and Yuxiong Wang. A Simple Solution for Offline Imitation from Observations and Examples with Possibly Incomplete Trajectories. In NeurIPS, 2023.
- **Kai Yan**, Alexander G. Schwing and Yuxiong Wang. CEIP: Combining Explicit and Implicit Priors for Reinforcement Learning with Demonstrations. In NeurIPS, 2022.
- **Kai Yan**, Jie Yan, Chuan Luo, Liting Chen, Qingwei Lin and Dongmei Zhang. A Surrogate Objective Framework for Prediction+Optimization with Soft Constraints. In NeurIPS, 2021.

Preprints

- Zhan Ling, Kang Liu, **Kai Yan**, Yifan Yang, Weijian Lin, Ting-Han Fan, Lingfeng Shen, Zhengyin Du, Jiecao Chen. LongReason: A Synthetic Long-Context Reasoning Benchmark via Context Expansion. In submission to ACL ARR December, 2024.
- **Kai Yan**¹, Zhenggang Tang¹, Liting Sun, Wei Zhan, Changliu Liu. A Microscopic Pandemic Simulator for Pandemic Prediction Using Scalable Million-Agent Reinforcement Learning. arXiv:2108.06589, 2021.
- **Kai Yan**¹, Yunlong Lu¹. Algorithms in Multi-Agent Systems: A Holistic Perspective from Reinforcement Learning and Game Theory. arXiv:2001.06487, 2020.

Honors & Awards

Feb. 2023	Graduate College Conference Presentation Award , University of Illinois at Urbana-Champaign	<i>Urbana, Illinois, US</i>
Jul. 2021	Stars of Tomorrow , Microsoft Research Asia	<i>Beijing, China</i>
Nov. 2020	John Hopcroft Scholarship , Center on Frontiers of Computing Studies (CFCS) @ PKU	<i>Beijing, China</i>
Dec. 2019	National Scholarship & Merit Student , Peking University	<i>Beijing, China</i>
Jan. 2019	Meritorious Winner , International Mathematical Contest in Modeling (MCM)	<i>Remote</i>
Sept. 2018	Founder Scholarship & Merit Student , Peking University	<i>Beijing, China</i>
Apr. 2018	2nd Award , PKU ACM Campus	<i>Beijing, China</i>
Jul. 2016	Silver Medal , National Olympiad in Informatics (NOI)	<i>Mianyang, China</i>
May. 2016	Silver Award , Asian-Pacific Informatics Olympiad (APIO)	<i>Beijing, China</i>

Services

Reviewer

- AAAI Conference on Artificial Intelligence (**AAAI**), 2025
- Transactions on Machine Learning Research (**TMLR**), 2024 (subreviewer)
- IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2023-2025
- Neural Information Processing Systems (**NeurIPS**), 2023-2024 ([2024 Top 10% reviewer](#))
- International Conference on Learning Representations (**ICLR**), 2024-2025
- International Conference on Machine Learning (**ICML**), 2024
- European Conference on Computer Vision (**ECCV**), 2024

¹Equal contribution.

Misc.

- Vice President of the PKU EECS Student Union, 2019-2020

Invited Talks

Oct. 2024 **Guest Lecturer on Agentic Foundation Models**, University of Michigan

Online

Sep. 2024 **Talks on Language Agent Tree Search (LATS)**, AutoGen Discord Channel

Online

Skills

Programming & Software

Python (Pytorch for deep learning, CVXPY / Gurobi / Google ORTools for optimization and Cython for high-performance), C/C++, Java, Matlab, HTML/CSS, JavaScript (Node.js), Qt, \LaTeX , Microsoft Office, Wireshark

Language

English (Professional with TOEFL 117/120), Chinese (Native)