Wanqi Xue

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Summary

My Ph.D research focuses on applying machine learning, especially reinforcement learning (RL) and multi-agent RL, to make decisions in complex and uncertain environments. My work has led to realistic applications in games, recommendation, trading and so on. Previously, I also worked on meta-learning and few-shot learning. I have experience in large open-source projects. I am a main contributor and an ASF committer of Apache-SINGA (the Southeast Asia's first Apache Top Level Project), for which I founded the AutoGrad system.

Education

Nanyang Technological University (NTU) — Singapore
Doctor of Philosophy - Computer Science — *2019 - Present*
Supervisors: Prof. Bo An (Main); Prof. Chai Kiat Yeo.

National University of Singapore (NUS) — Singapore
Master of Science - Electrical Engineering — *2017 - 2018*

University of Electronic Science and Technology of China (UESTC) — Chengdu, China
Bachelor of Engineering - Electronic Science and Technology — *2012 - 2016*

Work Experiences

SEA AI Lab (SAIL) — Singapore
Research Internship — *Jul 2022 - Jan 2023*

- **Mentor**: Dr. Zhongwen Xu.
- **Research Topic**: Robust reinforcement learning with human feedback/preferences algorithms.

Kuaishou Inc. — Remote
Research Internship — *Jul 2021 - Jul 2022*

- **Mentor**: Dr. Qingpeng Cai.
- **Research Topic**: Optimizing long-term user engagement in sequential recommendation via reinforcement learning.

National University of Singapore (NUS) — Singapore
Research Assistant - Computer Science — *Jan 2018 - Jun 2019*

- **Supervisor**: Prof. Wei Wang.
- **Research Areas**: Large-scale distributed deep learning systems; meta-learning and few-shot learning.

Publications

Wanqi Xue, Bo An, Shuicheng Yan, Zhongwen Xu. Reinforcement Learning from Diverse Human Preferences. Preprint.

Wanqi Xue, Qingpeng Cai, Zhenghai Xue, Shuo Sun, Shuchang Liu, Dong Zheng, Peng Jiang, Kun Gai, Bo An. PrefRec: Preference-based recommender systems for reinforcing long-term user engagement. Preprint.

Qingpeng Cai, Zhenghai Xue, Chi Zhang, **Wanqi Xue**, Shuchang Liu, Ruohan Zhan, Xueliang Wang, Tianyou Zuo, Wentao Xie, Dong Zheng, Peng Jiang and Kun Gai. Two-stage constrained actor-critic for short video recommendation. *International World Wide Web Conference (WWW)*, 2023.

Wanqi Xue, Qingpeng Cai, Ruohan Zhan, Dong Zheng, Peng Jiang, Kun Gai, Bo An. ResAct: Reinforcing long-term engagement in sequential recommendation with residual actor. *International Conference on Learning Representations (ICLR)*, 2023.

Shuxin Li, Xinrun Wang, Youzhi Zhang, **Wanqi Xue**, Jakub Cerny, Bo An. Solving large-scale pursuit-evasion games using pre-trained strategies. *AAAI Conference on Artificial Intelligence (AAAI)*, 2023.

Shuo Sun, **Wanqi Xue**, Rundong Wang, Xu He, Junlei Zhu, Jian Li, Bo An. DeepScalper: A risk-aware reinforcement learning framework to capture fleeting intraday trading opportunities. *International Conference on Information and Knowledge Management (CIKM)*, 2022.

Wanqi Xue, Wei Qiu, Bo An, Zinovi Rabinovich, Svetlana Obraztsova, Chai Kiat Yeo. Mis-spoke or mis-lead: Achieving robustness in multi-agent communicative reinforcement learning. *International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2022. **(Oral Presentation)**

Wanqi Xue, Bo An, Chai Kiat Yeo. NSGZero: Efficiently learning non-exploitable policy in large-scale network security games with neural monte carlo tree search. *AAAI Conference on Artificial Intelligence (AAAI)*, 2022. **(Oral Presentation)**

Wanqi Xue, Youzhi Zhang, Shuxin Li, Xinrun Wang, Bo An, Chai Kiat Yeo. Solving large-scale extensive-form network security games via neural fictitious self-play. *International Joint Conference on Artificial Intelligence (IJCAI)*, 2021.

Shuxin Li, Youzhi Zhang, Xinrun Wang, **Wanqi Xue**, Bo An. CFR-MIX: Solving imperfect information extensive-form games with combinatorial action space. *International Joint Conference on Artificial Intelligence (IJCAI)*, 2021.

Wanqi Xue, Wei Wang. One-shot image classification by learning to restore prototypes. *AAAI Conference on Artificial Intelligence (AAAI)*, 2020.

Yi Sen Ng, **Wanqi Xue**, Wei Wang, Panpan Qi. Convolutional neural networks for food image recognition: An experimental study. *International Workshop on Multimedia Assisted Dietary Management (ACMMM Workshop)*, 2019.

Open-source Projects

Apache-SINGA: the Southeast Asia's first Apache Top Level Project (more than 2.7k stars in GitHub), focusing on distributed training of deep learning and machine learning models.

- **AutoGrad System**: I founded the whole Autograd system for Apache-SINGA, which is a key module for deep learning frameworks. The AutoGrad system is able to perform differentiation of a tensor (loss) automatically.
- **Applications Based on the AutoGrad System**: I developed two real-world applications on top of the AutoGrad system, i.e., DL-based bone age predictor and lung nodule classifier.
- **Apache Software Foundation (ASF) Committer:** I am a main contributor and ASF committer of Apache-SINGA.

Patents

Neural Monte Carlo Tree Search For Efficiently Learning Non-Exploitable Policy In Large-Scale Network Security Games.
Wanqi Xue, Bo An, Chai Kiat Yeo. Provisional Singapore Patent, 2022.

CFR-MIX: Solving Imperfect Information Extensive-Form Games With Combinatorial Action Space.
Shuxin Li, Youzhi Zhang, Xinrun Wang, **Wanqi Xue**, Bo An. Technology Disclosure, NTUitive reference:2021-021, 2022.

A Neural Fictitious Self-Play Based Approach For Solving Large-Scale Escape Interdiction Games.
Wanqi Xue, Youzhi Zhang, Shuxin Li, Xinrun Wang, Bo An, Chai Kiat Yeo. Provisional Singapore Patent, 2021.

Awards

AAAI Student Scholarship	*2022*
AAMAS Student Scholarship	*2022*
AAMAS Student Scholarship	*2021*
AAAI Student Scholarship	*2020*
NTU Research Scholarship	*2019 - 2023*
UESTC Renmin Scholarship	*2013 - 2015*

Teaching

SC1015/CZ1115: Introduction to Data Science and Artificial Intelligence (Spring 2021, Spring 2022)

CZ2004: Human-Computer Interaction (Fall 2020, Fall 2021)

CZ1104/CE1104: Linear Algebra for Computing (Fall 2020, Spring 2021)