

# 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

<b>Nanyang Technological University (NTU)</b> <i>Doctor of Philosophy - Computer Science</i> Supervisors: Prof. Bo An (Main); Prof. Chai Kiat Yeo.	Singapore 2019 - Present
<b>National University of Singapore (NUS)</b> <i>Master of Science - Electrical Engineering</i>	Singapore 2017 - 2018
<b>University of Electronic Science and Technology of China (UESTC)</b> <i>Bachelor of Engineering - Electronic Science and Technology</i>	Chengdu, China 2012 - 2016

## WORK EXPERIENCES

<b>SEA AI Lab (SAIL)</b> <i>Research Internship</i> <ul style="list-style-type: none"><li>◦ <b>Mentor:</b> Dr. Zhongwen Xu; Prof. Shuicheng Yan</li><li>◦ <b>Research Topic:</b> Robust reinforcement learning with human feedback/preferences algorithms.</li></ul>	Singapore Jul 2022 - Jan 2023
<b>Kuaishou Inc.</b> <i>Research Internship</i> <ul style="list-style-type: none"><li>◦ <b>Mentor:</b> Dr. Qingpeng Cai.</li><li>◦ <b>Research Topic:</b> Optimizing long-term user engagement in sequential recommendation via reinforcement learning.</li></ul>	Remote Jul 2021 - Jul 2022
<b>National University of Singapore (NUS)</b> <i>Research Assistant - Computer Science</i> <ul style="list-style-type: none"><li>◦ <b>Supervisor:</b> Prof. Wei Wang.</li><li>◦ <b>Research Areas:</b> Large-scale distributed deep learning systems; meta-learning and few-shot learning.</li></ul>	Singapore Jan 2018 - Jun 2019

## 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: Recommender systems with human preferences for reinforcing long-term user engagement. *SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)*, 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.
- 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.
- Wanqi Xue**, Wei Wang. One-shot image classification by learning to restore prototypes. *AAAI Conference on Artificial Intelligence (AAAI)*, 2020.
- Shuo Sun, Xinrun Wang, **Wanqi Xue**, Xiaoxuan Lou, Bo An. Mastering Stock Markets with Efficient Mixture of Diversified Trading Experts. *SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)*, 2023.

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.

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.

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.

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

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**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

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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

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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

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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)