Xinran Li

Email: xinran.li@connect.ust.hk | **Personal Website | Google Scholar | Github**

EDUCATION

The Hong Kong University of Science and Technology (HKUST) 02/2022-03/2026 (expected)

Ph.D. Candidate in Electronic and Computer Engineering, Supervisor: Prof. Jun Zhang

Research Topic: Cooperative multi-agent reinforcement learning

Beijing Institute of Technology (BIT) 09/2016-08/2020

B.Eng. of Electronic and Information Engineering, GPA: 92.35/100, ranking 1/94

Australian National University (ANU) 07/2019-06/2020

Exchange Student, GPA: 6.875/7, Supervisors: Prof. Salman Durrani & Dr. Xiaohui Zhou (Katrina)

Honor thesis: SWIPT-Enabled Cellular-Connected UAV: Energy Harvesting and Data Transmission

RESEARCH EXPERIENCE

LLM Planning for Embodied Tasks 11/2024-05/2025

- [Under Review] **X. Li**, C.Bai, Z. Li, J. Zheng, T. Xiao, J. Zhang, "Learn as Individuals, Evolve as a Team: Multi-agent LLMs Adaptation in Embodied Environments,"

  TLDR: LIET is a novel framework that introduces individual utility functions and evolving communication schemes to enable LLM agents to adapt and achieve effective and efficient cooperative planning in embodied household tasks.

Heterogenous Multi-agent Reinforcement Learning 01/2024-05/2024

- [NIPS' 24] **X. Li**, L. Pan, J. Zhang, "Kaleidoscope: Learnable Masks for Heterogeneous Multi-agent Reinforcement Learning," *Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2024

  TLDR: Kaleidoscope is a novel adaptive partial parameter sharing scheme that employs learnable masks for both agent policies and critic ensembles, enabling policy heterogeneity and improved value estimations to enhance MARL.

Exploration in Multi-agent Reinforcement Learning 06/2023-01/2024

- [ICML' 24] **X. Li**, Z. Liu, S. Chen, J. Zhang, "Individual Contributions as Intrinsic Exploration Scaffolds for Multi-agent Reinforcement Learning," *International Conference on Machine Learning (ICML)*, 2024

  TLDR: ICES is a novel algorithm that improves cooperative exploration in sparse reward MARL by assessing individual contributions with Bayesian surprise using a conditional variational autoencoder, and decoupling exploration from exploitation policies to utilize privileged global information during training.

Communication in Multi-agent Reinforcement Learning 02/2022-10/2024

- [ICLR' 25] **X. Li**, X. Wang, C. Bai, J. Zhang, "Exponential Topology-enabled Scalable Communication in Multi-agent Reinforcement Learning," *International Conference on Learning Representations (ICLR)*, 2025

  TLDR: ExpoComm is a scalable communication protocol for MARL that leverages the small-diameter and small-size properties of exponential topologies to ensure rapid and cost-effective (near-linear) information dissemination among agents.

- [AAMAS'24 Oral] **X. Li**, J. Zhang, "Context-aware Communication for Multi-agent Reinforcement Learning," *International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2024. (Acceptance Rate: 25%)

  TLDR: CACOM is a novel protocol addressing bandwidth limitations in MARL by enabling receiver-centric, personalized message exchange through attention mechanisms and discretizing messages via quantization.

- [AAMAS'23 Oral] X. Wang*, **X. Li***, J. Shao, and J. Zhang, "AC2C: Adaptively Controlled Two-hop Communication for Multi-agent Reinforcement Learning," *International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2023. (Acceptance Rate: 23.3%)

  TLDR: AC2C is a novel protocol that overcomes limited communication ranges in MARL by enabling adaptively controlled two-hop information exchange, effectively expanding agents' reception fields for superior performance.

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INDUSTRY EXPERIENCE

AI Businesss, Alibaba 04/2024-10/2025

Research intern, Leader: Qingguo Chen

Main Responsibilities: Conduct research in large language model reasoning.

Embodied AI Team, TeleAI 08/2024-04/2025

Research intern, Leader: Chenjia Bai

Main Responsibilities: Conduct research in large language model planning in embodied environments.

Shenzhen Research Institute of Big Data, the Chinese University of Hong Kong, Shenzhen 08/2021-12/2021

Research assistant, Mentor: Rui Zhou & Liusha Yang

Main Responsibilities: Conduct research in wireless data quality assessment by proposing diversity measurement.

Department of Open Source Algorithm System, SenseTime 10/2020-07/2021

Algorithm intern, Mentor: Wenwei Zhang, Leader: Kai Chen

- Project: **MMPretrain (MMClassification)**, Role: Main Contributor (Github ID: LXXXXR)
  Project Descriptions: An open source pre-training toolbox based on PyTorch (part of OpenMMLab project)
  Main Responsibilities: 1) Bumped version from v0.6.0 to v0.12.0. 2) Supported new features such as multi-label classification tasks and data augmentation; reproduced algorithms such as ResNeSt. 3) Refactored codes and docs, replied issues, fixed bugs and responded to GitHub community. (More than 100 PRs)

AWARDS and SKILLS

- **Awards**:
  - Best Teaching Assistant Award 2023
  - Outstanding Graduate (Top 4%) 2020
  - National Scholarship (Top 2%) 2018
  - National Scholarship (Top 2%) 2017
- **Languages**: English (TOEFL: 113/120), Chinese (Native Speaker)
- **Coding Skills**: Proficient in Python and Pytorch; Familiar with MATLAB and Wolfram

ACADEMIC SERVICES

- **Conference Reviewer**: ICLR, ICML, NeurIPS
- **Teaching Assistant**:
  EESM 5900O Mobile Edge Computing and Edge AI
  ELEC 3100 Signal Processing and Communications
  ELEC 1010 Electronic and Information Technology