

# Dan Qiao

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## EDUCATION

### PhD student, Computer Science

*Chinese University of Hong Kong, Shenzhen*

Sep. 2022 – Present

*Shenzhen, China*

### Master of Science, Automotive Engineering

*Beijing University of Aeronautics and Astronautics | GPA: 3.6*

Sep. 2018 – Jul. 2021

*Beijing, China*

### Bachelor of Science, Automotive Engineering

*Beijing University of Aeronautics and Astronautics | GPA: 3.2*

Sep. 2014 – Jul. 2018

*Beijing, China*

## INTERNSHIP

### RL Researcher

*Moza Racing Company, working on building distributed training clusters for SAC in racing games.*

Dec. 2024 – Present

*Shenzhen, China*

### RA, Computer Science

*Chinese Academy of Science, Institute of Automation, working on privacy-preserving MARL.*

Sep. 2021 – June. 2022

*Beijing, China*

## PUBLICATIONS & PREPRINTS

**D. Qiao**, W. Li, S. Yang, H. Zha, B. Wang\*, Beyond Value Decomposition: Constraining Multi-Modality in Offline Multi-Agent Reinforcement Learning via Score Decomposition, Preprint, 2025.

W. Li, **D. Qiao**, B. Wang, X. Wang, B. Jin, H. Zha\*, Semantically Aligned Task Decomposition in Multi-Agent Reinforcement Learning, Preprint, [arXiv:2305.10865](https://arxiv.org/abs/2305.10865). 2023.

**D. Qiao**, J. Zhang\*, Y. Zhang, S. Xiao, H. Chen, Privacy-preserved Fully Decentralized Multi-agent Reinforcement Learning for Networked Social Systems, Draft & Patent. 2022.

**D. Qiao**, G. Wen, Z. Peng\*, Novel Saturated Nussbaum-type Function based Adaptive Distributed Consensus Control of Multi-agent Systems with Unknown Arbitrary Control Directions, Preprint, [arXiv:2201.09453](https://arxiv.org/abs/2201.09453). 2021.

S. Yang, Y. Hua, **D. Qiao**, Y. Lian, Y. Pan\*, Y. He, A coupled electrochemical-thermal-mechanical degradation modelling approach for lifetime assessment of lithium-ion batteries, *Electrochimica Acta*, vol. 326, 2020.

## RESEARCH EXPERIENCE

### Diffusion Models in Offline MARL

*Diffusion Models, Offline MARL*

Dec. 2023 – Jan. 2025

- Recognizing the behavior policy infactorization property in multi-modality offline MARL datasets. Developing offline policy decomposition methods with diffusion models to handle the OOD joint policy distribution problems.

### Semantically Aligned Task Decomposition in MARL

*MARL, Language Model-based Subgoal Generation, Credit Assignment*

Mar. 2023 – Oct. 2023

- Leveraging Pretrained Language Models prompting with Chain of Thought (CoT) to articulate potential task goals and facilitate goal decomposition. Incorporate language-grounded RL to train each agent's goal-conditioned policy with self-reflection mechanism to re-planning.

### Differential Privacy Preserved Decentralized MARL for Social Networked Systems

*Fully Decentralized MARL, Differential Privacy, Social Foundation Systems*

Nov. 2021 – Mar. 2022

- Introduce the Laplace noise-based Differential Privacy technique into the QD-Learning to protect the Q-value which may be associated with the agent's privacy information. Provide the theoretical boundary analysis with mean square convergence and expectation convergence of the Q-value.

### Nussbaum Functions based Formation Control with Unknown Control Directions

*Unknown Actuator Failures and Nonlinearities, Control Theory*

July 2020 – Apr. 2021

- Propose a novel lemma of Nussbaum-type functions to overcome the limitation of the identical unknown control directions assumptions and control shock. Designed a distributed control algorithm for the consensus problem of multi-agent system with Lyapunov stability analysis.

### Other Minor Topics

*Social Dilemmas, Opinion Dynamics, Multi-agent Consensus Control*

- Learning direct reciprocity and indirect reciprocity to coordinate among independent learning MARL algorithms.
- Consensus of opinion-dynamics in social systems.
- Observer-based distributed sliding mode formation tracking control of multiple vehicles. (Master Degree Thesis)

## SKILLS & INTEREST

IELTS 6.5 (Reading 7.5 Listening 6.5 Written 6.0 Speaking 6.0), Pytorch

Writing blog, Skiing, and Editing video.