

# Jiajun Fan

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## Education

### Tsinghua University

MASTER OF ELECTRONIC INFORMATION (COMPUTER SCIENCE)

Beijing, CHN

Aug 2021 - Jun 2024 (Expected)

### Nankai University

BACHELOR OF INTELLIGENT SCIENCE AND TECHNOLOGY

Tianjin, CHN

Sep 2017 - Jun 2021

- GPA: 3.93/4.0
- Courses: Reinforcement Learning, Computer Vision, Computer Composition Principle, Probability Theory and Mathematical Statistics

## Academic Experience

### Research on High-efficiency Reinforcement Learning Algorithm

Beijing, China

R&D INTERN

Sep 2020 - Jun 2021

- I extended the basic paradigm of RL called the Generalized Policy Iteration (GDI) into a more generalized version, which is called the Generalized Data Distribution Iteration (GPI).
- I unified massive RL algorithms and techniques into the GDI paradigm, which can be considered as one of the special cases of GDI.
- I provided theoretical proof of why GDI is better than GPI and how it works.
- My work has achieved SOTA and broken through massive human world records.
- I have published a paper called "GDI: Rethinking What Makes Reinforcement Learning Different From Supervised Learning" and several patents.

### Research on Model-free Reinforcement Learning Algorithm

Beijing, China

R&D INTERN

Sep 2020 - Jun 2021

- I proposed a unified framework of model-free reinforcement learning called CASA.
- I proposed an entropy regularization free mechanism for policy-based reinforcement learning based on bandits.
- I have published two papers called "CASA-B: A Unified Framework of Model-Free Reinforcement Learning" and "An Entropy Regularization Free Mechanism for Policy-based Reinforcement Learning". Additionally, I have published several patents.

### Research on Model-based Reinforcement Learning Algorithm

Tianjin, China

R&D INTERN

Apr 2020 - Sep 2020

- I proposed a novel method to improve the algorithm learning framework and test the algorithm performance on the MuJoCo simulation environment.
- I published a paper called "Critic PI2: Master Continuous Planning via Policy Improvement with Path Integrals and Deep Actor-Critic Reinforcement Learning".

### Multifunctional Home Service Robot

Tianjin, China

R&D INTERN

Sep 2018 - Jul 2019

- I proposed a solution for the entire project and a finite state machine diagram.
- I implemented autonomous navigation and RRT path planning related algorithms based on ROS.
- Project results have been presented in the 2019 ROBOCUP Sydney World Finals.

## Publications

### Paper

- **Fan, J.**, Xiao, C., & Huang, Y. (2021). GDI: Rethinking What Makes Reinforcement Learning Different From Supervised Learning. arXiv preprint arXiv:2106.06232.
- **Fan, J.**, Ba, H., Guo, X., & Hao, J. (2020). Critic PI2: Master Continuous Planning via Policy Improvement with Path Integrals and Deep Actor-Critic Reinforcement Learning. arXiv preprint arXiv:2011.06752.
- Xiao, C., Shi, H., **Fan, J.**, & Deng, S. (2021). An Entropy Regularization Free Mechanism for Policy-based Reinforcement Learning. arXiv preprint arXiv:2106.00707.
- Xiao, C., Shi, H., **Fan, J.**, & Deng, S. (2021). CASA-B: A Unified Framework of Model-Free Reinforcement Learning. arXiv preprint arXiv:2105.03923.

## Patent

- **Fan, J.** "Hyperparameter determination method, device, deep reinforcement learning framework, medium and equipment." CN113052252A. 2021.06.29.
- **Fan, J.** "Hyperparameter determination method, device, deep reinforcement learning framework, medium and equipment." CN113052253A. 2021.06.29.
- **Fan, J.** "Hyperparameter determination method, device, deep reinforcement learning framework, medium and equipment." CN113052248A. 2021.06.29.
- **Fan, J.** "Training method, device, medium and electronic equipment of deep reinforcement learning model." CN113052312A. 2021.06.29.
- **Fan, J.** "Hyperparameter determination method, device, deep reinforcement learning framework, medium and equipment." CN112949850A. 2021.06.11.
- **Fan, J.** "Hyperparameter determination method, device, deep reinforcement learning framework, medium and equipment." CN112926629A. 2021.06.08.
- **Fan, J., Xiao, C.** "Method, device, learning framework, medium and equipment for determining action value." CN112926628A. 2021.06.08.
- **Fan, J., Xiao, C.** "Training method, device, medium and electronic equipment of deep reinforcement learning model." CN112926735A. 2021.06.08.
- **Fan, J., Xiao, C.** "Training method, device, medium and electronic equipment of deep reinforcement learning model." CN112926629A. 2021.05.07.

## Awards

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2021	<b>Outstanding Graduates</b> , Nankai University	Tianjin, China
2021	<b>Excellent Graduation Thesis</b> , Nankai University	Tianjin, China
2021	<b>Tang Lixin Scholarship</b> , Nankai University	Tianjin, China
2020	<b>National Scholarship</b> , Nankai University	Tianjin, China
2020	<b>Nomination for Zhou Enlai Scholarship</b> , Nankai University	Tianjin, China
2019	<b>National Scholarship</b> , Nankai University	Tianjin, China
2019	<b>3st Prize</b> , Robocup@HOME Education World Final	Sydney, Australia
2019	<b>Bronze Medal</b> , ACM / ICPC Asia Regional Contest	Xuzhou, China
2018	<b>National 2st Prize</b> , National College Students Mathematical Contest in Modeling	Tianjin, China
2018	<b>The First Prize Scholarship</b> , Nankai University	Tianjin, China