MINGHUAN LIU

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EDUCATION

Shanghai Jiao Tong University (SJTU)   *Sep. 2019 - Now*

Ph.D. in Computer Science and Technology

· Apex Data & Knowledge Management Lab

· Leader of the ApexRL research group

· Advisor: Weinan Zhang

Southwest Jiaotong University (SWJTU)   *Sep. 2015 - July. 2019*

B.S. in Computer Science and Technology

· Overall GPA: 3.84/4.0   Ranking: 1/98

· Key Lab of Cloud Computing and Intelligent Technology

· Advisor: Tianrui Li

RESEARCH INTERESTS

- My general research interest lies in developing principled and efficient **reinforcement learning (RL)** algorithms to tackle kinds of decision making problems and build essential AI, including learning in **multi-agent systems**.

- I am sincerely devoted to **data-driven** RL methods, specifically, **imitation learning**, **offline RL**, that can make RL applicable for real-world challenges, like autonomous driving, sports analysis, healthcare, games, robotics, etc.

PUBLICATIONS / PREPRINTS

Plan Your Target and Learn Your Skills: Transferable State-Only Imitation Learning via Decoupled Policy Optimization.

Minghuan Liu, Zhengbang Zhu, Yuzheng Zhuang, Weinan Zhang, Jun Wang, Yong Yu, Jianye Hao.

Submitted to The 39th International Conference on Machine Learning **ICML-22**.

- We propose Decoupled Policy Optimization (DPO), a novel framework that explicitly decouples the state-to-action mapping policy as a high-level satte planner and an inverse dynamics model. DPO allows for transferring to different dynamics settings intuitively and generalizing the planner on out-of-demo state region.

Goal-Conditioned Reinforcement Learning: Problems and Solutions.

Minghuan Liu, Menghui Zhu, Weinan Zhang.

Submitted to The 31st International Joint Conference on Artificial Intelligence, Survey Track **IJCAI-22**.

- We bring a brief survey for goal-conditioned reinforcement learning, containing the basic challenge, corresponding solutions, and future prospects.

PerfectDou: Summit DouDizhu with Perfect Information Distillation.

Guan Yang*, **Minghuan Liu***, Weijun Hong, Weinan Zhang, Fei Fang, Guangjun Zeng, Yue Lin.

Submitted to The 31st International Joint Conference on Artificial Intelligence **IJCAI-22**.

- We propose PerfectDou, a state-of-the-art DouDizhu AI system that beats all previous algorithms with a proposed technique named perfect information distillation.

Curriculum Offline Imitation Learning.

Minghuan Liu, Hanye Zhao, Zhengyu Yang, Jian Shen, Weinan Zhang, Li Zhao, Tie-Yan Liu.

The 35th Conference on Neural Information Processing Systems. **NeurIPS 2021**.

- We propose curriculum offline imitation learning (COIL), a simple and practical imitation learning

based method for offline reinforcement learning. COIL utilizes an experience picking strategy for imitating from adaptive neighboring policies with a higher return, and improves the current policy along curriculum stages.

Learning to Build High-fidelity and Robust Environment Models.
Weinan Zhang, Zhengyu Yang, Jian Shen, **Minghuan Liu**, Yimin Huang, Xing Zhang, Ruiming Tang, Zhenguo Li.
The 20th European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases. **ECML-PKDD 2021**.
- We propose robust learning to simulate (RL2S), a new problem of RL which focuses on learning a high-fidelity environment simulator for serving diverse downstream tasks; we further transform RL2S as a novel robust imitation learning problem and propose efficient algorithms to solve it.

MapGo: Model-Assisted Policy Optimization for Goal-Oriented Tasks.
Menghui Zhu*, **Minghuan Liu***, Jian Shen, Zhicheng Zhang, Sheng Chen, Weinan Zhang, Deheng Ye, Yong Yu, Qiang Fu, Wei Yang. (*Equal Contribution)
The 30th International Joint Conference on Artificial Intelligence. **IJCAI 2021**.
- We propose MapGo, a model-based framework for goal-oriented RL which involves a novel relabeling stretegy FGI and a model-based training module UMPO.

Energy-Based Imitation Learining.
Minghuan Liu, Tairan He, Minkai Xu, Weinan Zhang.
The 20th International Conference on Autonomous Agents and Multiagent Systems. **Oral**. **AA-MAS 2021**.
- We propose EBIL, a two-step solution for imitation learning: first estimate the energy of expert's occupancy measure, and then take the energy to construct a surrogate reward function as a guidance for the agent to learn the desired policy.

Multi-Agent Interactions Modeling with Correlated Policies.
Minghuan Liu, Ming Zhou, Weinan Zhang, Yuzheng Zhuang, Jun Wang, Wulong Liu, Yong Yu.
The 8th International Conference on Learning Representations. **ICLR 2020**.
- We propose CoDAIL, which cast the multi-agent interactions modeling problem into a multi-agent imitation learning framework with explicit modeling of correlated policies by approximating opponents' policies.

AWARDS & HONORS

TOP 6, Finalist of Sports Analytics Challenge (sponsored by PSG)	*2019*
TOP 10, SCADA Data Missing Repair Competition	*2019*
TOP 3, AI Challenger 2018 in Weather Forecasting	*2018*
National First Prize, China Undergraduate Mathematical Contest in Modeling	*2017*
Meritorious Winner, Mathematical Contest In Modeling	*2017*
China National Scholarship $\times$ 2 (1%)	*2016&2017*
Tang Lixin Scholarship (1‰)	*2017*
IBM Scholarship (1‰)	*2017*
Special Grade Comprehensive Scholarship $\times$ 4 (1%)	*2016 - 2018*

SKILLS

Machine Learning: Pytorch, Tensorflow, Scikit-Learn, LightGBM

Programming Languages: Python, JavaScript, C / C++, Java, MATLAB

Standard Tests: CET-6(574), CET4(616)

Hobbies and Interests: Soccer, Swimming