

PENG Zhenghao

Homepage: <https://pengzhenghao.github.io/>

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EDUCATION

University of California, Los Angeles (UCLA)

September 2022

- PhD student at the Department of Computer Science, supervised by [Prof. Zhou Bolei](#).

The Chinese University of Hong Kong (CUHK)

August 2019 - Present

- MPhil student at the Department of Information Engineering, supervised by [Prof. Zhou Bolei](#).

University of California, Berkeley (UCB)

July 2017 - Aug. 2017

- Summer session.

Shanghai Jiao Tong University (SJTU)

Sept. 2015 - July 2019

- Bachelor of Engineering and member of Zhiyuan Honors Program.
- Research assistant supervised by [Prof. Jiang Li](#).

RESEARCH PAPERS

[1] Qihang Zhang, **Zhenghao Peng**, and Bolei Zhou. Action-conditioned contrastive policy pretraining. *arXiv preprint arXiv:2204.02393*, 2022 [[PDF](#)]

[2] Quanyi Li, **Zhenghao Peng**, Haibin Wu, Lan Feng, and Bolei Zhou. Human-ai shared control via frequency-based policy dissection. *arXiv preprint arXiv:2206.00152*, 2022 [[PDF](#)]

[3] Quanyi Li*, **Zhenghao Peng***, Zhenghai Xue, Qihang Zhang, and Bolei Zhou. Metadrive: Composing diverse driving scenarios for generalizable reinforcement learning. *IEEE transaction on Pattern Analysis and Machine Intelligence*, 2021 (TPAMI) [[Paper](#), [Code](#), [Website](#)]

[4] Mingxin Huang, Yuliang Liu, **Zhenghao Peng**, Chongyu Liu, Dahua Lin, Shenggao Zhu, Nicholas Yuan, Kai Ding, and Lianwen Jin. Swintextspotter: Scene text spotting via better synergy between text detection and text recognition. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition, 2022 (CVPR 2022)*

[5] Quanyi Li*, **Zhenghao Peng***, and Bolei Zhou. Efficient learning of safe driving policy via human-ai copilot optimization. In *International Conference on Learning Representations, 2021 (ICLR 2022)* [[PDF](#), [Code](#), [Website](#)]

[6] **Zhenghao Peng***, Quanyi Li*, Chunxiao Liu, and Bolei Zhou. Safe driving via expert guided policy optimization. In *5th Annual Conference on Robot Learning, 2021 (CoRL 2021)* [[PDF](#), [Code](#), [Website](#), [Poster](#)]

[7] **Zhenghao Peng**, Quanyi Li, Ka Ming Hui, Chunxiao Liu, Bolei Zhou, et al. Learning to simulate self-driven particles system with coordinated policy optimization. *Advances in Neural Information Processing Systems*, 34, 2021 (NeurIPS 2021) [[PDF](#), [Code](#), [Website](#), [Poster](#)]

[8] Hao Sun, Ziping Xu, Meng Fang, **Zhenghao Peng**, Jiadong Guo, Bo Dai, and Bolei Zhou. Safe exploration by solving early terminated mdp. *arXiv preprint arXiv:2107.04200*, 2021 [[PDF](#)]

[9] Quanyi Li*, **Zhenghao Peng***, Qihang Zhang, Chunxiao Liu, and Bolei Zhou. Improving the generalization of end-to-end driving through procedural generation. *arXiv preprint arXiv:2012.13681*, 2020 [[PDF](#), [Repo](#), [Website](#)]

[10] **Zhenghao Peng**, Hao Sun, and Bolei Zhou. Non-local policy optimization via diversity-regularized collaborative exploration. *arXiv preprint arXiv:2006.07781*, 2020 [[PDF](#)]

[11] Hao Sun, **Zhenghao Peng**, Bo Dai, Jian Guo, Dahua Lin, and Bolei Zhou. Novel policy seeking with constrained optimization. *arXiv preprint arXiv:2005.10696*, 2020 [[PDF](#)]

[12] Hao Sun, Jiankai Sun, **Zhenghao Peng**, Dahua Lin, and Bolei Zhou. Learning with identity and uniqueness through social constraint. In *NeurIPS 2019 Deep RL Workshop*. IEEE, 2019

RESEARCH EXPERIENCES

Efficient Learning through Human-AI Copilot [5]

July 2021 - November 2021

Supervised by *Prof. Zhou Bolei*

- Proposed the Human-AI Copilot (HACO) algorithm for human-in-the-loop RL that trains agents from human interventions, partial demonstrations and free exploration, even without reward.
- HACO achieves high sample efficiency, high safety and low human cognitive cost.
- Please visit <https://decisionforce.github.io/HACO/>.

Safe Reinforcement Learning System via Expert in the Loop [6]

March 2021 - June 2021

Supervised by *Prof. Zhou Bolei*

- Proposed an Expert Guided Policy Optimization (EGPO) framework for safe RL, which incorporates the guardian mechanism in the interaction of agent and environment to ensure safe and efficient exploration.
- The experiments on safe driving shows EGPO can achieve training and test-time safety and better performance.
- Please visit <https://decisionforce.github.io/EGPO/>.

Simulating Realistic Traffic Flow via Multi-agent RL [7]

Feb. 2021 - May 2021

Supervised by *Prof. Zhou Bolei*

- Developed a novel MARL method called Coordinated Policy Optimization (CoPO) to incorporate social psychology principle to learn neural controller for a population of autonomous driving vehicles.
- The vehicles population learned by CoPO achieves superior performance and exhibits complex and socially compliant behaviors that improve the traffic efficiency and safety.
- Please visit: <https://decisionforce.github.io/CoPO/>

Autonomous Driving Simulator MetaDrive [3]

July 2020 - Present

Supervised by *Prof. Zhou Bolei*

- Developed the **MetaDrive**, an open-ended and highly customizable driving simulator based on Panda3D and Bullet.
- Utilized procedural generation to generate infinite driving scenes with different road networks and traffic flows.

Efficient Asynchronous Reinforcement Learning [10]

Jan. 2020 - July 2020

Supervised by *Prof. Zhou Bolei*

- Proposed Ensemble Policy Optimization (EPO) framework that trains multiple heterogeneous policies simultaneously solving the same task while maintaining the diversity of the ensemble.
- EPO substantially improves sample efficiency in continuous locomotion tasks compared to the single-policy optimization counterparts.

AWARDS AND HONORS

Teaching Assistant Awards

Term 1 & Term 2, 2020 - 2021, CUHK

Postgraduate Studentship

2019 - 2022, CUHK

Zhiyuan Honors Scholarship

2015 - 2017, SJTU

MISCELLANEOUS

Programming Languages: Python, Matlab, HTML, CSS, C++, etc.

ML Frameworks: Ray, RLlib, TensorFlow, PyTorch, Keras, etc.

Skills: Git, \LaTeX , PyCharm, Keynote, Photoshop, Final Cut, Cantonese, etc.

Hobbies: Genshin Impact, Badminton, Cycling, Hiking, Movie, Science Fiction