PENG Zhenghao

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EDUCATION

The Chinese University of Hong Kong (CUHK) *August 2019 - Present*

- Graduate student under the supervision of Prof. Zhou Bolei, Department of Information Engineering.

University of California, Berkeley *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 PAPERS

[1] 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**)

[2] 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]

[3] **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]

[4] **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]

[5] 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]

[6] 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]

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

[8] 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]

[9] 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 [2] *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 [3] *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 [4] *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 [6] *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 [7] *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.