Zhenghao PENG

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RESEARCH INTERESTS

Reinforcement Learning, Robotics, Multimodal LLM (VLA, VLM) and Human-in-the-loop Learning.

My research focuses on building physically interactive agents that can reason, align with human intent, and generalize across diverse tasks. I aim at building foundation models for robotics—scalable, aligned, and deployable in the real world to improve human well-being.

Robots Experience: Unitree Go2 Quadruped Robot, Four-wheeled Delivery Robot.

EDUCATION

University of California, Los Angeles (UCLA) *September 2022 - May 2026 (Expected)*

- Ph.D. student at the Department of Computer Science, supervised by Prof. Bolei Zhou.

The Chinese University of Hong Kong (CUHK) *August 2019 - July 2022*

- M.Phil. in Information Engineering, supervised by Prof. Bolei Zhou at Multimedia Lab (MMLab).

Shanghai Jiao Tong University (SJTU) *Sept. 2015 - July 2019*

- B.Eng. in Naval Architecture and Ocean Engineering. Member of Zhiyuan Honor Program.
- Research assistant supervised by Prof. Li Jiang.

EXPERIENCE

NVIDIA, Santa Clara, CA *June 2025 - Present*

- Integrated Qwen2.5-VL into the autonomous driving with domain-specific encoder/decoder and enabled multi-node FSDP training for large-scale VLA models.
- Curated and augmented in-house AV datasets by designing an automated data quality labeling pipeline.
- Developed a reasoning model leveraging meta-action representations, achieving 15% performance improvement and enhancing interpretability of VLA behaviors.

Waymo, Mountain View, CA *June 2023 - September 2023*

- Research intern in behavior modeling. Mentored by Justin Fu and Rowan McAllister.
- Fine-tuned multi-agent behavior models with reinforcement learning. Our method uses plain REINFORCE to train large transformer to avoid value net, similar to GRPO though much earlier than it.
- Reduced collision and off-road rates and improved safety-critical metrics on the Waymo Open Sim Agents Challenge (WOSAC), raising composite performance by 22%.
- Built a new evaluation framework that better ranks and tests autonomous driving planners in realistic scenarios generated by our model.

OPEN-SOURCE PROJECTS

MetaDrive is an open-source driving simulator for reinforcement learning and autonomous driving. It has received ∼1000 GitHub stars and 350+ citations, and is widely adopted in research community.

For all my open-source projects, please visit my GitHub.

AWARDS AND HONORS

- Dissertation Year Award 2025-2026, UCLA
- Amazon Fellowship, 2024-2025, UCLA
- University Fellowship, 2023-2024, 2024-2025, UCLA
- The Outstanding Tutors Award 2021 of the Faculty of Engineering , 2021, CUHK

- Teaching Assistant Award, Term 1 2020 - 2021, Term 2 2020 - 2021, CUHK
- Postgraduate Studentship, 2019 - 2022, CUHK
- Zhiyuan Honors Scholarship, 2015 - 2017, SJTU

SELECTED RESEARCH PAPERS

For the complete list of publications, please visit my Google Scholar.

[14] **Predictive Preference Learning from Human Interventions**.
Haoyuan Cai, Zhenghao Peng, and Bolei Zhou **(NeurIPS 2025)**

[13] **Robot-Gated Interactive Imitation Learning with Adaptive Intervention Mechanism**.
Haoyuan Cai, Zhenghao Peng, and Bolei Zhou **(ICML 2025)** [PDF, Code, Webpage]

[12] **Embodied Scene Understanding for Vision-Language Models via MetaVQA**.
Weizhen Wang, Chenda Duan, Zhenghao Peng, Yuxin Liu, and Bolei Zhou. **(CVPR 2025)** [PDF, Code, Webpage]

[11] **Data-Efficient Learning from Human Interventions for Mobile Robots**.
Zhenghao Peng, Zhizheng Liu, and Bolei Zhou. **(ICRA 2025)** [Webpage, PDF]

[10] **Improving Agent Behaviors with RL Fine-tuning for Autonomous Driving**.
Zhenghao Peng, Wenjie Luo, Yiren Lu, Tianyi Shen, Cole Gulino, Ari Seff, and Justin Fu. **(ECCV 2024)** [PDF]

[9] **Shared Autonomy with IDA: Interventional Diffusion Assistance**.
Brandon J. McMahan, Zhenghao Peng, Bolei Zhou, and Jonathan C. Kao. **(NeurIPS 2024)** [PDF]

[8] **Learning from Active Human Involvement through Proxy Value Propagation**.
Zhenghao Peng, Wenjie Mo, Chenda Duan, Quanyi Li, and Bolei Zhou. **(NeurIPS 2023 Spotlight)** [PDF, Webpage]

[7] **ScenarioNet: Open-Source Platform for Large-Scale Traffic Scenario Simulation and Modeling**.
Quanyi Li*, Zhenghao Peng*, Lan Feng, Zhizheng Liu, Chenda Duan, Wenjie Mo, and Bolei Zhou. **(NeurIPS 2023)** [PDF, Code, Webpage]

[6] **Guarded Policy Optimization with Imperfect Online Demonstrations**.
Zhenghai Xue, Zhenghao Peng, Quanyi Li, Zhihan Liu, and Bolei Zhou. **(ICLR 2023)** [PDF, Code, Webpage]

[5] **Human-AI Shared Control via Policy Dissection**.
Quanyi Li, Zhenghao Peng, Haibin Wu, Lan Feng, and Bolei Zhou. **(NeurIPS 2022)** [PDF, Code, Webpage]

[4] **MetaDrive: Composing Diverse Driving Scenarios for Generalizable Reinforcement Learning**.
Quanyi Li*, Zhenghao Peng*, Zhenghai Xue, Qihang Zhang, and Bolei Zhou. **(IEEE TPAMI 2021)** [PDF, Code, Webpage]

[3] **Safe Driving via Expert Guided Policy Optimization**.
Zhenghao Peng*, Quanyi Li*, Chunxiao Liu, and Bolei Zhou. **(CoRL 2021)** [PDF, Code, Webpage, Poster]

[2] **Learning to Simulate Self-Driven Particles System with Coordinated Policy Optimization**.
Zhenghao Peng, Quanyi Li, Ka Ming Hui, Chunxiao Liu, and Bolei Zhou. **(NeurIPS 2021)** [PDF, Code, Webpage, Poster]

[1] **Non-local Policy Optimization via Diversity-regularized Collaborative Exploration**.
Zhenghao Peng, Hao Sun, and Bolei Zhou. **(arXiv 2020)** [PDF]

TALKS

- Human-in-the-loop Agent Learning, EECS 598: Action and Perception Guest Lecture, invited by: Stella Yu, May 2024

TEACHING EXPERIENCES

- CS260R Reinforcement Learning, UCLA, 2025 Winter
- CS260R Reinforcement Learning, UCLA, 2023 Fall
- CS269 Seminar on Reinforcement Learning, UCLA, 2022 Fall
- IERG5350 Reinforcement Learning, CUHK, Term 1, 2021-22
- CSCI2100E Data Structures, CUHK, Term 2, 2020-21
- IERG5350 Reinforcement Learning, CUHK, Term 1, 2020-21
- IERG6130 Seminar on Reinforcement Learning, CUHK, Term 2, 2019-20

MISCELLANEOUS

- **Reviewer:** NeurIPS, ICML, CVPR, ECCV, ICLR, CoRL, RSS, IROS, ICRA, AAAI, TNNLS, IJCV, ICCV, RA-L, *etc.*
- **Frameworks:** PyTorch, Jax, TensorFlow, Ray, RLLib, Keras, ROS2, *etc.*
- **Skills:** LaTeX, Keynote, Photoshop, Final Cut Pro, Git, Cantonese, Photography, *etc.*