

PEIDE HUANG

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EDUCATION

Carnegie Mellon University

September 2020 - Present

M.S. in Machine Learning

Ph.D. in Mechanical Engineering

Pittsburgh, PA, US

Academic advisor: Prof. Ding Zhao (SafeAI Lab)

Stanford University

September 2018 - April 2020

M.S. in Mechanical Engineering (Robotics Track), GPA: 3.9/4.0

Stanford, CA, US

Nanyang Technological University, Singapore

September 2014 - May 2018

B.E. in Aerospace Engineering with Highest Distinction, GPA: 4.9/5.0

Singapore

CURRENT RESEARCH

Peide's research goal is to understand the interplay between the learning agents and the tasks, with the objective of enabling safe, robust, and efficient decision-making. To achieve this goal, he leverages curriculum learning, representation learning, and game theory. He tackles real-world applications in robotics and autonomous driving.

SELECTED PUBLICATIONS

* indicates equal contribution.

1. **What Went Wrong? Closing the Sim-to-Real Gap via Differentiable Causal Discovery**
Peide Huang, Xilun Zhang*, Ziang Cao*, Shiqi Liu*, Mengdi Xu, Wenhao Ding, Jonathan Francis, Bingqing Chen, Ding Zhao
2023 Conference on Robot Learning (CoRL 2023)
2. **Continual Vision-based Reinforcement Learning with Group Symmetries**
Shiqi Liu*, Mengdi Xu*, **Peide Huang**, Yongkang Liu, Kentaro Oguchi, Ding Zhao
2023 Conference on Robot Learning (CoRL 2023) (Oral, 6.6%)
3. **Curriculum Reinforcement Learning using Optimal Transport via Gradual Domain Adaptation**
Peide Huang, Mengdi Xu, Jiacheng Zhu, Laixi Shi, Fei Fang, Ding Zhao.
The 36th Conference on Neural Information Processing Systems (NeurIPS 2022)
4. **Robust Reinforcement Learning as a Stackelberg Game via Adaptively-Regularized Adversarial Training**
Peide Huang, Mengdi Xu, Fei Fang, Ding Zhao.
The 31st International Joint Conference on Artificial Intelligence (IJCAI 2022).
5. **Scalable Safety-Critical Policy Evaluation with Accelerated Rare Event Sampling**
Mengdi Xu, **Peide Huang**, Fengpei Li, Jiacheng Zhu, Xuewei Qi, Kentaro Oguchi, Zhiyuan Huang, Henry Lam, and Ding Zhao.
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2022).
6. **Group Distributionally Robust Reinforcement Learning with Hierarchical Latent Variables**
Mengdi Xu, **Peide Huang**, Yaru Niu, Visak Kumar, Jieli Qiu, Chao Fang, Kuan-Hui Lee, Xuewei Qi, Henry Lam, Bo Li, Ding Zhao.
The 26th International Conference on Artificial Intelligence and Statistics (AISTATS 2023)
7. **Cardiac Disease Diagnosis on Imbalanced Electrocardiography Data Through Optimal Transport Augmentation**
Jieli Qiu, Jiacheng Zhu, Mengdi Xu, **Peide Huang**, Michael Rosenberg, Douglas Weber, Emerson Liu,

Ding Zhao

2023 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2023)

8. Latent Goal Allocation for Multi-Agent Goal-Conditioned Self-Supervised Imitation Learning

Peide Huang*, Rui Chen*, and Laixi Shi*.

NeurIPS 2021 Bayesian Deep Learning Workshop.

PREPRINTS

1. Creative Robot Tool Use with Large Language Models

Mengdi Xu*, Peide Huang*, Wenhao Yu*, Shiqi Liu, Xilun Zhang, Yaru Niu, Tingnan Zhang, Fei Xia, Jie Tan, Ding Zhao.

2. Trustworthy Reinforcement Learning Against Intrinsic Vulnerabilities: Robustness, Safety, and Generalizability

Peide Huang*, Mengdi Xu*, Zuxin Liu*, Wenhao Ding, Zhepeng Cen, Bo Li, Ding Zhao.

3. Multimodal Representation Learning of Cardiovascular Magnetic Resonance Imaging

Jielin Qiu*, Peide Huang*, Makiya Nakashima, Jaehyun Lee, Jiacheng Zhu, Wilson Tang, Pohao Chen, Christopher Nguyen, Byung-Hak Kim, Debbie Kwon, Douglas Weber, Ding Zhao, David Chen.

AWARDS AND HONORS

- CMU Machine Learning Department Fellowship 2023-2024
- NeurIPS 2022 Scholar Award
- NeurIPS 2022 Top Reviewer (8% of all reviewers)
- ICLR 2021 Travel Award
- NTU 2016 President Research Scholar with Distinction

INTERNSHIP EXPERIENCE

Bosch Center for Artificial Intelligence

Machine Learning Research Intern

May 2023 - August 2023

Pennsylvania, US

- Proposed a novel sim-to-real approach that aligns the robot simulator with the real world by discovering the causal relationship between the simulator parameters and the sim-to-real gap.
- Proposed a safety-critical scenario generation method for autonomous vehicle evaluation.

Cleveland Clinic Foundation

Machine Learning Research Intern

September 2022 - May 2023

Ohio, US

- Proposed a novel multi-modal representation learning framework to work with complex sequences of cardiovascular Magnetic Resonance Imaging (cMRi).
- Communicated with doctors and medical experts to understand the challenges faced in medical imaging analysis and complement the machine learning model with domain knowledge.

Flexiv Robotics Ltd.

System Engineer Intern

June 2019 - September 2019

California, US

- Established a new experimental software and hardware framework to expedite the prototyping and testing procedure of products in development. Developed a multi-threaded inter-process communication software library to achieve more robust and faster communication between middle-ware modules.

- Coordinated with senior engineers and managers to ensure smooth integration of the new framework into the R&D department. Constructed a standard operating procedure for the experimental setup.

Agency for Science, Technology and Research, Singapore

January 2017 - June 2017

Research Assistant

Singapore

- Designed and developed a variable footprint, Omni-directional mobile robotic platform that can change the morphology for increased stability or compactness in response to the task requirements.
- Communicated with the supervisor and managed the project timeline, budgeting, and deliverables.

SERVICES

Conference Reviewer NeurIPS, ICML, AISTATS, ICASSP, CVPR

Journal Reviewer TPAMI, IJCV

SELECTED PRESENTATIONS

- Bayesian Deep Learning Workshop, NeurIPS 2021
- Workshop on Security and Safety in Machine Learning Systems, ICLR 2021

TEACHING AND LEADERSHIP EXPERIENCE

CMU Modern Control Theory, Fall 2021

Head of teaching assistants

CMU Linear Control Systems, Fall 2020

Head of teaching assistants

NTU Introduction to Computing, Spring 2016

Peer tutor

NTU Robotics Club

Co-founder and Vice President