



WENHAO DING

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EDUCATION

Carnegie Mellon University, Pittsburgh, USA

Aug 2019 - May 2024 (Expected)

Ph.D. Mechanical Engineering

Carnegie Mellon University, Pittsburgh, USA

Jan 2021 - Dec 2022

M.S. Machine Learning

Tsinghua University, Beijing, China

Aug 2014 - July 2018

B.Eng. Electronic Engineering

RESEARCH INTERESTS

Intelligent Digital Twin:	Generating critical scenarios for virtual autonomy development.
Adversarial Machine Learning:	Improving robustness by training against semantic adversarial examples.
Causal Reinforcement Learning:	Making generalizable decisions by discovering the underlying causality.

HONORS & AWARDS

2022 - Qualcomm Innovation Fellowship Winner, North America
2022 - CMU K&L Gates Presidential Fellowship, College of Engineering nominee
2022 - NeurIPS Scholar Award
2019 - CMU Graduate Student Assembly/Provost Conference Funds
2018 - Tsinghua University Outstanding Undergraduate Thesis Award
2017 - 34th Tsinghua University Academic Challenge Cup (*Second prize*)
2016 - Fellowship of Spark Talents Program (*50 recipients in Tsinghua per year*)

PUBLICATION

Bayesian Reparameterization of Reward-Conditioned Reinforcement Learning with Energy-based Models

**Wenhao Ding, *Tong Che, Ding Zhao, Marco Pavone*

Under Review, 2023

Learning to View: Decision Transformers for Active Object Detection

Wenhao Ding, Nathalie Majcherczyk, Mohit Deshpande, Xuwei Qi, Ding Zhao, Rajasimman Madhivanan, Arnie Sen

IEEE International Conference on Robotics and Automation (ICRA) 2023

Generalizing Goal-Conditioned Reinforcement Learning with Variational Causal Reasoning

Wenhao Ding, Haohong Lin, Bo Li, Ding Zhao

Conference on Neural Information Processing Systems (NeurIPS) 2022

SafeBench: A Benchmarking Platform for Safety Evaluation of Autonomous Vehicles

**Chejian Xu, *Wenhao Ding, Weijie Lyu, Zuxin Liu, Shuai Wang, Yihan He, Hanjiang Hu, Ding Zhao, Bo Li*

Conference on Neural Information Processing Systems (NeurIPS) 2022

CausalAF: Causal Autoregressive Flow for Goal-Directed Safety-Critical Scenes Generation

Wenhao Ding, Haohong Lin, Bo Li, Ding Zhao

Conference on Robot Learning (CoRL) 2022

**A Survey on Safety-critical Scenario Generation for Autonomous Driving
– A Methodological Perspective**

Wenhao Ding, Chejian Xu, Haohong Lin, Bo Li, Ding Zhao

IEEE Transactions on Intelligent Transportation Systems (T-ITS), 2023

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

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

Preprint arXiv:2209.08025

Semantically Controllable Scene Generation with Guidance of Explicit Knowledge

Wenhao Ding, Bo Li, Kim Ji Eun, Ding Zhao

Preprint arXiv:2106.04066

Certifiable Deep Importance Sampling for Rare-Event Simulation of Black-Box Systems

Mansur Arief, Yuanlu Bai, Wenhao Ding, Shengyi He, Zhiyuan Huang, Henry Lam, Ding Zhao

Preprint arXiv:2111.02204

Multimodal Safety-Critical Scenarios Generation for Decision-Making Algorithms Evaluation

Wenhao Ding, Baiming Chen, Bo Li, Kim Ji Eun, Ding Zhao

IEEE Robotics and Automation Letters (RA-L)

Context-Aware Safe Reinforcement Learning for Non-Stationary Environments

Baiming Chen, Zuxin Liu, Jiacheng Zhu, Mengdi Xu, Wenhao Ding, Liang Li, Ding Zhao

IEEE International Conference on Robotics and Automation (ICRA) 2021

Task-Agnostic Online Reinforcement Learning with an Infinite Mixture of Gaussian Processes

Mengdi Xu, Wenhao Ding, Jiacheng Zhu, Zuxin Liu, Baiming Chen, Ding Zhao

Neural Information Processing Systems (NeurIPS) 2020

**Deep Probabilistic Accelerated Evaluation: A Certifiable Rare-Event Simulation
Methodology for Black-Box Autonomy**

Mansur Arief, Zhiyuan Huang*, Guru Kumar, Yuanlu Bai, Wenhao Ding, Henry Lam, Ding Zhao*

Artificial Intelligence and Statistics (AISTATS) 2021

Learning to Collide: An Adaptive Safety-Critical Scenarios Generating Method

Wenhao Ding, Baiming Chen, Minjun Xu and Ding Zhao

IEEE International Conference on Intelligent Robots and Systems (IROS) 2020

Adaptive Multi-scale Detection of Acoustic Events

Wenhao Ding and Liang He

IEEE/ACM Transactions on Audio, Speech, and Language Processing (T-ASLP)

CMTS: Conditional Multiple Trajectory Synthesizer for Generating Safety-critical Driving Scenarios

Wenhao Ding, Mengdi Xu and Ding Zhao

IEEE International Conference on Robotics and Automation (ICRA) 2020

A New Multi-vehicle Trajectory Generator to Simulate Vehicle-to-Vehicle Encounters

Wenhao Ding, Wenshuo Wang and Ding Zhao

IEEE International Conference on Robotics and Automation (ICRA) 2019

Prior Knowledge-based Regularization for Sound Event Localization and Detection

Wenhao Ding, Jingyang Zhang* and Liang He*

Detection and Classification of Acoustic Scenes and Events Challenge 2019 (Task 3)

Multi-Scale Time-Frequency Attention for Acoustic Event Detection

Jingyang Zhang, **Wenhao Ding**, Jintao Kang and Liang He
Interspeech 2019

MTGAN: Speaker Verification through Multitasking Triplet Generative Adversarial Networks
Wenhao Ding and Liang He
Interspeech 2018

Hierarchical Reinforcement Learning Framework towards Multi-agent Navigation
Wenhao Ding, Shuaijun Li and Huihuan Qian
IEEE International Conference on Robotics and Biomimetics (ROBIO) 2018

Vehicle Pose and Shape Estimation through Multiple Monocular Vision
Wenhao Ding, Shuaijun Li, Guilin Zhang, Xiangyu Lei and Huihuan Qian
IEEE International Conference on Robotics and Biomimetics (ROBIO) 2018

WORK EXPERIENCE

Amazon Lab126, Sunnyvale, CA, USA <i>Applied Scientist Intern</i>	<i>May 2022 - Aug 2022</i>
Bosch Center for Artificial Intelligence, Pittsburgh, PA, USA <i>Machine Learning Research Intern</i>	<i>May 2021 - Aug 2021</i>
Tsinghua University, Beijing, China <i>Research Engineer</i>	<i>July 2018 - Aug 2019</i>
Chinese University of HongKong, HongKong, China <i>Research Assitant</i>	<i>July 2017 - Sep 2017</i>

ACADEMIC SERVICES

Conference Reviewer:	ICML 22-23, ICLR 22-23, NeurIPS 21-22 (top reviewer), ECCV 22, CVPR 22-23, ICCV 21-23, ICRA 20-23, IROS 20-22, ICME 20-23
Journal Reviewer:	TMLR, IEEE RA-L, IEEE Access, IEEE T-ITS, IEEE TII, IEEE MM
Organizer:	CVPR 2023 Secure and Safe Autonomous Driving Workshop and Challenge ICRA 2022 SeasonDepth Challenge
Program Committee:	NeurIPS 2022 ML4AD Workshop, NeurIPS 2022 TSRML Workshop, IJCAI 2022 AI4AD Workshop and Challenge

STUDENTS MENTORED

Haohong Lin, <i>Ph.D. student in CMU</i>	<i>Aug 2021 - Now</i>
Shuai Wang, <i>Master's student in CMU</i>	<i>Aug 2021 - Now</i>
Guilin Zhang, <i>Master's student in CMU, now in Google</i>	<i>Aug 2021 - May 2022</i>
Yihan He, <i>Master's student in CMU, now in DeepRoute</i>	<i>Aug 2021 - May 2022</i>
Jiayi Xia, <i>Master's student in CMU, now in Zoox</i>	<i>Oct 2021 - May 2022</i>
Minjun Xu, <i>Master's student in CMU, now in Akuna Capital</i>	<i>Oct 2020 - May 2021</i>
Manoj Bhat, <i>Master's student in CMU, now in Amazon</i>	<i>Oct 2020 - May 2021</i>

TALKS

Generalizing Goal-Conditioned Reinforcement Learning with Variational Causal Reasoning <i>AI Timer, China (online)</i>	<i>Feb 16 2023</i>
Safety-critical Scenarios Generation with Causal Discovery <i>Wayve, UK (online)</i>	<i>Oct 26 2022</i>
Safety-Critical Driving Scenario Generation – and What Lessons We Have Learned <i>University of Pennsylvania, USA (online), host by Prof. Rahul Mangharam</i>	<i>Feb 28 2022</i>
Safety-critical Scenarios Generation for Autonomous Vehicles <i>Stanford University, USA (online), host by Prof. Mykel Kochenderfer</i>	<i>Jan 31 2022</i>