Yaru Niu

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Education

Carnegie Mellon University — Pittsburgh, PA
Ph.D. in Mechanical Engineering, Safe AI Lab — *Aug. 2022 – Present*
Advisor: Prof. Ding Zhao

Gerogia Institute of Technology — Atlanta, GA
M.S. in Electrical and Computer Engineering, CORE Robotics Lab — *Aug. 2019 – April 2022*
Advisor: Prof. Matthew Gombolay

South China University of Technology (SCUT) — Guangzhou, China
B.Eng. in Intelligence Science and Technology — *Sep. 2015 – June 2019*
Advisor: Prof. Zhijun Zhang

University of California, Irvine — Irvine, CA
Visiting Student in the Department of EECS — *June 2018 – Aug. 2018*

University of California, Berkeley — Berkeley, CA
Exchange Student, Concentration in Computer Science — *Aug. 2018 – Dec. 2018*

Publications

(* indicates equal contributions)

1. Changyi Lin, Xingyu Liu, Yuxiang Yang, **Yaru Niu**, Wenhao Yu, Tingnan Zhang, Jie Tan, Byron Boots, Ding Zhao. LocoMan: Advancing Versatile Quadrupedal Dexterity with Lightweight Loco-Manipulators. *International Conference on Intelligent Robots and Systems (IROS)*, 2024.
2. Yuyou Zhang, **Yaru Niu**, Xingyu Liu, Ding Zhao. COMPOSER: Scalable and Robust Modular Policies for Snake Robots. *International Conference on Robotics and Automation (ICRA)*, 2024.
3. Haohong Lin, Wenhao Ding, Zuxin Liu, **Yaru Niu**, Jiacheng Zhu, Yuming Niu, Ding Zhao. Safety-aware Causal Representation for Trustworthy Reinforcement Learning in Autonomous Driving. *Robotics and Automation Letters (RA-L)*, 2024.
4. **Yaru Niu**, Shiyu Jin*, Zeqing Zhang*, Jiacheng Zhu, Ding Zhao, Liangjun Zhang. GOATS: Goal Sampling Adaptation for Scooping with Curriculum Reinforcement Learning. *International Conference on Intelligent Robots and Systems (IROS)*, 2023.
5. Mengdi Xu, Peide Huang, **Yaru Niu**, Visak Kumar, Jielin Qiu, Chao Fang, Kuan-Hui Lee, Xuewei Qi, Henry Lam, Bo Li, Ding Zhao. Group Distributionally Robust Reinforcement Learning with Hierarchical Latent Variables. *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2023.
6. Lingfeng Sun*, Chen Tang*, **Yaru Niu**, Enna Sachdeva, Chiho Choi, Teruhisa Misu, Masayoshi Tomizuka, Wei Zhan. Domain Knowledge Driven Pseudo Labels for Interpretable Goal-conditioned Interactive Trajectory Prediction. *International Conference on Intelligent Robots and Systems (IROS)*, 2022.
7. **Yaru Niu**. Adaptable and Scalable Multi-Agent Graph-Attention Communication. *Master's Thesis, Georgia Institute of Technology*, 2022.
8. Rohan Paleja*, **Yaru Niu***, Andrew Silva, Chace Ritchie, Sugju Choi, Matthew Gombolay. Learning Interpretable, High-Performing Policies for Autonomous Driving. *Robotics: Science and Systems (RSS)*, 2022.
9. **Yaru Niu***, Rohan Paleja*, Matthew Gombolay. Multi-Agent Graph-Attention Communication and Teaming. *International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2021 (**Oral**).
10. **Yaru Niu***, Rohan Paleja*, Matthew Gombolay. MAGIC: Multi-Agent Graph-Attention Communication. *Mair2 Workshop at International Conference on Computer Vision (ICCV)*, 2021 (**Best Paper Award**).
11. Zhijun Zhang*, **Yaru Niu***, Ziyi Yan, Shuyang Lin. Real-time Whole-body Imitation by Humanoid Robots and Task-oriented Teleoperation Using an Analytical Mapping Method and Quantitative Evaluation. *Applied Sciences (Special Issue Human-Friendly Robotics, Impact Factor: 2.217)*, 2018.

12. Zhijun Zhang, **Yaru Niu**, Shangen Wu, Shuyang Lin, Lingdong Kong. Analysis of Influencing Factors on Humanoid Robots' Emotion Expressions by Body Language. *International Symposium on Neural Networks (ISNN), Lecture Notes in Computer Science (LNCS), Springer*, 2018.
13. Zhijun Zhang, Lingdong Kong, **Yaru Niu**. A Time-Varying-Constrained Motion Generation Scheme for Humanoid Robot Arms. *International Symposium on Neural Networks (ISNN), Lecture Notes in Computer Science (LNCS), Springer*, 2018.

Preprints

(* indicates equal contributions)

1. Yuming Feng*, Chuye Hong*, **Yaru Niu***, Shiqi Liu, Yuxiang Yang, Wenhao Yu, Tingnan Zhang, Jie Tan, Ding Zhao. Learning Multi-Agent Loco-Manipulation for Long-Horizon Quadrupedal Pushing. *arXiv Preprint*, 2024.
2. Rohan Paleja*, Letian Chen* **Yaru Niu***, Andrew Silva, Zhaoxin Li, Songan Zhang, Chace Ritchie, Sugju Choi, Kimberlee Chestnut Chang, Hongtei Eric Tseng, Yan Wang, Subramanya Nageshrao, Matthew Gombolay. Learning Interpretable, High-Performing Policies for Continuous Control. Submitted to *Journal of Machine Learning Research (JMLR)*, 2023.
3. Mengdi Xu*, Peide Huang*, Wenhao Yu, Shiqi Liu, Xilun Zhang, **Yaru Niu**, Tingnan Zhang, Fei Xia, Jie Tan, Ding Zhao. Creative Robot Tool Use with Large Language Models. *arXiv Preprint*, 2023.
4. Lingdong Kong, Shaoyuan Xie, Hanjiang Hu, **Yaru Niu**, et al. The RoboDrive Challenge: Drive Anytime Anywhere in Any Condition. *arXiv Preprint*, 2024.
5. Lingdong Kong, **Yaru Niu**, Shaoyuan Xie, Hanjiang Hu, et al. The RoboDepth Challenge: Methods and Advancements Towards Robust Depth Estimation. *arXiv Preprint*, 2023.
6. Zhijun Zhang (PI), Lingdong Kong, **Yaru Niu**, Ziyang Liang. Modification of Gesture-Determined-Dynamic Function with Consideration of Margins for Motion Planning of Humanoid Robots. *arXiv Preprint*, 2020.

Patents

1. Zhijun Zhang, **Yaru Niu**. A Mapping Method of Human Postures Applied to Motion Imitation by Humanoid Robots (Translated from Chinese). *Published Authorization Number: CN107953331B.*
2. Zhijun Zhang, **Yaru Niu**. A Similarity Evaluation Method of Imitation by Humanoid Robots (Translated from Chinese). *Published Authorization Number: CN107818318B.*
3. Zhijun Zhang, **Yaru Niu**, Hao Wang. A Mapping Method of Human Body's Rotation and Displacement Applied to Humanoid Robots (Translated from Chinese). *Published Authorization Number: CN108858188B.*
4. Zhijun Zhang, **Yaru Niu**, Hao Wang. An Evaluation Metric of Humanoid Robot and Human Posture Similarity (Translated from Chinese). *Published Application Number: CN109064486A.*

Research Experience

Bosch Center for Artificial Intelligence May 2024 – Aug. 2024
Machine Learning Research Intern *Mentors: Bingqing Chen, Jonathan Francis, Zhenzhen Li*

Baidu Research Jan. 2022 – July 2022
Research Intern, Robotics and Autonomous Driving Lab (RAL) *Mentor: Liangjun Zhang*

University of California, Berkeley July 2021 – Feb. 2022
Research Intern, Mechanical Systems Control (MSC) Lab *Advisor: Masayoshi Tomizuka*

Georgia Institute of Technology Jan. 2020 – May 2022
Graduate Research Assistant, Cognitive Optimization and Relational Robotics Lab *Advisor: Matthew Gombolay*

South China University of Technology Aug. 2016 – June 2019
Undergraduate Researcher, Bionic Intelligent Robot (BIR) Lab *Advisor: Zhijun Zhang*

University of California, Irvine Summer 2018
Undergraduate Researcher, Advanced Integrated Cyber-Physical Systems (AICPS) Lab *Advisor: Al Faruque*

Teaching Experience

24784 Trustworthy Artificial Intelligence Jan. 2024 – May 2024
Graduate Teaching Assistant, Carnegie Mellon University

CS 4731/7632 Game Artificial Intelligence June 2020 – Dec. 2020
Graduate Teaching Assistant, Georgia Institute of Technology

CS 4641 Machine Learning Jan. 2021 – May 2021
Graduate Teaching Assistant, Georgia Institute of Technology

Honors & Awards

Georgia Tech ECE Fellowship Feb. 2022

Best Paper Award, ICCV 2021 Mair2 Workshop (top 1) Oct. 2021

AAMAS 2021 Scholarship Feb. 2021

National Motivational Scholarship (twice), awarded by Ministry of Edu. of China (rank 2/51) Nov. 2016, 2018

The Jetta Scholarship, awarded by Jetta Company Limited (rank 3/51) Dec. 2017

SCUT Scholarship, awarded by SCUT (rank 3/51) Nov. 2017

2^{nd} **Prize in China Undergrad. Math. Contest in Modeling (CUMCM)** (top 5% in SCUT) Oct. 2017

1^{st} **Prize of Guangdong Province in CUMCM** (top 5% in SCUT) Oct. 2017

Academic Service

Reviewer: RA-Letters, CoRL, ICRA, IROS, WAFR, MRS, ICLR, NeurIPS, AISTATS
Program Committee: NeurIPS 2023-2024 Workshop on Foundation Models and Decision Making (FMDM), CoRL 2023 Workshop on Language and Robot Learning (LangRob), Machine Learning for Autonomous Driving (ML4AD) Symposium 2023, NeurIPS 2022 Workshop on ML4AD
Organizer: ICRA 2024 RoboDrive Challenge, ICRA 2023 RoboDepth Challenge