Zifan **Xu**

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Education

The University of Texas at Austin — *Austin, TX*

PH.D. IN COMPUTER SCIENCE — *Sep. 2021 - present*

- Graduate Courses: Reinforcement Learning, Machine Learning, Robot Learning.
- Advised by Dr. Peter Stone, Learning Agents Research Group (LARG).
- Research Area : Curriculum Learning, Deep Reinforcement Learning (RL), Meta Learning, Autonomous Navigation.

The University of Texas at Austin — *Austin, TX*

M.S. IN PHYSICS — *Sep. 2018 - Jul. 2021*

University of Science and technology of China — *Hefei, Anhui*

B.S. IN PHYSICS — *Sep. 2014 - Jul. 2018*

Projects

RL-based Autonomous Navigation in Highly-Constraint Spaces — *Austin, TX*

ADVISED BY PROF. PETER STONE AT LARG — *Nov. 2019 - present*

- [BARN competition]: organized a competition for autonomous navigation in highly-constrained spaces at ICRA 2022. [Website] [Report]
- [Navigation Benchmark]: benchmarked different deep RL methods for autonomous navigation, including base-RL algorithms (TD3, SAC, and DDPG), model-based RL algorithms (Dyna-style, MPC, and MBPO), safe RL (Lagrangian-based method), and architectures (CNN, RNN, and transformer). [Paper]
- [APPLR]: applied deep RL policy to improve classical local planners by dynamically adjusting the hyper-parameters. [Paper]

Curriculum Learning for Deep RL — *Austin, TX*

ADVISED BY PROF. PETER STONE AT LARG — *Nov. 2019 - Present*

- [MM-ACL]: leveraged meta-learning to improve the curriculum learning on a set of similar tasks. [Paper]
- [Task factorization]: studied curriculum learning for deep RL with different task factorization methods. [Paper]

Retrieval-Augmented LLMs for Challenging Reasoning Tasks @ AWS Titan Lab — *Arlington, VA*

ADVISED BY PROF. YANJUN QI AT AWS — *Jun. 2023 - Aug. 2023*

- [RSD]: developed Reasoning Skill Discovery (RSD) that leverage unsupervised feature representation learning to improve the performance of LLMs on challenging reasoning tasks by up to 6% success rates. [Paper]

Lifelong Learning Machine (L2M) - DARPA — *Austin, TX*

ADVISED BY PROF. ERIC EATON AT LARG — *Nov. 2019 - Jun. 2022*

- Applied lifelong learning algorithms to autonomous mobile service robots that enables continuous deployments of the robots across novel, unstructured environments. [Poster]
- Developed object detection module based on YOLOv5 for a autonomous service robot that simultaneously build the object maps for searching different objects as requested.

Publications

INTERNATIONAL CONFERENCE ON ROBOTICS AND AUTOMATION (ICRA) *Areas: [ML, RL, Autonomous Navigation]*

- "Benchmarking Reinforcement Learning Techniques for Autonomous Navigation", Zifan Xu, Bo Liu, et. al. *ICRA 2023.*
- "APPLR: Adaptive Planner Parameter Learning from Reinforcement", Zifan Xu, et al. *ICRA 2021.*

CONFERENCE ON LIFELONG LEARNING AGENTS (COLLAS) *Areas: [RL, Meta Learning]*

- "Model-Based Meta Automatic Curriculum Learning", Zifan Xu, et al. *CoLLAs 2023.*

INTERNATIONAL CONFERENCE ON MACHINE LEARNING (ICML) *Areas: [ML, RL, Causal Learning]*

- "Causal Dynamics Learning for Task-Independent State Abstraction", Zizhao Wang, Xuesu Xiao, Zifan Xu, Yuke Zhu, and Peter Stone. *ICML 2022.*

INTERNATIONAL SYMPOSIUM ON SAFETY, SECURITY, AND RESCUE ROBOTICS (SSRR) *Areas: [ML, RL, Autonomous Navigation]*

- "Machine Learning Methods for Local Motion Planning: A Study of End-to-End vs. Parameter Learning", Zifan Xu, et al. *SSRR 2021.*

Skills

- Languages : Python, C++, Matlab, Arduino Language
- Libraries : OpenCV, PyTorch, ROS, scikit-learn, JAX
- Software : MuJoCo, Gazebo, Git