Xinwei Gao

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EDUCATION

Master of Science in Mechanical Engineering, National University of Singapore, Singapore; 2021 – 2022

- GPA: 4.40/5.00
- Modules: Deep Learning for Robotics, Neural Networks, Machine Vision

Bachelor of Science in Mechanical Engineering, Nanjing University of Science and Technology, China; 2017 – 2021

- GPA: 3.22/4.00
- Modules: Artificial Intelligence; Modern Control System; Electrotechnics; Mechanical Manufacture
- Awards: Outstanding Graduate Award in Mechanical Engineering

RESEARCH INTEREST

Reinforcement Learning; Safety mechanisms of Machine Learning; Game Theory; Multi-Agent System. Seeking to expand into emerging fields like generative AI, continuous learning, federated learning, and related areas.

RESEARCH EXPERIENCE

AI Singapore: Short Regret Reinforcement Learning in Trainer-Trainee System; December 2023 - Present

- Introduces a theoretical approach that leverages regret minimization within a teacher-student framework to provide immediate training feedback and fairness comparison. This approach allowing real-time updates with sample efficiency while preserving optimal solution for the long-horizon problem.

AI Singapore: Constrained Lane Keeping in Simulation-to-Real Environment; October 2022 - Present

- Formulate a constraint Lane Following problem which is sensitive to the lane deviation for safety consideration. Design a Lane Following algorithm on continuous and discrete space. This approach outperforms various baselines in terms of performance.

Mechanical Engineering Project: Individual Voting for RL and Search-based Algorithm Combination in Multi-agent Pathfinding; Aug 2021 - Oct 2022

- Proposed a mechanism optimize the pathfinding algorithm in dead/livelock situations by learning to combine a decentralized RL algorithm and a search-based algorithm. This approach outperforms various baselines in terms of the runtime of planning algorithm and the completion rate of robot path planning tasks.

Final Year Project: Reinforcement Learning in Continuous Control Problem; Sept 2020 - May 2021

- Implemented a RL-based algorithm for robust manipulator operation using RGB image inputs and Cartesian coordinate outputs. Achieved autonomous grasping for arbitrary workpiece structures.

WORK EXPERIENCE

Research Associate; Prof. Arvind Easwaran, CPS Research Group, NTU, Singapore; October 2022 - Present

- ML safety navigation algorithm design and robot control architecture development for CPS system.
- Research on automated assessment of trustworthiness for AI Training Programs (ATP).

Student Researcher; Prof. Guillaume SARTORETTI, MARMOT Lab, NUS, Singapore; April 2022 - May 2022

- Multi-agent Pathfinding research for warehouse systems.
- Reinforcement learning-based path planner design.
- Algorithm performance testing, baseline comparison and results summarization.

AWARDS & HONORS

Outstanding Graduate Award in Mechanical Engineering, NJUST, China, 2021

School of Mechanical Engineering School-level Scholarship, NJUST, China, Spring 2019-2020

Second Prize in Jiangsu Province Mechanics Competition, China, 2019

Outstanding Organizer of Literary Activities in Student Union, NJUST, China, Spring 2019

School of Mechanical Engineering School-level Scholarship, NJUST, China, Spring 2018-2019

School of Mechanical Engineering School-level Scholarship, NJUST, China, Fall 2018-2019

School of Mechanical Engineering School-level Scholarship, NJUST, China, Spring 2017-2018

SKILLS AND INTERESTS

Coding Skills: Python, C++
Scientific Tools: MATLAB, Origin
Operating Systems: Linux, ROS, Docker
CAD Software: AutoCAD, SolidWorks
Game Development: Unity, OpenAI Gym

REFERENCE

Prof. Arvind Easwaran
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