XINWEI GAO

PROFESSIONAL SUMMARY

Candidates possess in-depth expertise in machine learning research and algorithm development. Proficient in problem formulation, designing experiments, collecting and analyzing research data. Excellence in teamwork and leadership capabilities.

PROFESSIONAL EXPERIENCE

Research Associate, 10/2022 to Current
Arvind Easwaran, CPS Research Group, NTU - Singapore

- Research into ML safety in Cyber-Physical Systems field.
- Design and develop safety navigation algorithm for CPS system.
- Develop robot control architecture for CPS system navigation.
- Data collection and summarize developed algorithm.
- Set up equipment, organized inventory and maintained facilities.

Student Researcher, 04/2022 to 05/2022
Guillaume SARTORETTI, MARMOT Lab, NUS - Singapore

- Research into Multi-agent Pathfinding for warehouse system.
- Design and develop reinforcement learning based path planner for Multi-agent Pathfinding.
- Test performance of designed algorithm under specific test sets and collect experiment data.
- Compare with baseline planners and summarize experiment results.

EDUCATION

Master of Science, Mechanical Engineering, 06/2022
National University of Singapore - Singapore

Bachelor of Science, Mechanical Engineering, 07/2021
Nanjing University of Science And Technology - Nanjing, China

RESEARCH EXPERIENCE

Oct 2021~Present: "CRADLE: Constrained Reinforcement for Autonomous Driving Learning in Simulation-to-Real Environment" (Under Review)
Proposed a constraint-RL based formulation for the autonomous driving problem with lane offset and collisions constraints. Developed a autonomous driving algorithm which is maximizing the driving distance while adhering to two different constraints. Proposed approach performs better than the previous RL-based approach on the specific autonomous driving task.

CONTACT

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WEBSITES

- xinweigao.com
- linkedin.com/in/sherwin-xinwei-gao/
- github.com/GAO-XINWEI

SKILLS

- Languages: Python, C++
- Scientific Packages: MATLAB
- OS: Linux, ROS, Docker
- CAD: AutoCAD, SolidWorks
- Game Development: Unity

Aug 2021~Oct 2022: Mechanical Engineering Project "Individual Voting for RL and Search-based Algorithm Combination in Multi-agent Pathfinding."
Proposed an Individual Voting mechanism to optimize the algorithm's performance in dead/livelock situations. A decentralized RL algorithm and a centralized search-based algorithm are learned to combine by Individual Voting. This mechanism significantly increase the number of successful pathfinding agents and the path planning efficiency.

Sept 2020~May 2021: Final year project "The Application of Reinforcement Learning in Continuous Control Problem."
Apply a reinforcement learning based algorithm for manipulator's robust operation. RGB image is input to policy network, and Cartesian coordinate variables is output for manipulator controlling in continuous space. The algorithm achieve autonomous grasping task for various workpieces structure without manually adjusture the control algorithm.