Chenning Yu

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RESEARCH INTEREST

Deep Learning; Generative Agents; Robotics; Graph Neural Networks; Multi-Agent Planning

EDUCATION

University of California, San Diego
○ Ph.D. in Computer Science, Advisor: Prof. [Sicun Gao]   *Sept. 2021 - Jan. 2025 (Expected)*

University of California, San Diego
○ M.S. in Computer Science   *Sept. 2019 - Jun. 2021*

PUBLICATION

6. [**ICRA 23**] <u>Chenning Yu</u>*, Qingbiao Li*, Sicun Gao, Amanda Prorok. "Accelerating Multi-Agent Planning Using Graph Transformers with Bounded Suboptimality." *IEEE International Conference on Robotics and Automation*, 2023.

5. [**NeurIPS 23**] Milan Ganai, Zheng Gong, <u>Chenning Yu</u>, Sylvia Herbert, Sicun Gao. "Iterative Reachability Estimation for Safe Reinforcement Learning." *The Conference on Neural Information Processing Systems*, 2023.

4. [**IROS 23**] Hongzhan Yu, Chiaki Hirayama, <u>Chenning Yu</u>, Sylvia Herbert, Sicun Gao. "Sequential Neural Barriers for Scalable Dynamic Obstacle Avoidance." *IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2023. *Best Robocup Paper Award.*

3. [**CoRL 22**] <u>Chenning Yu</u>, Hongzhan Yu, Sicun Gao. "Learning Control Admissibility Models with Graph Neural Networks for Multi-Agent Navigation." *The Conference on Robot Learning*, 2022.

2. [**NeurIPS 22**] Ruipeng Zhang, <u>Chenning Yu</u>, Jingkai Chen, Chuchu Fan, Sicun Gao. "Learning-based Motion Planning in Dynamic Environments Using GNNs and Temporal Encoding." *The Conference on Neural Information Processing Systems*, 2022.

1. [**NeurIPS 21**] <u>Chenning Yu</u>, Sicun Gao. "Reducing Collision Checking for Sampling-Based Motion Planning Using Graph Neural Networks." *The Conference on Neural Information Processing Systems*, 2021.

ACADEMIC EXPERIENCE

Reliable Autonomous Systems Lab, MIT   *Jun. 2022 - Oct. 2022*
Designing Generalizable Reinforcement Learning Agents with Highly Safe Performances   Advisor: Prof. *[Chuchu Fan]*
○ Designed a set-theoretic formulation of RL policies to guarantee the forward invariance for safety-critical constraints.
○ Generalized the RL agents to out-of-distribution tasks using the compositionality, and attaining highly safe performances.
○ Tested the approach in a safety-critical MuJoCo robot environment with a performance of over 90% per-state safeness.

Prorok Lab, University of Cambridge   *Jun. 2022 - Sept. 2022*
Accelerating Multi-Agent Planning using Graph Transformers and Contrastive Learning   Advisor: Prof. *[Amanda Prorok]*
○ Incorporated the Graph Transformers into a provably near-optimal planning framework for computation acceleration.
○ Analyzed the approach in continuous clustered environments up to 30 agents, which are infeasible for traditional planners.
○ Increased the success rates of the multi-agent planners by over 25% on average, with near-optimal performances.

Automation Algorithms Group, UC San Diego   *Feb. 2020 - Present*
Accelerating Motion Planning using Graph Neural Networks and Imitation Learning   Advisor: Prof. *[Sicun Gao]*
○ Applied Graph Neural Networks to motion planning tasks, which enables faster planning with success rate guarantees.
○ Evaluated the method with PyBullet robot arms from 2 to 14 degrees of freedom. The result has a 99% success rate and requires only 17% of the collision checking queries compared to the state-of-the-art learning-based planner.
○ Extended the proposed method to dynamic environments and accelerated the total planning time by up to 95%.

TECHNICAL SKILLS

Programming	Python, Bash, MATLAB
Development & Tools	PyTorch, JAX, TensorFlow, PyBullet, Jupyter Notebook, ROS, Raspberry Pi, Linux, Git

PROFESSIONAL ACTIVITIES

Conference Reviewer	AAAI 2023, ICLR 2024, ICRA 2023/2024, L4DC 2023, NeurIPS 2023