Fan Yang

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Google Scholar

Education

Carnegie Mellon University Aug 2021 – Present
Master of Science in Robotics *Pittsburgh, PA, US*

Stanford University Jun 2018 – Aug 2018
Summer Session *Stanford, CA, US*

Tsinghua University Aug 2016 – Jun 2020
Bachelor of Engineering in Engineering Mechanics (Honor program, Qian Class) *Beijing, China*

Research Experience

Graduate Research Assistant at *Carnegie Mellon University* Aug. 2021 – Present
Advisor: David Held *Pittsburgh, PA, US*

- Designed a hierarchical framework that uses trajectory optimization as a low-level policy to ensure safety constraints. It achieves state-of-the-art performance for the safety gym benchmark tasks.
- Combined high-level motion planning with low-level policy in long-horizon manipulation tasks.
- Investigated extracting better representations of point cloud for manipulation tasks inspired by contact points.

Research Assistant at *Tsinghua University* Aug. 2020 – Jun. 2021
Advisor: Huaping Liu *Beijing, China*

- Developed an adversarial training method to make robots robust to joint damage.
- Developed a set of continual learning tasks and evaluated SOTA continual learning algorithm in RL domain. Demonstrated the gap of continual learning algorithm on RL tasks.

Research Assistant at *University of California, Berkeley* Sep. 2019 – Mar. 2020
Advisor: Masayoshi Tomizuka *Berkeley, CA, US*

- Developed an algorithm that extracts the relation between multiple agents and predict their trajectories with multi-modalities in a highly interactive and dynamical system, e.g. traffic, and physical particles.
- Designed a hybrid attention mechanism by using RL to prune unimportant edges in a graph and applying soft attention on the remaining graph in trajectory predictions.

Research Assistant at *Stanford University* Jun. 2019 – Aug. 2020
Advisor: Oussama Khatib *Stanford, CA, US*

- Developed an operational-space compliant control method with an optimization algorithm to select grasping points. Given only rough geometry and location of the objects, our method can grasp objects precisely without any force, tactile or vision sensing.

Research Assistant at *Purdue University* Aug. 2018 – Jan. 2020
Advisor: Richard Voyles *West Lafayette, IN, US*

- Developed mathematical formulations for an operational space hierarchical controller for Unmanned Aerial Vehicles with a parallel manipulator, including Jacobian matrix, mass matrix, and null space control.

Publications

Yang, Fan, Wenxuan Zhou, Harshit Sikchi, and David Held. "Self-Paced Policy Optimization with Safety Constraints.". ICML Safe Learning for Autonomous Driving Workshop, 2022

Yang, Fan, Chao Yang, Huaping Liu, and Fuchun Sun. "Evaluations of the Gap between Supervised and Reinforcement Lifelong Learning on Robotic Manipulation Tasks." In Conference on Robot Learning, pp. 547-556. PMLR, 2022.

Yang, Fan, Chao Yang, Di Guo, Huaping Liu, and Fuchun Sun. "Fault-aware robust control via adversarial reinforcement learning." In 2021 IEEE 11th Annual International Conference on CYBER Technology in Automation, Control, and Intelligent Systems (CYBER), pp. 109-115. IEEE, 2021.

Li, Jiachen, **Fan Yang**, Hengbo Ma, Srikanth Malla, Masayoshi Tomizuka, and Chiho Choi. "Rain: Reinforced hybrid attention inference network for motion forecasting." In Proceedings of the IEEE/CVF International Conference on Computer Vision, pp. 16096-16106. 2021.

Li, Jiachen*, **Fan Yang***, Masayoshi Tomizuka, and Chiho Choi. "Evolvegraph: Multi-agent trajectory prediction with dynamic relational reasoning." Advances in neural information processing systems 33 (2020): 19783-19794.

Yang, Fan, Wenxuan Zhou, David Held. "Hera: Hierarchical Reinforcement Learning with Safe Motion Planning". To be submitted to Robotics: Science and Systems 2023.

Awards & Honors

Academic Excellence Scholarship (Awarded to the top 30% of students)
Tsinghua University *2018 & 2017*

Xuetang Scholarship (Awarded to 200 out of 3000 students)
Tsinghua University *2019 & 2018 & 2017*

Overall Excellence Scholarship (awarded to 10% of the students)
Tsinghua University *2018*

Specialized Skills

Programming Languages: Python, C, C++, Julia, MATLAB
Libraries: Pytorch, ROS
Software: SolidWorks, Abaqus

Academic Services

- Reviewer of International Conference on Robotics and Automation (ICRA), Conference on Robotic Learning (CORL), Intelligent Vehicles Symposium (IV).

Competition

- Fourth in MineRL Competition of NeurIPS 2020, advised by Prof. Lin Shao and Prof. Jiankun Wang