Yixiao Wang

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Education

University of California, Berkeley — **California, USA**

PhD student in Mechanical Engineering, GPA: 4.0/4.0 — Sept. 2022 – Present

- Research Interests: Behavior representation and prediction, Planning and optimization, Diffusion model
- Research Advisor: Prof. Masayoshi Tomizuka, Member of the National Academy of Engineering

Northwestern University — **Illinois, USA**

Master in Mechanical Engineering, GPA: 4.0/4.0 — Sept. 2019 – June 2021

Shanghai Jiao Tong University — **Shanghai, China**

Master in Mechanical Engineering — Sept. 2018 – Mar. 2021

B.S. in Mechanical Engineering, GPA: 3.8/4.3 Rank: 5% — Sept. 2014 – June 2018

Selected Research Experience

Distributed Multi-agent Interaction with Imagined Potential Games — Mar. 2024 – Present

- Formulate a distributed multi-agent interactive policy as an imagined potential game solution, imagine negotiation between agents, and solve it in an imagined centralized setting. It can plan multi-agent actions, especially when other distributed planners do not have a solution, such as in a deadlock situation.

Efficient and Reusable Diffusion Policy for Multi-task Learning — Dec. 2023 – Present

- Design a sparse and computationally efficient vision encoder and diffusion policy network as well as training strategy for multi-task learning to extract shared knowledge across tasks and prevent forgetting in continuous learning. Test multi-task and continuous learning in Robomimic, showing enhanced performance, few-shot ability, and fast fine-tuning on new tasks. Targeting submission to CoRL 2024.

Towards Efficient and Explainable Representation in Diffusion — Oct. 2023 – Present

- Compress and extract features in diffusion model, and investigate diminishing mechanism. Test in semantic correspondence datasets including SPair-71K and rank 1st. Targeting submission to NeurIPS 2024.

Optimizing Diffusion Model for Controllable Joint Trajectory Prediction — Aug. 2023 – Feb. 2024

- Optimize the diffusion model with an explicit solution in a conditional multi-agent setting and propose a computationally effective gradient-based sampling method. Test on the Argoverse 2 dataset, showing enhanced performance with fewer diffusion steps compared to the vanilla diffusion model and previous guided sampling methods. Submitted to ECCV 2024.

Socially-compliant MCTS-based Interactive Planning — Oct. 2022 – Feb. 2023

- Formulate a socially-compliant behavior model as a Nash Game for a distributed multi-agent setting and utilize Monte Carlo Tree Search (MCTS) to solve for interactive planning for each agent. Test in a closed-loop autonomous driving simulator, demonstrating controllable, safe, and diverse trajectory simulations.

Imitating Human Driver through Trajectory Prediction — Jan. 2022 – Aug. 2022

- Decouple the imitation learning objectives into priors learned as trajectory prediction tasks, and injected human-defined objectives learned as lightweight plug-in modules. It provides a customized warm start for the planning module, accelerating the optimization process. Test on closed-source data, demonstrating reliable and rapid adaptability when transferring to unseen scenarios or new traffic rules.

Toolpath Designing for Hub Surface Grinding — Oct. 2020 – Mar. 2021

- Proposed an boundary detection method based on Delaunay triangulation and Depth First Search, increasing the detection efficiency.

- Formed a sweeping surface segmentation module for arbitrary geometry.
- Calculated feed velocity and path spacing to minimize average residual volumes.
- Converted grinding interval movement designing into a TSP and solved it to decrease the production time.

Manufacturing Analysis and Toolpath Designing Jan. 2020 – Mar. 2021

- Analyzed heat transfer process and residual stress distribution in the manufacturing procedure, determined and validated the key factors influencing the final product property, designed a toolpath to improve the mechanical property of the product based on above analysis results.

Large Cylinder Machining Process and Mechanism Analysis Mar. 2017 – June 2018

- Analyzed the structural stiffness of the large cylinder using finite element method and simulated the distortion during the machining process.
- Designed the support structure for machining to decrease the distortion in the machining area and compensate it into feed length.

Skills

Languages	English - Fluent, Chinese - Native
Technical Skills	Pytorch, Python, C++, Matlab, Abaqus, UG

Selected Scholarship & Honor

Outstanding Graduates of Shanghai Jiao Tong University	Dec. 2020
Outstanding Graduates of Shanghai City (21/415)	June 2018
Scholarship of Shanghai City (9/415)	Dec. 2017
First Prize of SGMW Scholarship (Top 10%)	Oct. 2016
INESA Scholarship (Top 20%)	Dec. 2015