YIXIAO LI

Department of Mechanical Engineering, Tsinghua University

(+86)18999911262 ⋄ liyixiao18@mails.tsinghua.edu.cn

EDUCATION

Tsinghua University, Beijing

Bachelor in Mechanical Engineering   *August 2018 - Present*

Minor in Statistics   *September 2019 - Present*

GPA: 3.86/4.0

Rank: 6/97

RESEARCH EXPERIENCE

Hyperparameter Optimization for Hierarchical Long Short Term Safety Control   *July 2021 - Present*

Intelligent Control Lab, Carnegie Mellon University

Advisor: Prof.Changliu Liu

Hierarchical Long Short Term Safety Framework(HLSTS) is a general safety control algorithm which proves to be effective in motion planning under stochastic environments. However, extensive experiments show that the performance of HLSTS is heavily influenced by hyperparameters. In order to improve the reproducibility and fairness of the proposed HLSTS, we are developing a contextual optimization algorithm for HLSTS, which also has potential value such as reducing efforts in deploying HLSTS and improving performance.

- Developed a coarse-fine tuning optimization framework for HLSTS, which improved the efficiency of HLSTS by 40%.
- Currently work on active contextual optimization which enables faster deployment of HLSTS through Sim2Real transfer.

Dynamic Object Representation for Robotic Manipulation Task   *January 2021 - July 2021*

Institute of Mechatronics, Tsinghua University

Advisor: Prof.Chuxiong Hu

We proposed Dynamic Object-centric Representations, which are used to train a neural network for capturing the dynamic of robot-objects interactions. Combined with Model Predictive Controller(MPC), our model could be utilized to generate possible sequence of actions for robots to perform tasks, such as pushing.

- Adapted programs from simulation for real-world experiments.
- Developed research programs for data washing and visualization.
- Spent **35** days conducting real-world experiments and collected about **5,500** episodes of real-world training&validation data.
- Conducted ablation experiments to prove efficacy of the proposed method.
- Co-authored the paper *Learning Dynamic Object-centric Representations for Robot Manipulation*

Design of Mechanical Logic Gates Utilizing Origami Structure   *September 2019 - April 2020*

Institute of Solid Mechanics, Tsinghua University

Advisor: Prof.Changqin Chen

This research aimed at designing an possible origami structure for mechanical logic gates which utilized a proposed a bistability-based foldable origami structure. The obtained results illustrated a possible solution for more complex logic operations, such as data processing and storage.

- Contributed to establishing mechanical models for bistability-based foldable origami structures.
- Contributed to designing mechanical logic gates AND, OR, and NOT based on the proposed origami structure.
- Tested 4 different manufacture methods(i.e. laser cutting and 3D printing, etc.) for making prototypes of our design.

PUBLICATIONS

[1] Jiayu Wang, Yunan Wang*, **Yixiao Li***, Chuxiong HU* & Yu ZHU, Learning Dynamic Object-centric Representations for Robot Manipulation, Science China Technological Sciences(under review) (*These authors contributed to the work equllly and should be regarded as co-first authors.)

[2] Zhiqiang Meng, Weitong Chen, Tie Mei, Yuchen Lai, **Yixiao Li**, C.Q. Chen*, Bistability-based foldable origami mechanical logic gates. Extreme Mechanics Letters, 2021

TECHNICAL STRENGTHS

Programming	R, Python, MATLAB(Simulink) under Linux and Windows
Software & Tools	LaTex, Abaquas, SolidWorks, AutoCad