Hongyi Chen

Homepage:https://hychen-naza.github.io/ **Email:** hongyic@andrew.cmu.edu

RESEARCH INTERESTS

Robotics and Dexterous Manipulation: Bridge learning and control theory to create robust and efficient solutions for greater scopes of dexterous, contact-rich manipulation tasks.

EDUCATION

Carnegie Mellon University, 2nd year Ph.D in Robotics; May 2028 (Expected)

Georgia Institute of Technology, M.S in Robotics; May 2023

Carnegie Mellon University, M.S in Electrical and Computer Engineering; May 2021

Peking University, B.A in Economics; June 2019

Beijing University of Chemical Technology (BUCT),B.S in Applied Mathematics; June 2018

SELECTED PUBLICATIONS

[1] **Hongyi Chen**, Abulikemu Abuduweili, Aviral Agrawal, Yunhai Han, Harish Ravichandar, Changliu Liu, Jeffrey Ichnowski. KOROL: Learning Visualizable Object Feature with Koopman Operator Rollout for Manipulation. *8th Annual Conference on Robot Learning (CoRL)*, 2024. [PDF]

[2] **Hongyi Chen**, Yunchao Yao, Ruixuan Liu, Changliu Liu, Jeffrey Ichnowski. Automating Robot Failure Recovery Using Vision-Language Models With Optimized Prompts. *Submitted to American Control Conference (ACC), 2025*. [PDF]

[3] **Hongyi Chen**, Yilun Du, Yiye Chen, Patricio A. Vela, Joshua B. Tenenbaum. Planning with Language Models through Iterative Energy Minimization. In: *The International Conference on Learning Representations (ICLR)*, 2023. [PDF]

[4] Ruinian Xu, **Hongyi Chen**, Yunzhi Lin and Patricio A. Vela. SGL: Symbolic Goal Learning for Human Instruction Following in Robot Manipulation. *Robotics and Automation Letters (RA-L) with the IROS option*, 7(4):10375–10382. 2022 [PDF]

[5] **Hongyi Chen**, Changliu Liu. Safe and Sample efficient Reinforcement Learning for Clustered Dynamic Uncertain Environments. *IEEE Control System Letters (L-CSS)*, 6:1928–1933. 2021 [PDF]

ROBOT MANIPULATION RESEARCH EXPERIENCE

Carnegie Mellon University, Pittsburgh, PA — Aug 2023 – present

Advisor: *Jeffrey Ichnowski* and *Zackory Erickson*, Robotics Institute

- Proposed KOROL, which learns flexible visual features for Koopman dynamics without the need to manually defined object states, and demonstrated that KOROL, using learned object features, outperforms Koopman dynamics based on ground-truth states.
- Deployed KOROL to learn linear dynamics for force-aware human body contact using a soft hand, optimizing contact poses to achieve desired forces through MPC.
- Investigated how optimizing visual and text prompts can enhance the spatial reasoning of VLMs, enabling them to function effectively as black-box controllers for both motion-level position correction and task-level recovery from unknown failures.

ROBOT PLANNING & LEARNING RESEARCH EXPERIENCE

Massachusetts Institute of Technology, Cambridge, MA — Jun 2022 – Sep 2022

Advisor: *Joshua B. Tenenbaum*, Department of Brain and Cognitive Sciences

- Proposed an iterative planning approach with masked language models through energy minimization, showcasing unique benefits like task generalization and plan composition.

Georgia Institute of Technology, Atlanta, GA — Dec 2021 – May 2023

Advisor: *Patricio A. Vela*, School of Electrical and Computer Engineering;

Advisor: *Danfei Xu*, School of Interactive Computing

- Developed a hybrid planner combining symbolic and neural methods for parsing human instructions and task planning, alongside a semantic graph neural network for guided object search in home-assistant robots. Deployed the instruction-following pipeline on AI2THOR simulator and physical Stretch robot.

Carnegie Mellon University, Pittsburgh, PA — Jan 2021 – May 2022

Advisor: *Changliu Liu*, Robotics Institute

- Applied safe control theory with reinforcement learning (RL) to navigate crowded, dynamic, and uncertain environments, ensuring theoretical safety guarantees and achieving a significantly higher probability of collision-free navigation.

SKILLS

Programming: Python, Pytorch, C/C++, CUDA