

Hongyi Chen

	Homepage: https://hychen-naza.github.io/	Email: hchen657@gatech.edu
RESEARCH INTERESTS	<p>High-level robot planning and reasoning: Language-model based high-level task reasoning and decomposition; Neuro-symbolic planner; Planner-guided progressive skill learning.</p> <p>Trustworthy learning algorithms: Design reliable learning and execution models using rigorous control theory to achieve safety assurances and robustness guarantees.</p> <p>Application: Smart robotics for manufacturing applications and daily household assistants.</p>	
EDUCATION	Georgia Institute of Technology , Atlanta, GA M.S in Robotics; GPA: 4.0 / 4.0	May 2023
	Carnegie Mellon University , Pittsburgh, PA M.S in Electrical and Computer Engineering; GPA: 3.72 / 4.0	May 2021
	Peking University , Beijing B.A in Economics; GPA: 3.60 / 4.0	June 2019
	Beijing University of Chemical Technology (BUCT) , Beijing B.S in Mathematics and Applied Mathematics; GPA: 4.03 / 4.3	June 2018
REFEREED JOURNAL PUBLICATIONS	<p>[1] Ruinian Xu, Hongyi Chen, Yunzhi Lin and Patricio A. Vela. SGL: Symbolic Goal Learning for Human Instruction Following in Robot Manipulation. <i>Robotics and Automation Letters (RA-L) with the IROS option</i>, 7(4):10375–10382. 2022 [PDF]</p> <p>[2] Hongyi Chen, Changliu Liu. Safe and Sample efficient Reinforcement Learning for Clustered Dynamic Uncertain Environments. <i>IEEE Control System Letters (L-CSS) with ACC option</i>, 6:1928–1933. 2021 [PDF]</p> <p>[3] Hongyi Chen, Fan Zhang, Bo Tang, Qiang Yin and Xian Sun. Slim and Efficient Neural Network Design for Resource-Constrained SAR Target Recognition. <i>Remote Sensing</i>, 10(10):1618. 2018 [PDF]</p>	
REFEREED CONFERENCE & WORKSHOP PUBLICATIONS	<p>[4] Hongyi Chen, Yilun Du, Yiye Chen, Patricio A. Vela, Joshua B. Tenenbaum. Planning with Language Models through Iterative Energy Minimization. In: <i>The International Conference on Learning Representations (ICLR)</i>, 2023. Under Review.</p> <p>[5] Hongyi Chen, Letian Wang, Yuhang Yao, Ye Zhao, and Patricio A. Vela. Human Instruction Following: Graph Neural Network Guided Object Navigation. In: <i>CVPR workshop in Embodied AI</i>, 2022. Accepted [PDF]</p> <p>[6] Hongyi Chen, Shiyu Feng, Ye Zhao, Changliu Liu, and Patricio A. Vela. Safe Hierarchical Navigation in Cluttered Dynamic Uncertain Environments. In: <i>IEEE Conference on Decision and Control (CDC)</i>, 2022. Accepted.</p>	
RESEARCH EXPERIENCE	Georgia Institute of Technology , Atlanta, GA Advisor: Patricio A. Vela , School of Electrical and Computer Engineering	Dec 2021 – present
	<ul style="list-style-type: none">• Designed a hierarchical solution consisting of a multi-phase planner and a low-level safe controller to jointly solve the safe navigation problem in crowded, dynamic, and uncertain environments.• Developed a hybrid planner combining symbolic and neural-based approaches for human instruction parsing and task planning, and further designed a semantic graph neural network guided object searching for home-assistant robots.	
	Advisor: Danfei Xu , School of Interactive Computing	
	<ul style="list-style-type: none">• Decompose high-level tasks into mid-level plans with language models and train the task skills in self-supervised way through the graph abstraction.	
	Massachusetts Institute of Technology , Cambridge, MA Advisor: Joshua B. Tenenbaum , Department of Brain and Cognitive Sciences	Jun 2022 – present

	<ul style="list-style-type: none"> Proposed an iterative planning approach with language models through energy minimization, and further demonstrate its unique benefits, including new task generalization, test-time constraints adaptation, and the ability to compose plans together. 	
	Carnegie Mellon University , Pittsburgh, PA	Jan 2021 – Sep 2021
	Advisor: Changliu Liu , Robotics Institute	
	<ul style="list-style-type: none"> Exploited safe control theory to address two major challenges in reinforcement learning (RL): satisfying safety constraints and efficiently learning with limited samples. 	
	Tsinghua University , Beijing	Jun 2018 – Sep 2018
	Advisor: Zhihui Du , Department of Computer Science and Technology	
	<ul style="list-style-type: none"> Accelerated online-searching for gravitational waves by parallelizing the linear recurrence and optimizing the inefficient memory access in GPU 	
	Beijing University of Chemical Technology , Beijing	Feb 2018 – May 2018
	Advisor: Fan Zhang , College of Information Science and Technology	
	<ul style="list-style-type: none"> Designed slimmed CNN in resource-constrained platforms, achieving 40x model compression while maintaining its accuracy for synthetic aperture radar target recognition. 	
PROFESSIONAL EXPERIENCE	Carnegie Mellon University , Pittsburgh, PA	May 2020 – Aug 2020
	Autonomous Driving Software Engineer	
	<ul style="list-style-type: none"> Implemented path planning algorithms, from high level behavior planning to low level RRT path generation; Improved localization accuracy by fusing the IMU and GPS sensor. 	
	Interdisciplinary-Technology Company , Beijing	Feb 2020 – May 2020
	Quantitative Trading Researcher	
	<ul style="list-style-type: none"> Constructed and optimized effective stock factors using genetic algorithms and further developed the dynamic contextual multi-factor model to build stock portfolio. 	
COURSE PROJECTS	Carnegie Mellon University , Pittsburgh, PA	
	18-349 Introduction to Real-Time Embedded Systems (A)	
	<ul style="list-style-type: none"> Developed a real-time kernel capable of admission control, task scheduling, isolation, and synchronization. 	
	Georgia Institute of Technology , Pittsburgh, PA	
	CS8803 Special Topics in Compiler (A)	
	<ul style="list-style-type: none"> Built a TigerCompiler that includes scanner, parser and syntax error detector in front-end, and is capable of semantics analysis and IR code generation in back-end. 	
AWARDS AND HONORS	Outstanding Undergraduate Thesis (Top 1%) of BUCT, 2018	
	Outstanding Student Scholarship (Top 5%) of BUCT, 2014, 2015	
TECHNICAL SKILLS	Programming: C/C++, Python, Java, CUDA	
	Tools: Tensorflow, Pytorch, ROS	
	Languages: Proficient in English and Chinese	