XIHANG YU (JIMMY)

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EDUCATION

UNIVERSITY OF MICHIGAN, COLLEGE OF LITERATURE, SCIENCE, AND THE ARTS ANN ARBOR, MI
B.S. in Computer Science with Honors, B.S. in Mathematics, GPA: 4.0 /4.0 *Jan 2022 - May 2024(Expected)*
COLUMBIA UNIVERSALITY, COLUMBIA COLLEGE NEW YORK, NY
Visiting Student Program in Computer Science track, GPA: 4.0/4.0 *Sep 2021 - Dec 2021*
CHINESE UNIVERSITY OF HONG KONG, DEPT. OF COMPUTER SCIENCE HONG KONG
Major in Artificial Intelligence: Systems and Technologies, GPA: 3.869/4.0 *Sep 2019 - May 2021*
SELECTED COURSES:
Graduate Level: Hybrid Control, Continuous Optimization Methods, Mobile Robotics, Nonlinear Dynamics and Geometric Mechanics, Robot Perception, Principles of Machine Learning.
Undergraduate Level: Analysis and Optimization, Combinatorics and Graph Theory, Linear Programming, Autonomous Robotics, Natural Language Processing, Computer Vision, Computational Aspects of Robotics, Computer Systems, Computer Science Theory, Cryptography.

RESEARCH INTERESTS

Optimization, Robot Perception, Vision-based Control

PUBLICATIONS

[1] Fully Proprioceptive Slip-Velocity-Aware State Estimation for Mobile Robots via Invariant Kalman Filtering and Disturbance Observer
X. Yu, S. Teng, T. Chakhachiro, W. Tong, T. Li, TY. Lin, S. Koehler, M. Ahumada, JM. Walls, M. Ghaffari
2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) (acceptance rate: 43.3%) [arXiv] [video] [code]

[2] LaDyBot: Learning Language-Guided Collaborative Dynamics
X. Yu, E. A. Olson, and O. C. Jenkins
Computer Science Honors Thesis, University of Michigan. [video] [thesis]

[3] SIM-Sync: From Certifiably Optimal Synchronization over the 3D Similarity Group to Scene Reconstruction with Learned Depth
X. Yu, H. Yang
Under Review at RA-L. [arXiv] [code] [colab]

[4] APISR: Anime Production Inspired Real-World Anime Super-Resolution
B. Wang, F. Yang, **X. Yu**, C. Zhang, H. Zhao
Under Review at CVPR

RESEARCH EXPERIENCES AND INTERNSHIPS

MANIPULATION AND ROBOT PERCEPTION | ROBOTICS INSTITUTE, UNIVERSITY OF MICHIGAN
Research Assistant Supervised by Dr. Chad Jenkins (Lab for Progress) *Jan 2023-April 2023, Sep 2023 - Present*
  ▪ Conducted Computer Science Honors Thesis: Learning Language-Guided Collaborative Dynamics in Robotics
CERTIFIABLE ALGORITHM AND SEMIDEFINITE PROGRAMMING | HARVARD UNIVERSITY
Visiting Scholar Supervised by Dr. Heng Yang (Computational Robotics Lab) *May 2023 - Aug 2023*
  ▪ Developed certifiably correct camera trajectory estimation algorithm using semidefinite programming (SDP)
MOBILE ROBOT | ROBOTICS INSTITUTE, UNIVERSITY OF MICHIGAN
Research Assistant Supervised by Dr. Maani Ghaffari (Curly Lab) *April 2022 - Dec 2022*
  ▪ Conducted research on state estimation using Invariant Extended Kalman Filter
REHABILITATION ROBOT | MECHANICAL ENGINEERING DEPT., COLUMBIA UNIVERSITY
Research Assistant Supervised by Dr. Sunil K Agrawal (ROAR Lab) *Dec 2021 - April 2022*
  ▪ Contributed kinematics and dynamic libraries to wheelchair robot for active postural support using rospy [website]

AV SIMULATION | CIVIL ENGINEERING AND ENGINEERING MECHANICS DEPT., COLUMBIA UNIVERSITY
Research Assistant Supervised by Dr. Sharon Di (DitecT Lab) *Sep 2021 - Dec 2021*
  ▪ Developed MmWave communication in TraCI framework for NS3 and SUMO Coupling in the COSMOS project
SOFTWARE ENGINEER INTERNSHIP | HUAWEI TECHNOLOGIES CO., LTD *June 2021 - Aug 2021*
  ▪ Contributed to code auto-generation frame on HUAWEI OptiX OSN1800 OTN communication platform
LYAPUNOV STABILITY AND FINITE-TIME CONTROL | CUHK SUMMER RESEARCH INTERNSHIP
Research Assistant Supervised by Dr. Dongkun Han *May 2020 - Aug 2020*
  ▪ Designed Control Barrier Function-based multiagent coordination controller with Matlab simulation [video] [report]

SELECTED COURSE PROJECTS

3D SEMANTIC SCENE UNDERSTANDING | EECS487 INTRODUCTION TO NLP, UNIVERSITY OF MICHIGAN
  ▪ Fine-tuned feed-forward network with GPT-J that achieves state-of-the-art scene classification performance [report]
VISION AND LANGUAGE MANIPULATION | EECS498 PRINCIPLE OF ML, UNIVERSITY OF MICHIGAN
  ▪ Conducted transfer learning experiments of the PerceiverActor model on the VLMbench dataset [report]
PARALLEL COMPUTING | EECS475 INTRODUCTION TO CRYPTOGRAPHY, UNIVERSITY OF MICHIGAN
  ▪ Developed from scratch parallelized versions of cryptographic algorithms, encompassing Counter Mode (CTR),
    Electronic Code Book (ECB), Cipher Block Chaining (CBC), and Hash Tree algorithms [report]
HYBRID MODEL PREDICTIVE CONTROL| EECS563 HYBRID CONTROL, UNIVERSITY OF MICHIGAN
  ▪ Proposed and implemented Moment Relaxation-based solver for Multi-Contact Consensus Complementarity
    Control via ADMM [report]
3D VISION | EECS442 COMPUTER VISION, UNIVERSITY OF MICHIGAN
  ▪ Proposed and implemented SDP-based formulation for joint camera trajectory estimation and depth finetuning
    [paper] [code] [colab]

LEADERSHIP AND SERVICES

TEACHING ASSISTANT | ROB 530 MOBILE ROBOTICS, UNIVERSITY OF MICHIGAN
Instructor: Dr. Maani Ghaffari *Jan 2023 - Apr 2023*
  ▪ Helped to develop homework and quizzes, organized office hour sessions in the graduate course with 158 students
REVIEWER | TRANSACTION ON MECHATRONICS (TMECH)
GRADER |MATH 465 COMBINATORICS AND GRAPH *Oct 2022 - Dec 2022*
MOTION PLAN SUBTEAM LEADER | COLUMBIA UNIVERSITY ROBOTICS CLUB *Sep 2021 - Dec 2021*
  ▪ Led 10+ Columbia students to develop autonomous vehicles, organized motion planning workshops

HONORS AND AWARDS

UNIVERSITY HONORS, UMICH *Academic Merit*	*Dec 2022, Apr 2023*
LEUNG SIU KOI SCHOLARSHIP, CUHK *Academic Merit*	*Dec 2021*
ELITE STREAM SCHOLARSHIP, CUHK *Academic Merit*	*Oct 2021*
DEAN'S LIST, CUHK *Top 10% in the department*	*Aug 2021, Aug 2020*
CHUNG CHI COLLEGE CLASS SCHOLARSHIP, CUHK *Best student in the class of a department*	*Nov 2020*
TALENT DEVELOPMENT SCHOLARSHIP, HONG KONG GOVERNMENT EDUCATION BUREAU	*May 2020*
NATIONAL CREATIVE COMPOSITION COMPETITION *Grand Prize (10 awards in total, National-level）*	*Aug 2018*

SKILLS

  ▪ Programming Tool: Experienced with C/C++ (system-level and high-performance code), Python (including PyTorch,
    Pandas, and Numpy), MATLAB (fast-implemented simulation code)
  ▪ Robotics Tool: ROS, CUDA, NVIDIA Issac Gym, PyBullet
  ▪ Optimization Tool: MOSEK, Gurobi