Xuning Yang

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Interests

Planning, Control, Human Robot Interaction, Bayesian inference for decision making, Systems

Education

2017–2021 (exp) **Robotics Institute, Carnegie Mellon University** Ph.D. in Robotics
Proposal: Teleoperation via Intuition: Safe and Intent Oriented Navigation
Advisors: Nathan Michael, Jean Oh
Committee: Nathan Michael, Jean Oh, Henny Admoni, Sanjiban Choudhury (Aurora Innovation), Helen Oleynikova (Nvidia)

2015–2017 **Robotics Institute, Carnegie Mellon University** M.S. in Robotics
Advisors: Nathan Michael, Koushil Sreenath

2010–2015 **University of Toronto** B.A.Sc. in Engineering Science with Honours
Major in Aerospace Engineering, Minor in Robotics and Mechatronics
Thesis: Control with Complex Specifications for a Flip Maneuver of a Quadrotor Helicopter
Advisor: Mireille Broucke

Experience

2018 **Toyota Research Institute** Ann Arbor MI, USA
Research Intern, Risk Aware Trajectory Planning and Control

Developed FLUID planner, a planner that generates dynamically feasible trajectories given previous trajectories segments by learning a local flow field of directional intent.

2015– **Resilient Intelligent Systems Lab, Robotics Institute, Carnegie Mellon University** Pittsburgh PA, USA
Graduate Research Assistant

Designed, built and maintained quadrotor/hexarotor hardware and software systems with focus on novel planning frameworks for trajectory-based teleoperation. Developed, implemented and tested safety critical trajectory management frameworks. Developed long-duration locally adaptive motion-primitives based teleoperation for ground robots and quadrotors using online regression over feature-based operator intent. Primary research focuses on intent representation, inference and prediction for imperceptible operator control of mobile robots using trajectory-based teleoperation.

2015 **Rapyuta Robotics Ltd.** Zürich, Switzerland; Tokyo, Japan
Control Engineering Intern

Simulated, implemented and tested an aggressive quadrotor hover-to-hover flip maneuver using a parameterized open-loop trajectory, improved using iterative learning scheme for real-time flip performance.

2014 **Autonomous Systems and Biomechatronics Lab, University of Toronto** Toronto ON, Canada
Research Assistant

Implemented OctoMap for 3D mapping with Microsoft Kinect and developed constraints and parameters for classification of traversable terrains in an intelligent robot learning system for realtime terrain categorization.

2013–2014 **IBM Canada Ltd.** Markham ON, Canada
Software Developer Intern, Release Engineering

Publications

X. Yang, Jasmine Cheng, N. Michael, "An Intention Guided Hierarchical Trajectory Generation Framework for Trajectory-based Teleoperation of Mobile Robots". *International Conference on Robotics and Automation (ICRA)*, 2021. [pdf]

X. Yang, N. Michael, "Assisted Mobile Robot Teleoperation with Intent-aligned Trajectories via Biased Incremental Action Sampling". *International Conference on Intelligent Robots and Systems (IROS)*, 2020. [pdf]

A. E. Spitzer*, **X. Yang***, J. Yao, A. Dhawale, K. Goel, M. Dabhi, M. Collins, C. Boirum, N. Michael, "Fast and Agile Vision-Based Flight with Teleoperation and Collision Avoidance on a Multirotor". *International Symposium on Experimental Robotics (ISER)*, 2018. [pdf]

A. Dhawale, **X. Yang**, N. Michael, "Reactive Collision Avoidance using Real-Time Local Gaussian Mixture Model Maps". *International Conference on Intelligent Robots and Systems (IROS)*, 2018. [pdf]

X. Yang, A. Agrawal, K. Sreenath, N. Michael, "Online Adaptive Teleoperation via Motion Primitives for Mobile Robots". *Special Issue on Learning for Human-Robot Collaboration, Autonomous Robots*, April 2018. [pdf]

X. Yang, K. Sreenath, N. Michael, "A Framework for Efficient Teleoperation via Online Adaptation". *International Conference on Robotics and Automation (ICRA)*, 2017. [pdf]

X. Yang, K. Sreenath, N. Michael, "Online Adaptive Teleoperation via Incremental Intent Modeling". *Late Breaking Report, Human-Robot Interaction (HRI)*, 2017. [pdf]

S.C.C. Shih, I. Barbulovic-Nad, **X. Yang**, R. Fobel, and A.R. Wheeler, "Digital microfluidics with impedance sensing for integrated cell culture and analysis". *Biosensors and Bioelectronics*. Oct. 2013, vol. 42, pp. 314–320. [pdf]

Talks

Oct 2018 "Toward intuitive human controlled MAVs: motion primitives based teleoperation". Invited talk, IROS 2018 workshop on Vision based Drones: What's Next?

Peer Review Activities

2021 Journal of Intelligent and Robotic Systems (JINT)
2018,19,20 IEEE International Conference on Robotics and Automation (ICRA)
2020 IEEE Access
2018 IEEE Transactions on Robotics (T-RO)

Systems Linux/Unix **Languages** C++, MATLAB, Python **Software** ROS, Git, LaTeX