Yizhou (Philip) Huang

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EDUCATION

Carnegie Mellon University   Pittsburgh, USA
Ph.D. in Robotics   August 2023 - Current

University of Toronto   Toronto, Canada
MSc. in Computer Science   Sept 2021 - August 2023

- Thesis: Planning and navigation for autonomous surface vessels
- Supervisors: Florian Shkurti and Tim Barfoot, cGPA: 4.00/4.00

University of Toronto   Toronto, Canada
BASc. in Engineering Science (Machine Intelligence Major)   Sept 2016 - June 2021

- Thesis: Improving regularization-based continual learning with hypernetworks [pdf]
- Supervisor: Florian Shkurti, cGPA: 3.88/4.00 (90.2%)

PUBLICATIONS

1. **Yizhou Huang**, Hamza Dugmag, Timothy D. Barfoot, and Florian Shkurti, "Stochastic Planning for ASV Navigation Using Satellite Images", *IEEE International Conference on Robotics and Automation (ICRA 2023)* [pdf] [video]

2. **Yizhou Huang**, Kevin Xie, Homanga Bharadhwaj, and Florian Shkurti, "Continual Model-Based Reinforcement Learning with Hypernetworks", *IEEE International Conference on Robotics and Automation (ICRA 2021)* [pdf] [blog] [video]

3. Keenan Burnett, Jingxing Qian, Xintong Du, Linqiao Liu, David J. Yoon, Tianchang Shen, Susan Sun, Sepehr Samavi, Michael J. Sorocky, Mollie Bianchi, Kaicheng Zhang, Arkady Arkhangorodsky, Quinlan Sykora, Shichen Lu, **Yizhou Huang**, Angela P. Schoellig, Timothy D. Barfoot, "Zeus: A System Description of the Two-Time Winner of the Collegiate SAE AutoDrive Competition", *Journal of Field Robotics*, 2021 [pdf] [video]

4. Qiyang Li, Xintong Du, **Yizhou Huang**, Quinlan Sykora, Angela P. Schoellig, "Learning of Coordination Policies for Robotic Swarms", *arXiv preprint arXiv:1709.06620*, 2017 [pdf]

PROFESSIONAL EXPERIENCE

Robot Learning and Vision Lab, University of Toronto   Toronto, Canada
Robotics Researcher   Jan 2020 - Present

- Conducted **field tests of an autonomous surface vessel (ASV)** on a **3.7km** route in Northern Ontario; proposed, implemented, and validated a robust route-planning algorithm in the presence of environmental disturbances and unexpected obstacles
- Developed a hypernetwork-based, **continual learning** algorithm for model-based reinforcement learning; demonstrated state-of-the-art performance in multiple robotic simulations, including a door-opening experiment
- Proposed the use of self-tuning network as a scalable hypernetwork architecture; reduced memory use by **98%**; verified its efficacy for continual image classification on many benchmarks, including MNIST and Tiny ImageNet

Qualcomm Inc.   Toronto, Canada
Machine Learning Engineering Intern   May 2019 - May 2020

- Developed and streamlined C++ test apps for Qualcomm's HTA neural networks (NN) compiler on Snapdragon devices; reduced test time by **20% for a team of 15+** engineers
- Created a compiler profiling tool capable of reducing NN inference latency by **>15%**
- Developed a GUI application with Electron.js for visualizing neural networks in custom representation and running different test apps, which significantly improved the efficiency of day-to-day development

Civil, Environmental, Agricultural and Learning Lab, Technion
Undergraduate Research Assistant

Haifa, Israel
May 2018 - Aug 2018

- Designed a depth-camera-based quadcopter localization and tracking pipeline in C++ running at 30Hz
- Re-trained a Mask-RCNN network in Keras to detect sunflowers using a custom dataset of 75 images
- Developed a demo in ROS featuring a **Crazyflie** nano-quadcopter autonomously navigating between 2-4 sunflowers for artificially pollinating sunflowers. [video]

Dynamic Systems Lab, University of Toronto
Undergraduate Research Assistant

Toronto, Canada
May 2017 - Aug 2017

- Designed and implemented a software framework (with ROS, C++, and Python) capable of flying **a swarm of 9 Crazyflie nano-quadcopters indoors**
- Built a simulation environment in Gazebo to debug controller and planning modules in ROS
- Developed an interactive demo with six quadcopters flying a synchronized "wave" motion. [video]

TEACHING AND SERVICES

- **Teaching Assistant** for CSC384 — Spring 2023
  Introduction to Artificial Intelligence (University of Toronto)
- **Teaching Assistant** for CSC317 — Fall 2022
  Computer Graphics (University of Toronto)
- **Teaching Assistant** for CSC477 — Fall 2021
  Introduction to Mobile Robotics (University of Toronto)
- **Mentor** for PRISM Workshop — Spring 2022
  Preparation for Research through Immersion, Skills, and Mentorship (University of Toronto)
- **Reviewer** for IEEE/RSJ International Conference on Intelligent Robots and Systems, *IROS 2023* — 2023
- **Reviewer** for IEEE International Conference on Robotics and Automation, *ICRA 2023* — 2022
- **Reviewer** for IEEE/RSJ International Conference on Intelligent Robots and Systems, *IROS 2022* — 2022
- **Reviewer** for Workshop on Meta Learning, *NeurIPS 2020* — 2020

EXTRACURRICULAR ACTIVITIES

You're Next Career Network
Marketing Associate

Toronto, Canada
May 2020 - March 2021

- Worked for a student club that hosts the largest student-run career fair at the University of Toronto, connecting over **3000 students** and **100 companies** a year
- Designed event graphics for different social media platforms
- Analyzed event participant data and created a dashboard with Google Data Studio

University of Toronto Self-Driving Car Team
Object Detection Sub-Team Co-Lead and Member

Toronto, Canada
Feb 2018 - Aug 2020

- Finished **1st place in three consecutive years** of SAE AutoDrive Challenge

- Led the object detection sub-team of 5+ students in reproducing a 3D object detection network (PointPillar) and developed custom software for accelerating inference on the Intel OpenVINO platform
- Improved the performance of our squeezeDet pedestrian detector from **41% to 85%** average precision while maintaining runtime at 40ms
- Reproduced a lidar-based, birds-eye-view object detection algorithm (PIXOR) on the KITTI self-driving dataset; PyTorch code **(>260 stars)** is available on [GitHub](#)

Scholarships and Awards

3rd place, UofT Robotics Institute Three Minute Thesis Competition	2022
Canada Graduate Scholarships-Master's (CGS-M) award - CAD $17000	2021
Vector Scholarship in Artificial Intelligence - CAD $17000	2021
2nd place, Engineering Science Select Equity Den - CAD $1000	2020
University of Toronto Excellence Award - CAD $6,000	2020
William V. Hull Scholarship - CAD $ 520	2019
1st place, Engineering Science Roshambo In-class Tournament	2019
2nd place, University of Toronto Engineering Kompetitions (UTEK), Programming Section	2019
3rd place, University of Toronto Engineering Kompetitions (UTEK), Programming Section	2018
Sullivan Memorial Scholarship - CAD $ 3,415	2017
The Wallberg Undergraduate Scholarships - CAD $ 1,500	2017
Engineering Science Research Opportunities Program - CAD $ 6,000	2017
President's Entrance Scholarships - CAD $ 2000	2016
1st place, Engineering Science Matboard Bridge Design and Build Challenge	2016
2nd place, Engineering Science Pong AI vs. AI Competition	2016

Skills

- **Programming Languages**: Python, C++, MATLAB, Javascript/HTML, Bash, Latex, Java, Verilog
- **Libraries**: PyTorch, ROS, Tensorflow, OpenCV, PCL, Pyro, Electron.js, Pandas, NumPy, SciPy, Jupyter
- **Tools**: Git/Gerrit, Docker, Slurm, Linux, Illustrator, OpenVINO, AWS