

Yizhou (Philip) Huang

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EDUCATION

University of Toronto

BASc. in Engineering Science (Machine Intelligence Major)

– GPA: 3.89/4.00 (90.7%), Thesis Advisor: Prof. Florian Shkurti

Toronto, Canada

Sept 2016 - June 2021 (Expected)

RESEARCH EXPERIENCE

Robot Learning and Vision Lab, University of Toronto

Undergraduate Research Student

Toronto, Canada

Jan 2020 - Aug 2020

- Developed a hypernetwork-based, continual learning method used in model-based reinforcement learning setting which showed state-of-the-art performance compared to other continual learning strategies
- Demonstrated that regularizing past dynamics model with hypernetwork and learned task embeddings significantly **reduced catastrophic forgetting and achieved high overall performance**. Results are evaluated in three Panda robot arm experiments in the robosuite simulator. [Website](#)

Civil, Environmental, Agricultural and Learning Lab, Technion

Undergraduate Research Student

Haifa, Israel

May 2018 - Aug 2018

- Investigated the possibility of using Crazyflie nano-quadcopters to **artificially pollinate flowers**
- Designed a simple quadcopter location detection and tracking pipeline running at 30Hz from an RGB-D camera
- Re-trained Mask-RCNN to detect sunflowers using a custom dataset of 75 images
- Developed a demo for lab sponsors featuring a nano-quadcopter autonomously navigating between 2-4 sunflowers

Dynamic Systems Lab, University of Toronto

Undergraduate Research Student

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**. This includes modularizing different controller components, setting up communication protocols, and calibrating the onboard controller
- Built a simulation environment in Gazebo to debug controller and planning modules in ROS
- Developed an interactive “wave” demo with 6 quadcopters. [Video](#) available on Youtube
- Helped propose a neural-network-based approach for the learning of inter-robot coordination for swarm robotic system

PUBLICATIONS

1. K. Burnett, J. Qian, X. Du, L. Liu, D. J. Yoon, T. Shen, S. Sun, S. Samavi, M. J. Sorokey, M. Bianchi, K. Zhang, A. Arkhangorodsky, Q. Sykora, S. Lu, **Y. Huang**, A. Schoellig, T. D. Barfoot, “Zeus: A system description of the two-time winner of the collegiate sae autodrive competition”, *Journal of Field Robotics* [\[pdf\]](#)
2. **Y. Huang**, K. Xie, H. Bharadhwaj, and F. Shkurti, Continual model-based reinforcement learning with hypernetworks, *Deep RL Workshop (NeurIPS 2020)* [\[pdf\]](#)
3. Q. Li, X. Du, **Y. Huang**, Q. Sykora, and A. P. Schoellig, “Learning of coordination policies for robotic swarms”, *arXiv preprint arXiv:1709.06620*, 2017 [\[pdf\]](#)

WORK EXPERIENCE

Qualcomm Inc.

Software Engineering Intern

Toronto, Canada

May 2019 - May 2020

- Developed and streamlined C++ test apps for Qualcomm's HTA neural network (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 network in custom representation and running different test apps, which significantly improved the efficiency of day-to-day development

EXTRACURRICULAR ACTIVITIES

You're Next Career Network

Marketing Associate

Toronto, Canada

May 2020 - Current

- A student club that hosts the largest student-run career fair at 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 reproducing the 3D object detector (PointPillar) and developed custom frontend for accelerating inference on the Intel OpenVINO platform
- Improved the AP of our squeezeDet pedestrian detector from **41% to 85%** while maintaining runtime at 40ms
- Reproduced a lidar-based, birds-eye-view object detection algorithm (PIXOR) on the KITTI dataset. PyTorch code (>130 stars) available on [GitHub](#)

SCHOLARSHIPS AND AWARDS

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| • 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 programming, University of Toronto Engineering Programming Section | 2019 |
| • 3rd place programming, University of Toronto Engineering 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, Electron.js, Pandas, NumPy, SciPy, Jupyter
- **Tools** Git/Gerrit, Docker, Slurm, Linux, OpenVINO, AWS