

YIXUAN (RICHARD) XU

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EDUCATION

University of Toronto (UofT)

Toronto, ON

Candidate for BAsC in Engineering Science (Machine Intelligence)

September 2018 - April 2023

Minor in Engineering Business

cGPA: 3.6

Relevant Coursework: 6 Course in AI/ML, 5 Courses in Engineering Design, 3 Courses in Algorithm and Data Structure, 3 Courses in Statistic and Probability, 3 Courses in Calculus, 2 Courses in Linear Algebra, ODE, Database, Operating System, Matrix Algebra and Optimization, Computer Vision, Natural Language Computing, Generative Adversarial Networks.

Extracurricular Involvement: President at UofT Machine Intelligence Student Team, 3D Object Detection Team at UofT Self-driving Car Team

RESEARCH INTERESTS

Deep Learning in Computer Vision, Detection and Segmentation, Multimodal Learning, Multi-task Learning, Vision-Language Models, Image Generation, Audio Generation, Ethical AI.

PUBLICATIONS AND PREPRINTS

Yixuan Xu*, Hamid Fazlali*, Yuan Ren, and Bingbing Liu. AOP-Net: All-in-One Perception Network for Joint LiDAR-based 3D Object Detection and Panoptic Segmentation. Under review. [PDF](#)

Enxu Li*, Ryan Razani*, Yixuan Xu, and Bingbing Liu. CPSeg: Cluster-free Panoptic Segmentation of 3D LiDAR Point Clouds. Under review. [ArXiv](#)

Hamid Fazlali, Yixuan Xu, Yuan Ren, and Bingbing Liu. A Versatile Multi-View Framework for LiDAR-based 3D Object Detection with Guidance from Panoptic Segmentation. CVPR 2022. [PDF](#)

Enxu Li*, Ryan Razani*, Yixuan Xu, and Bingbing Liu. SMAC-Seg: LiDAR Panoptic Segmentation via Sparse Multi-directional Attention Clustering. ICRA 2022. [ArXiv](#)

PATENT APPLICATIONS

Yixuan Xu, Hamid Fazlali, and Bingbing Liu. System and Method for Guiding LiDAR-based 3D Object Detection by Multi-resolution Features Recovery Using Panoptic Segmentation Information. US Patent Application No. 63/317,360

RESEARCH EXPERIENCE

Toronto Robotics and AI Laboratory

Toronto, ON

Thesis Student

October 2022 - Now

Supervised by Prof. Steven Waslander

- Exploring methods of domain adaptation (train on annotated data and evaluate on domain-shifted data) for LiDAR-based 3D object detection.
- Designing algorithms to generate domain-invariant data.

BMO Lab for Creative Research in the Arts

Toronto, ON

Machine Learning Researcher

September 2022 - Now

Led by David Rokeby

- Investigating interaction of machine learning models and live performances, involving image and sound generation with stable diffusion, motion capture, and voice and vocal feature capture.

Noah's Ark Lab, Huawei Canada
3D Perception Research Intern
Supervised by Dr. Bingbing Liu, Cognitive IoV Perception Team

Markham, ON
May 2021 - August 2022

- Conducted research in LiDAR-based 3D object detection, panoptic segmentation, multi-task and multi-modal perception systems for autonomous vehicles.
- Contributed in deployment of real-time perception modules, patent applications, and academic publications.

LEADERSHIP EXPERIENCE

UTMIST (University of Toronto Machine Intelligence Student Team)
Advisor, VP Technical Writing
Co-president, Student Researcher

Toronto, ON
June 2021 -
Jun 2020 - May 2021

- Served a community of 950 machine intelligence enthusiasts, with the goal of connecting students with graduate students, professors, and industries in the field to clear the mist in machine intelligence.
- Oversaw workshops, community engagement, industry relations, marketing efforts, and project teams, in collaboration with other execs.
- Actively engaged with 80+ associates to understand their needs, while striving to achieve new ways and gain new connections to grow organization.

OpenRace
Co-founder, Team Lead

Toronto, ON
February 2019 - May 2020

- Launched a react mobile fitness app (Java, JavaScript, SQL), enabling runners to match and race virtually in real-time and in an equivalent condition.
- Directed a team of 12 to carry out extensive market research, customer validation, UX/UI testing before developing features and pitch deck.

Basic Military Training Centre, Singapore Armed Forces
Section Commander, Infantry Sergeant

Singapore
October 2016 - August 2018

- Excelled in demanding training exercises, later appointed as army instructor.
- Led training, ensured safety, and provided counselling for 124 new enlistees.

TECHNICAL SKILLS

Programming	Python, Matlab, C, SQL, Assembly, Verilog, Shell
Machine Learning	Pytorch, Tensorflow
Tools	Git, Docker
Presentation	Latex, Powerpoint

PROJECTS

Capstone Project: Advertisement Recommendation System (Ongoing since 2022) [Progress Update](#)

- Working with local Toronto AdTech startup AdView to develop a recommendation system that suggests the most effective advertisements based on user's personality.
- Experimenting with vision-language captioning model (GIT), BERT, and CNN with self-attention to improve prediction accuracy.

deMISTify: Machine Intelligence Newsletters (2021)

[Past Issues](#), [Recent Issues](#)

- Machine learning newsletters and articles written by UTMIST technical writers, covering interesting machine learning papers, news, and resources with 9000 views and 500 followers.
- Initiated the project and served as the head editor and technical writer.

SketchToPicture: Paired Image-to-Image Translation using cGAN Conditioned on Class Prediction (2021) [Video](#)

- A generative model that uses sketches or edge maps as input, classifies the depicted objects, and converts the sketch into realistic images. Used pretrained ResNet50 as classifier to provide labels for a label-supervised pix-2-pix that leverages conditional instance normalization.
- Served as the team lead.

COVID-19 Detection Diagnosis and Segmentation Tool (2020) [Video](#)

- An encoder-decoder model for detecting COVID-like symptoms and segmenting affected areas on lungs given CT scans as a potential method for easier diagnosis during test kit shortages. Achieved 91% classification test accuracy given limited samples..

OpenRace: Bringing Runners Together in Virtual Races (2018) [Pitch Deck](#), [App Demo](#), [Promo Video](#)

- A mobile fitness app that enables runners to match with other similarly-skilled runners from around the world and compete in real-time races anywhere, anytime.
- Served as the team lead.

PERSONAL HOBBIES

Driving, Mountain Biking, Backpacking, Interior Design, Real Estates Investment.