Richard Hu

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Education

University of Toronto *Toronto, Canada*

Master of Applied Science, Mechanical Engineering *Sep. 2019 - Expected Sep 2020*

Specialization Mechatronics, Mobile Robotics, Machine Learning

University of Toronto *Toronto, Canada*

Bachelor of Applied Science, Mechanical Engineering *Sep. 2013 - Apr. 2018*

Specialization Robotics and Mechatronics Minor; GPA (3.81/4.00)

Experience

Autonomous System and Biomechatronics Lab *Toronto, Ontario*

Researcher, Master Thesis *Sep. 2018 - Present*

- **Autonomy** Designed a mobile robot platform for urban search and rescue in ROS and C++
- **Machine Learning** Developed a deep reinforcement learning network and virtual-to-real transfer pipeline
- **Localization** Implemented lidar and vision based SLAM for real time pose estimation
- **Control** Optimized a robust motion controller for rough terrain navigation
- **Deployment** In house experimental testing with autonomous point to point navigation

aUToronto - SAE AutoDrive Challenge (2018 and 2019 Winner) *Toronto, Ontario*

Planning and Control Team *Sept. 2018 - Present*

- **Autonomy** Aim to develop a level 4 autonomous vehicle using ROS and C++; within a team of 30+ students
- **Localization** Implemented real-time kinematic GPS for precision localization
- **Planning** Optimize trajectory planner for real time performance
- **Simulation** Evaluation of planning and control system using kinematics and dynamics model

Toward Smart Cities: Road Accident Prevention *Toronto, Ontario*

Course Project *Sep. 2018 - Dec. 2018*

- **Smart City** Data-driven accident prediction using Scikit-learn in Python; within a team of 5 students
- **Data Engineering** Data collection, visualization, feature engineering, and negative sampling
- **Machine Learning** Trained and benchmarked 3 supervised learning models: Random Forest, SVM, and Deep Neural Network

Autonomous Turtlebot *Toronto, Ontario*

Course Project *Jan. 2018 - Sep. 2018*

- **Mapping** Developed robot coverage and exploration algorithm using ROS and C++
- **Computer Vision** Object detection and identification using OpenCV library
- **Social** Implemented person-following and emotional model for human-robot interaction

Autonomous Maze Navigation Rover Design *Toronto, Ontario*

Course Project *Sep. 2017 - Dec. 2017*

- **Autonomy** Implemented localization, collision avoidance, and path planning algorithm in MATLAB and Arduino
- **Control** Designed architecture for autonomous payload pick-up and delivery in a maze

Conavi Medical - Novasight Hybrid System *Toronto, Ontario*

Mechanical Engineer Intern *May. 2016 - Aug. 2017*

- **Research** Investigated potential design hazards and risks of catheter rotary assembly
- **Manufacturing** Streamlined an efficient assembly and calibration work instruction
- **Organization** Established an inventory system with full traceability for FDA 510k submission validation
- **Project Management** Directed technical design reviews with senior leadership; accelerated the exit of the project phase

Honors & Awards

All Terms	**Dean's Honour list**, University of Toronto	*Toronto, Ontario*
2018	**Best Undergraduate Poster Presentation**, CFD Society of Canada	*Winnipeg, Manitoba*
2015	**University of Toronto Excellence Award**, University of Toronto	*Toronto, Ontario*
2015	**Shell Canada Limited Engineering Scholarship**, University of Toronto	*Toronto, Ontario*
2015	**Best Innovation Award and Best Prototype Award**, U of T Engineering Competition Junior Design	*Toronto, Ontario*