Richard Hu

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Education

University of Toronto *Toronto, Canada*

Master of Applied Science, Mechanical Engineering *Sept. 2019 - April Present*

Research Learning-based rough terrain navigation for mobile robots research. GPA (4.0/4.0)

University of Toronto *Toronto, Canada*

Bachelor of Applied Science, Mechanical Engineering *Sept. 2013 - April 2018*

Specialization Mechatronics Stream and Bioengineering Stream, Robotics and Mechatronics Minor. GPA (3.81/4.00)

Experience

Autonomous System and Biomechatronics Lab *Toronto, Ontario*

Researcher *Sept. 2018 - Present*

- **System** Designed an autonomous mobile robot system using ROS and C++
- **SLAM** Implemented Lidar based and vision based SLAM for autonomous navigation
- **Control** Developed position controller and velocity controller for skid steer control
- **Reinforcement Learning** Sim to real transfer of learned policy onto the mobile platform for rough terrain navigation

Conavi Medical *Toronto, Ontario*

Mechanical Engineer - Novasight Hybrid System *May. 2016 - Aug. 2017*

- **Design** Designed critical components for the catheter using MATLAB and SolidWorks
- **Research** Investigated potential design hazards and risks for ensuring patient safety
- **Manufacturing** Fabricated catheter manufacturing jigs and drafted assembly work instructions
- **Operations** Directed major technical design reviews with senior leadership; accelerated the exit of the project phase
- **Management** Established a inventory system with full traceability, gaureeted validity of 510k submission to FDA

Projects

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

Mapping and Localization Team *Sept. 2018 - July. 2019*

- **Mapping** Processed semantic map using Python, QGIS and Open Street Map for level 3 autonomy vehicle
- **Localization** Implemented real-time kinematics GPS system for localzation

Toward Smart Cities: Data-driven Road Accident Prevention *Toronto, Ontario*

Data Scientist *Sept. 2018 - Dec. 2018*

- **Pipeline** Implemented machine learning pipeline for traffic accident prediction
- **Machine Learning** Trained Random Forest, K-means Clustering, SVM, and Deep Neural Network models using Sklearn
- **Data Engineering** Engineered features using weather, traffic, geography data, and negative sampling

Autonomous Turtlebot Navigation *Toronto, Ontario*

System Design *Jan. 2018 - Sept. 2018*

- **Mapping** Developed coverage algorithm for mapping using ROS and C++
- **Computer Vision** Used OpenCV for image detection and identification

Autonomous Maze Navigation Rover Design *Toronto, Ontario*

Developer *Sept. 2017 - Dec. 2017*

- **Autonomy** Implemented localization, obstacle detection, and path planning in MATLAB and Arduino
- **System** Designed architecture for autonomous payload pick-up and delivery in a maze

Honors & Awards

2018	**Best Undergraduate Poster Presentation**, CFD Society of Canada	*Winnipeg, Manitoba*
All Terms	**Dean's Honour list**, University of Toronto	*Toronto, Ontario*
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*