Chuyi Hou

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Research Interests

Risk-analysis and stochastic optimal control. Algorithms that enable control systems to make smarter decisions efficiently where safety cost is maximized. Machine Learning for Robotics and Control. Machine learning models that enable robots to operate at higher accuracy. Human Computer Interaction. Algorithms/Tools/Models that enable a seamless interaction between human and computers.

Education

University of Toronto Toronto 2017-2021

BASc in Engineering Science Major in Robotics

Undergraduate thesis supervisor: Margaret P. Chapman. GPA:4.0/4.0. Thesis title: "Towards a Scalable Approach for Risk-Averse Safety Analysis."

Research Experience

Research Associate 2021

Dynamic Graphics Project Lab of the University of Toronto Canada

Tested and validated various machine learning models to determine which ones are suitable for the task at hand and document the trade-offs. Interfaced with hardware prototypes and develop pipelines to efficiently transfer data to the computing units. Quantified the performance of the system. Built demos to showcase the abilities of the system.

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NSERC Summer Research Assistant 2019

Intelligent Transportation System Lab of the University of Toronto Canada

Performed literature review on topics such as "How Ontology is used in Smart City Projects and OpenTripPlanner", and "How to conduct inferencing based on Transportation Ontology Mappings", and successfully identified opportunities.Developed a gtfs auto-updater. Worked with JSON, and urllib.request in Python.Integrated loop detector Ontology map with the OpenTripPlanner using AlleogroGraph API.

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Working Experience

UASK Education 2018 - Present

Academic Part-time Online Tutor

Performed online one-to-one tutoring through ZOOM (a video conferencing application).

Tutored students who are from high schools and first year of universities.

Developed a great communication skills by having over 300 hours of online tutoring experience.

Projects

The Galbraith Memorial Mail Robot 2019

Role: **Developer** Supervisor: **Prof. G.M.T.D'Eleuterio**

Gained expertise in controlling Tutlebot3 Waffle Pi. Gained experience working with ROS and coding in python. Implemented PID control fro line following purpose, and Kalman Filter and Bayesian Localization on the robot.

Public repository can be accessed via: https://github.com/houchuyi/Robotic-Control-ROB301.git

Deep Learning Food Recognition Model 2019

Role: **Developer** Supervisor: **Prof. Lisa Zhang**

Gained expertise in implementing and training deep learning neural networks from very basic models, fully connected layers and convolutional networks, to Faster R-CNN, an object detection neural network.Trained, tuned, and tested a PyTorch standard Faster-RCNN.Created a Python graphic user interface (GUI), using tkinter library, for presentation demonstration purposes.Collaborated smoothly with my teammates offline.

Public repository can be accessed via: https://github.com/nbjameslee/Deep-Learning-Food-Detection-Model

Fully Autonomous Ball Dispensing Mobile Machine 2019

Role: **Circuitry and sensor member / Developer** Supervisor: **Prof. M.R.Emami**

Designed and tested a fully automatic ball dispensing mobile machine with PID control. Specialized in the design and construction of circuitry and sensor subsystems as well as integration with electromechanical and micro-controller. Developed communication between PIC board and Arduino through I^2C. Excellent teamwork throughout the project. "Almost professional", said by the supervisor. Won 2^{nd} place out of over 20 teams for performance efficiency and overall features in a public demonstration showcase.

School Experience

University of Toronto Scarborough Campus Robotics Club 2021-2022

University of Toronto Association of Chinese Engineers (UTACE) 2018-2022

University of Toronto Robotics Association (UTRA) 2019-2022

Awards

Dean's Honour List 2020 Fall

Dean's Honour List 2020 Winter

NSERC Undergraduate Student Research Award 2019

Dean's Honour List 2019 Fall

Dean's Honour List 2017 Fall

Professional Skill

Proficient in Python, Pytorch, OpenCV

Experienced in C, MATLAB

Familiar with ROS

Use

Publications