Daniel Robson

University of Waterloo, 3B Mechatronics Engineering, 2022 Candidate

dlrobson@uwaterloo.ca /in/dlrobson /dlrobson dlrobson.github.io

WORK EXPERIENCE

Software Engineer – LiDAR Perception | Cepton Technologies

Aug 2020 – Dec 2020 | Ottawa, ON

- Redesigned the object tracking logic with a K-d Tree implementation in C++. This module matches tracked objects with clusters from the proceeding point cloud frame. This overhaul increased the maximum number of trackable objects by 900%.
- Implemented an extended Kalman filter to track real-time vehicle motion from noisy LiDAR data. Vehicle motion was modelled using a bicycle kinematic model, significantly improving vehicle tracking compared to the original unicycle model implementation.
- Developed a background change detector that utilizes ICP to periodically check if a sensor has moved from its initial position, notifying the user if the sensor has shifted.
- Formulated an ML pipeline in Python for object classification that optimizes scikit-learn normalization and classification model parameters for small datasets. The final model classifies clusters at the same accuracy as manual classification methods.

Jan 2020 – May 2020 | Ottawa, ON

- Designed a LiDAR-camera overlay application that measures the homogeneous transform between a LiDAR and camera and aligns the LiDAR point cloud with the camera output.
- Created a method to locate a chessboard within a point cloud using DBSCAN and within an image using OpenCV, which together determines the LiDAR-camera transform.
- Established a K-d Tree density-based clustering algorithm that finds all clusters within a point cloud. It removes outliers and locates the point cloud of the chessboard.

Embedded Systems Engineer | Savormetrics

May 2019 – Aug 2019 | Mississauga, ON

- Automated product testing procedures to control multiple devices using serial port communication in bash. This increased the rate of data collection by over 1000%.
- Built visualizations using Python that organized sensor data for analysis by the AI team.
- Designed and 3D printed various product components for precise testing. A few designs were incorporated into the final product, including a sensor casing.

Software Developer | Teranet

Sept 2018 – Dec 2018 | Mississauga, ON

- Incorporated an offline testing environment to mimic registry responses using C#, allowing the international team to perform uninterrupted application testing.
- Embedded an exportable SQL table displaying the health of every webpage and service into a web application, allowing users to easily monitor server health.

PROJECTS

MovieMatchr – Hack The North 2020++ | Jan 2021

- Worked with a team of four to create a tinder-like webapp to help a group of friends choose a movie to watch, using React, Node.js, Docker, AWS, and DynamoDB.

Line Following Robot – MTE220 | Sept 2019

- Built a line following robot from soldering the PCD to implementing the control logic in C.

Operation Robot – MTE100 | Dec 2017

- Programmed a LEGO robot in C capable of playing the board game Operation.

SKILLS

Languages

C++	Python
C	MATLAB
Java	JavaScript
C#	SQL

EDUCATION

University of Waterloo

B.A.Sc., Mechatronics Engineering

2017 - Present

COURSES

Algorithms and Data Structures

Microprocessor Systems

Numerical Methods

Control Systems

RTOS

HOBBIES

Sourdough Baking

Gardening

Mechanical Keyboards

Piano

NBA

Soccer