

# John Liu

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## Education

### University of Waterloo

2021 – 2022

Master of Engineering – MEng, Electrical and Computer Engineering  
Specialization in Artificial Intelligence and Machine Learning

### University of Waterloo

2015 – 2020

Bachelor of Applied Science – BAsC, Honours Mechanical Engineering (With Distinction)

## Skills

**Languages** Python, C++, JavaScript, TypeScript, SQL, MATLAB, HTML, CSS

**Libraries/Tools** PyTorch, TensorFlow, Scikit-Learn, Pandas, NumPy, Docker, Git, Linux OS, Arduino, LaTeX

**Applications** Neural Network Models, Supervised/Unsupervised Learning, Reinforcement Learning, Predictive Analysis

**Other** SOLIDWORKS, PTC Creo, AutoCAD, Rapid Prototyping (3D printing, Laser Cutting)

## Projects

### MIT Driverless | Planning Software Developer (Plotly, Pandas, NumPy, SciPy, Docker)

July 2022 – Present

- Wrote and tested software for an autonomous racecar capable of reaching speeds of 140mph+ for the Indy Autonomous Challenge
- Generated vehicle pathing using cubic spline models allowing for safe attacking and defending maneuvers of the vehicle which enabled autonomous vehicle passing at 80mph at the Texas Motor Speedway competition
- Optimized racing lines for shortest distance and minimum lap times taking in account of vehicle dynamics and environmental factors to ensure ideal maneuvering around the racetrack

### Sentiment Analysis on Movie Reviews and Classifier (Pytorch, Scikit-learn, Pandas, NumPy)

June 2022

- Developed neural network architecture to predict positive and negative movie reviews on IMDb review dataset (84% accuracy)
- Preprocessed data using Word2Vec and Bag of Words (BoW) techniques before training custom designed neural network models
- Classification on various data sets and data analytics using Scikit-learn to perform PCA, K-means clustering, DBScan, and T-SNE

### Aerial Manipulator (MATLAB, Simulink, OpenCV)

Sep 2019 – May 2020

- Autonomously controlled drone modified with a manipulator attachment to grab objects from front and retract to center
- Implemented object detection using onboard camera through colour and edge detection as well as QR code and AprilTag detection
- Winner of design award for Best Engineering Design Process

### CNC Plotter (Arduino, GRBL)

May 2019 – Aug 2019

- Built pen plotter programmed using computer numerical control (CNC) capable of automatically drawing images onto a platform
- Designed optimal CoreXY timing belt routing system allowing for two stepper motors to move the servo arm in any horizontal direction across the drawing plane

## Work Experience

### The Woodbridge Group | Mechanical Engineering

Sep 2018 – Dec 2018

- Led the concept generation and prototype build of a pour head test system allowing for less downtime during routine inspections resulting in significant cost savings (>\$50,000 per hour of downtime)
- Detailed P&ID design in AutoCAD and modeling in SOLIDWORKS of pour head assembly and components

### Nytrix Ltd. | Product Development Engineering

Jan 2018 – Apr 2018

- Created simulation system allowing for detailed analysis of product performance and capabilities based on optics calculations
- 3D CAD modelling of touchscreen enclosures for injection molding with focus on DFM and DFA
- Developed a script to streamline company design procedures by automating product and CAD model revision changes
- Designed cost optimization script which realized the use of more cost-efficient components (>50% cheaper)

### HubHead Corp. | Systems Engineering

May 2017 – Aug 2017

- Organized and created enterprise asset management demos in order to optimize management procedures for clients

### Tyco Security Products | Mechanical Designer

Aug 2016 – Dec 2016

- Performed detailed CAD design in Creo and 3D printed product prototypes to test for tolerances, quality, and functional capabilities