

William Cohen

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Objective

Developer and project manager with 3.5 years of experience in enterprise-level infrastructure development and modeling looking for roles where I can apply my development and controls expertise, such as perception aware control or sensor fusion. I am obtaining my Master's degree in Aerospace Engineering in order to pivot my career into a more technical domain. My experience in control research and software development make me an excellent candidate for research-focused software engineering roles.

Education

University of Michigan, Ann Arbor, MI; **M.S.E.** in Aerospace Engineering; Expected December 2022

M.S.E. GPA: 4.0; **Graduate Student Instructor:** Physics Mechanics Labs (PHYSICS 141)

University of Michigan, Ann Arbor, MI; **B.S.E.** in Aerospace Engineering; Expected December 2022

B.S.E GPA in Major: 3.65/4.00, **Overall:** 3.37/4.00; **Minor:** Physics;

Deans List: Fall 2015, Fall 2016, Winter 2018; **Honor Society:** Sigma Gamma Tau

Relevant Coursework: Model Predictive Control; Avionics, Guidance, and Navigation; Data Science and Machine Learning; Experimental Aircraft Design; Mobile Robotics

Research and Projects

Intelligent Robotics and Autonomy Lab

Researcher/Member (May 2021 - Present)

- Researched and configured simulation environment for research using Microsoft's open-source AirSim simulator
- Wrote C++ code to retrieve RGB, depth, and segmentation image data from simulator for a reinforcement learning algorithm
- Designed experiments for gathering ground effect data of a moving quadrotor in a landing configuration, with a focus on relative velocities of aircraft and landing platform
- Implemented a nonlinear model predictive controller for a quadrotor to track and land on a moving cart providing noisy GPS data, resulting in offset-free tracking and convergence of 0.5 m/s in some applications
- Created an framework for unsupervised learning using AirSim to learn ground effects based off of experimental data

Computer Vision-Based UAV Stationkeeping

Algorithm and Hardware Lead (January 2022 - April 2022)

- Implemented a drone controller in C, including state estimation, PID and LQR controllers, logging, and radio communication on a BeagleBone Blue, achieving set point tracking in motion capture environment, with some path's RMSE values near 1.1
- Created a stationkeeping algorithm onboard using an Intel RealSense L515 camera running with ROS on a Raspberry Pi
- Utilized ROS Serial to communicate the Raspberry Pi global pose to the BeagleBone and created extern structs and function hooks to bridge the data from the C++ ROS server into the C controller

WiFi Micro-UAV Localization

Algorithm Lead (January 2022 - April 2022)

- Developed a particle filtering algorithm for localizing a robot in a known WiFi environment, resulting in a significant reduction in localization error when compared to dead reckoning
- Wrote a ray tracing algorithm to generate test data and a ROS simulation to test the efficacy of the localization method
- Gathered test data on a CrazyFlie 2.1 UAV in motion capture to generate a WiFi map and tested the drone on the data

Employment

Motional (April 2022 - August 2022)

Software Engineering Co-Op - Robotics Infrastructure

- Scoped and developed a library for path generation tools, including Kalman Filtering and RTS Smoothing
- Refactored existing coordinate transformation library and added benchmarking, reducing runtime in some functions by 75% and ensuring zero dynamic memory allocation in some operations

BlackRock (June 2017 - July 2021)

Analytics and Quantitative Solutions Associate (Jan 2021 - July 2021), Analyst (July 2018 - December 2020)

- Developed an application to report regulatory risk based capital charges based on client portfolios, and developed an optimizer to provide recommended trades, ultimately automating an existing process and deepening client engagements
- Served as a project manager for an infrastructure team, leading 15 developers and assisting in developing a new relational algebra system to simplify the existing architecture of the Aladdin product, culminating in a product rollout after 8 months
- Designed and built a containerized Python app to generate presentations for our client engagement team, utilizing powerpoint libraries and calling upon multiple internal APIs to gather risk and analytical data, resulting in positive C-suite feedback
- Verified and back-tested results of an internal mean-variance optimizer, demonstrating that tracking error minimization and cumulative performance regularly outperformed a competitor's engine in tracking a variety of indices

Additional Information

Platforms/OS: Linux (Ubuntu), Mac OS, Microsoft Windows

Software: Git (proficient), Macintosh Office Suite (proficient), Microsoft Office Suite (proficient), LaTeX (intermediate)

Languages: C++ (proficient), Matlab (proficient), Python (proficient), SQL (proficient), Bash (intermediate), Julia (intermediate), ROS-Python (intermediate), Cassandra (basic), JavaScript (basic)