



Derek Fan

✉ derekfan.18.2002@gmail.com

☎ +1 (510) 335-5426

🌐 Personal Website

🌐 LinkedIn Profile

EDUCATION

• University of California, Irvine – Irvine, CA

Sept. 2020 – Present

Bachelor of Science in Mechanical Engineering

GPA: 3.6/4

TECHNICAL SKILLS

Languages and Frameworks: Python, MATLAB, C++, ROS

Developer Tools and Platforms: Git, Linux, Windows

Engineering Software: SolidWorks, EC-Engineer

Additional Relevant Skills:

EXPERIENCE

• Johnson & Johnson Robotics and Digital Solutions

June 2023 – Present

Systems Integration Engineering Intern

Santa Clara, CA

- Assisted in measuring discrepancies between motor encoders in robot arms via the in-house Python API, which helped design a more accurate fail-safe condition for dangerous motions.
- Designed and manufactured a weighted fixture within specified constraints for robotic arm verification, formalizing a necessary test that did not previously exist.
- Improved upon the in-house vision verification app's GUI and backend in Python, introducing 4 new features for offline image signal processing and effectively increasing its usability by 400%.

• 3D Infotech

Oct. 2022 – Jan. 2023

Automation Engineering Intern

Irvine, CA

- Assembled robot arms, controllers, and sensors into robotic platforms to run demos for prospective customers.
- Troubleshooted individual components and integrated them into whole robot systems for system-level verification.
- Controlled robotic arms manually and programmatically to validate their functionality for customer use.

PROJECTS

• Neural Network & MPC Research – Multirotor Multi-Payload Trajectory Tracking

May 2023 – Present

Undergraduate Researcher

- Conceptualized the system design based on research of simulation tools, drone hardware, and practical algorithms for real-time reinforcement learning and MPC trajectory planning/tracking.
- Formulated nonlinear quadcopter dynamics and interfaced with Acados's nonlinear optimization to engineer an efficient real-time multiple-direct-shooting MPC.
- Leveraged PyTorch's automatic differentiation in the development of nonlinear and neural network dynamics to implement adaptive gradient-based (as opposed to sampling-based) MPC.

• Autonomous Drone Team (SUAS Competition)

Oct. 2021 – Present

Lead GN&C Engineer

- Designed an online path planning system utilizing ROS nodes and MAVLink for the first time in the team's history, effectively increasing the team's relevance in the competition by 200%.
- Developed a linear obstacle avoidance algorithm to be used with 3D point clouds, integrated it into online path planning, and optimized its calculations to decrease runtime by 90%.
- Applied point cloud processing algorithms for use with RealSense RGBD cameras, integrated them with obstacle avoidance, and optimized their parameters to decrease runtime by 50%.
- Improved the drone's performance by tuning its sensor/extended Kalman filter parameters and PID controller, bringing stable control to all 3 types of its orientations.

• Motion Planning and Control Testbed

Apr. 2022 – Oct. 2022

Undergraduate Research Assistant

- Implemented a linear quadratic regulator (LQR) velocity controller for optimal trajectory tracking.
- Deployed a scalable OptiTrack server client that sends position feedback to a distributed network via ROS nodes.
- Introduced multiprocessing to the server client to parallelize position feedback visuals with ROS communication.

RELEVANT COURSEWORK

- Classical Control, Robotic Motion Planning and Algorithms, Machines and Mechanisms
- Computer-Aided Design, Dynamics, Statics, Differential Equations, Multivariable Calculus, Linear Algebra