ANDREW SOONG

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EDUCATION

University of Michigan | Ann Arbor, MI **Graduating May 2022**

M.S. Mechanical Engineering (Controls Concentration) *GPA: 3.9/4.0*

M.S. Electrical & Computer Engineering (Signal & Image Processing and Machine Learning Emphasis)

Santa Clara University | Santa Clara, CA **June 2020**

B.S. Mechanical Engineering, Aerospace Engineering Minor *GPA: 3.6/4.0*

- **Computer Vision**: Implemented methods for classifying fresh/rotten apples, oranges, and bananas at ~85% success
  - (1) Blob detection found patches of rot and the RGB value of that patch was fed into a multi-layered perceptron
  - (2) Felzenszwalb segmentation distinguished rotten patches and the segmentation map was fed into a CNN
  - Method 1 yielded ~90% success rate and method (2) yielded ~80% success rate
- **Machine Learning:** Implemented Sparse Identification of Nonlinear Dynamics (SINDy) sparse regression algorithm
  - Implementation identified the correct dynamics of a Lorenz Attractor and pendulum with noisy data
- **Linear Feedback Control Systems:** Designed a MIMO LQR state feedback controller and observer
  - Utilized bode and singular value plots to aid in controller design in application for Reactive Ion Etching process
- **Mechatronics:** Gaining exposure to mathematical modeling, design, and simulation of electromechanical systems
  - Utilizing MATLAB/Simulink and LabView to implement mechatronic and control systems on a microcontroller for systems such as magnetic levitation, servo and stepper motors, and an inverted pendulum

WORK EXPERIENCE

Space Exploration Technologies Corp. (SpaceX) **Boca Chica, TX**

Automation and Controls Associate Engineer *May 2021 – August 2021*

- Set-up position control system in Siemens TIA for tower catch-arm hydraulics to catch a landing Heavy Booster
- Designed, in NX, a vibration isolating bracket, lowering 6g vibrations to 2g for remote I/O hardware on launch tower
- Owned cable conduit schedule and installation procedures for 200+ devices to direct the launch tower build process
- Designed electrical CAD (low/high voltage, serial comms, I/O) in ePlan and built electrical panels for production
- Wrote PLC ladder logic code in Siemens TIA for robot cell upgrades and automated nosecone load proofing station

Agilent Technologies **Santa Clara, CA**

R&D Mechanical Engineering Intern *June 2019 – September 2019*

- Increased manufacturing throughput by 4x with automated heater test bench capable of testing 4 heaters in parallel
- Designed stainless steel fixture in Siemens NX, enabling FTIR spectroscopy testing on electrospray nozzles
- Conducted step-response frequency testing of Silicon Nitride heater with Nitrogen flow for PID controller design
- Collected data using WAGO PLC and used Python for data analysis to compute model and PID controller parameters
- Implemented a PID controller in Structured Text and web-based HMI on WAGO PLC for heater testing

Lam Research Corporation **Fremont, CA**

Engineering Intern *June 2018 – September 2018*

- Created LED lighting system/brackets in Siemens NX to aid in high-speed video collection of silicon wafer washing
- Machined custom plastic plug mounts and Aluminum clamps using a Tormach Personal CNC

PROJECTS

Satellite Life Extension via Autonomous Solar Array Attachment **January 2021 – Present**

- Northrop Grumman sponsored Multidisciplinary Design Project aimed at satellite life extension and augmentation
- Conducted literature review into current satellite failures and future on-orbit servicing/augmentation technologies
- Developed concept of operations and testing requirements for on-orbit autonomous roll-out solar array attachment
- Implemented RANSAC and ICP using Open3D in C++ for point cloud registration for attachment point localization
- Gave poster presentation at the American Society for Gravitational and Space Research conference in Baltimore, MD

Senior Capstone Project – Basil Leaf Automation **September 2019 – June 2020**

- Designed, in SolidWorks, and prototyped an aluminum chassis for a robot capable of 2D cartesian motion
- Developed a stepper motor class in Python for stepper motor position control on a Raspberry Pi
- Pre-processed images using Principal Component Analysis, located centroid of leaves using OpenCV, and categorized fresh/rotten leaves at 73% accuracy using linear/quadratic discriminant analysis with Python scikit-learn library