Bruce Iverson

(916) 768-4608 • brucejamesiverson@gmail.com • www.linkedin.com/in/bruceiverson

Summary

Professional mechanical engineer with primary experience working in research and development of robotic systems and custom automation machinery. I have long standing interests in utilizing applied machine learning, robotics systems and manufacturing and automation solutions. I am detail oriented and self motivated, and enjoy exercising creativity and nuanced understanding of the physical world to collaborate to create system value.

Education

B.S. Mechanical Engineering, Santa Clara University   *Graduate 2018*
**M.S. Mechanical Engineering (Mechatronics), Santa Clara University*   *Graduate 2021*

Professional Experience

OnePointOne, Robotics Eng. II: Automatic Seeder Machine   *June 2020 - November 2022, Phoenix AZ*
- Collaborated with a team of engineers to prototype automation machinery with the purpose of planting individual seeds of a wide range of cultivars into custom growing hardware in a vertical orientation
- Designed and tested active and passive mechanisms utilizing techniques including static and dynamic physics modeling, tolerance stack up analysis, statistical analysis of performance during testing
- Met UL safety standards for all electronics and hardware through a detailed review process of documentation, inspection, and demonstration culminating in prototype serial numbers 2 through 4 all receiving field labels.
- Delivered four prototype units including doing an in depth revision of the machine hardware demonstrating significant performance improvements. I worked closely with engineering technicians to see that prototypes were of sufficient quality and stayed well maintained.. Our longer running machine has been in operation for well over two years.
- Consistently communicated estimated project costs and timelines ensured that our team was on top of all tasks and responsibilities associated with engineering development, machine fabrication, and farm operations for plant production
- Wrote and maintained software for operator interface with the machine in Python featuring a web server with local UI and REST API for farm automation control and telemetry, multiple FLIR camera video streams and motion control using machine vision analysis of video as measurement of state, and state machine for the coordination of a 10 + mechanisms.

OnePointOne, Mech. Eng. I: Modular Hydroponic System   *Jan. 2019 - June 2020, Santa Clara CA*
- Designed and prototyped structure and fluidics systems for a modular hydroponic leafy green grow system integrated in pallet racking structure.
- Collaborated with plant scientists to derive requirements and define design specifications for the system, and with engineers to integrate controls, telemetry, environmental systems, and LED lighting for plants.
- Built and delivered prototypes that were used to fulfill orders of basil to three star Michelin chef David Kinch for over a year at his restaurant Mentone. "...the wonderful Genovese Basil they have been growing for us at Mentone for our Pesto, essentially our Spirit Animal here at Mentone" -David Kinch.

Delucchi Electric, Mech. Eng.: Mobile robotics, factory automation   *Oct. 2016 - Nov. 2018, Santa Clara, CA*
- Collaborated with a team researching and developing autonomous robotics and automation systems for onsite and prefabrication construction applications
- Designed and prototyped mechanical systems for a mobile robot on tank tracks with mounted 4 axis robot arm whose purpose was to install wall outlets in active construction sites achieving a functional prototype
- Designed mechanical systems for a mobile robot whose purpose was to navigate a construction site and mark the floors according to the building drawings using a spray painting system. I designed the chassis, locomotion systems, and automated spray painting systems, and ultimately delivered a functional prototype used successfully in demonstrations to investors.
- Initiated an automated manufacturing machine project with the objective of measuring, cutting, and coiling metal cable for electrical prefab purposes. I individually took the project from a concept to a functional prototype, including software on an arduino for telemetry and control and user facing software on a raspberry pi.

Other Projects

Emergency Response Drone   *SCU Sept. 2017 - May 2018*

- Design and prototype an autonomous drone for emergency response scouting and firefighting surveillance purposes in collaboration with the Palo Alto Fire Department
- Drone featured a unique coaxial 6 motor tricopter design, with the two front rotor sets on a rotation mechanism. This mechanism allowed those motors to point forwards, the drone transforming mid flight to allow for flight in the traditional style of airplanes.
- Design full CAD model and subsequently performed CFD analysis on the to determine optimum body shape, angle of attack, and estimate lift and drag coefficients for control system use
- Researched the electronics of an autonomous drone, assembled and tested all sensors, controllers, and actuators. Integrated flight controller with ground control computer allowing GPS tracking of the plane. Eventually this platform would have allowed for autonomous flight control.

Algorithmic Trading Platform

- Python based trading platform integrated with crypto currency exchange as a project to learn more about programming
- Interfaced with the API of Bittrex and TD Ameritrade exchanges using REST and websockets, able to handle and execute real orders on the exchange
- Experiments with basic machine learning algorithms including K means, simple neural networks, using python packages to practice and apply theory learned in school
- Experimented more with AI using the NEAT and ES-HYPER-NEAT algorithms, implementing crossvalidation, and hyperparameter tuning.
- Ultimately abandoned the project after demonstrating functionality as my objective was to learn and not to attempt to deploy profitable algorithms (which eluded me)

ROS connection between camera vision system and 6 axis arm   *2019, SCU Robotic Systems Lab*

- Added reflective elements to the end of an industrial 6 axis Pandas robotic arm such that an array of off the shelf Optitrack cameras situated around the workspace would always be able to measure the position and orientation of the robot end effector in cartesian space for all possible positions of the arm.
- Connected to the cameras and to the robot using ROS enabling the robotic systems lab to conduct experimental control systems research using feedback of end effector cartesian position and orientation.

—————————————————————— **Skills and Interests** ——————————————————————

Engineering Skills

- Experience with part design, assembly design, systems design testing and integration
- 3D printing: operation and maintenance of FDM printers
- Familiar with:
  - C++ and software for embedded systems/microcontrollers, MATLAB, finite element analysis (FEA)
- Very experienced with:
  - CAD: Solidworks/Inventor, Fusion 360. Python, Linux/Windows OS, FDM 3D printing design operation and maintenance

Interests

- Fitness, downhill skiing, reading, cooking and more!
- I have a number of other technical personal projects, ask me about them!