NIKOLAAS BENDER

Roboticist - Explorer
Energetic, Motivated, Capable, Rapid

CONTACT

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SKILLS

PROFICIENCY | TIME

Robotics	4+ yrs
Machine Learning	3+ yrs
Python	7+ yrs
C++	7+ yrs
Linux	7+ yrs
Web Development	7+ yrs
Internet Of Things	2+ yrs
Teaching	10+ yrs

TOOL BOX

- C++, Python, GoLang, C#, fortran, C, JavaScript, SQL
- ROS, OpenCV, Pytorch, TensorFlow, GTSAM, Eigen
- Agile, ClickUP, JIRA, Communication
- Object-Oriented Design, Jupyter, MatLab, TensorRT, Git, Docker, Cmake
- CAN bus, UART, LoRa, Embedded C

EDUCATION

MS - Electrical and Computer Engineering — **2021 - 2023**
University of California Santa Cruz

Head of drone operations and precision agriculture for HARE lab

BA - Computer Science — **2016 - 2021**
University of Colorado Boulder

Specialized in field robotics
Minor in philosophy

WORK EXPERIENCE

Researcher — **2021 - current**
University of California Santa Cruz

- Team leader precision agriculture group
- Developing geographic annotation system, use a physical appliance to label drone data taken in the same geographic region. System is more accurate and faster to use than traditional labeling techniques
- Leading research efforts using machine learning to accelerate NDVI calculations
- Developed hyperspectral sensor head for DJI Matrice M300
- Researching keypoint extraction for SLAM through unsupervised deep learning techniques on hyperspectral data

Research: SLAM in self similar environments, automation of dataset creation

Researcher — **2020 - 2022**
University of Colorado Boulder (continued at) University of California Santa Cruz

Developed a remote data gathering and exfiltration system with industry and Army partners monitoring an autonomous shuttle at Fort Carson, Colorado Springs. Developed a system for aligning LIDAR and camera data for fusion. Built an early collision warning system using velodyne LIDARs to find instances of unsafe driving.

Undergraduate research assistant — **2019 - 2021**
University of Colorado Boulder

Developed and maintained the human operator interface for team MARBLE as part of the DARPA SubT Challenge. Self directed and developed a novel system for allowing operators to set goal points in the 3D map generated by the robots. The system also allowed for muxing teleop and 3D representation of artifacts in the map. Also collected a multimodal dataset for YOLO using LIDAR and visual data. MARBLE finished 3rd overall winning $500,000 in prize money.

- Statistical Signal Processing, Mechantronics, Computer Vision, Linear Dynamics, Data Structures, Algorithms, Filtering, State Estimation

Software development intern — **Summer 2019**
Object Rocket, Austin Texas

Developed production software as part of the database automation team. Built and ran unit tests. Learned how professional software development teams operate.

Software development intern — **Summer 2018**
IQVIA

Built an error logging tool for database updates. Errors were displayed on a website that was mobile friendly. Automated database updates.

ACADEMIC PROJECTS

Team Toast — **2021**
Mechatronics robot

Part of a 3 person team that built a robot from the ground up, used a pic32 to sense from hand built magnetic, infrared, and light level sensors to navigate and solve a course for the UCSC Mechatronics class. Learned how to work for 100hrs/week, built complex circuits, and rapidly fabricate a platform. Focus of class was rapid development through early failure and iteration.

Sidewalk Sculpin — **2019**
ROS based robot that autonomously followed sidewalks on campus

Part of a 3 person team that built a Clear Path Jackal with an nVidia Jetson AGX Xavier and an Intel RealSense camera to follow sidewalks through the use of a semantic segmentation neural network with gradient descent. Became well practiced in the application of neural networks to robotic platforms and computational optimization of control and perception systems.

"Lucky" Number Seven — **2019**
ROS based 1/10th scale car that raced around a set of hallways autonomously

Part of a 5 person team that used two laser range finders with an ODROID sbc mounted to a 1/10th scale car. The class required developing a car to navigate a specified track within a set amount of time. This project honed skills in ROS and forced learning the fundamentals of modern robotics.

CoLab — **2018**
Golang based collaboration and project tracking site

Leader of a 5 person team that built the basics of a website that mixed Twitter and Trello. Learned complex web design and system deployment to remote resources.

EXTRACURRICULAR

- Competitive cyclist: Racing road, gravel, enduro, and downhill. For fun, exercise, and community.
- Skiing: off piste adventures hunting for powder to float through.
- Surfing: Recently learned skill, and necessary for life in Santa Cruz.
- Martial Arts: Second degree black belt and former MMA instructor.