Caleb Norfleet

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EDUCATION:

Harvey Mudd College, Claremont, CA — Engineering Departmental Honors, 3.99 GPA
Bachelor of Science, Engineering; Concentration in Economics — May 2021

- Selected for Frederick N. Holliday Leadership Award for "outstanding leadership in the Engineering Clinic program"
- Selected for J. R. Phillips Engineering Award for "outstanding experimental technique and engineering judgment"
- Selected from class of 225 for Platt Prize "to honor exceptional academic achievement and community impact"
- ΤΒΠ Engineering Honor Society President; National Merit Scholar; recipient of Harvey S. Mudd Merit Scholarship
- Relevant courses: Microprocessor Systems, Motion Planning & Controls, State Estimation, Autonomous Vehicles, Digital Electronics & Computer Architecture, Data Structures & Program Development, CMOS VLSI Design

Cary Academy, Cary, NC — Class of 2017

- Head of School Award (4 of 100); Rensselaer Medal (1 of 100); National Honor Society Service Award (1 of 40)
- Finished 1st place in division with three-person team at National American Computer Science League competition

SKILLS:

Programming: C++, C, Python, Assembly, Bash, Java, MATLAB, Git

State Estimation: Extended & Unscented Kalman Filter, Particle Filter, Bayes Filter, Probabilistic Mapping

Motion Planning: A*, D*, Expansive Planner, RRT*, PRMs, APFs, Trajectory Tracking, Pure Pursuit, PID Control

Digital & Analog Electronics: FPGAs (SystemVerilog), PCB Design (Altium & KiCAD), CMOS VLSI

Design & Prototyping: Oscilloscope & Electronics Tools, CAD (SolidWorks)

EXPERIENCE:

Firmware Engineer, Advanced Hardware Engineering Team, Zoox, Foster City, CA — Summer 2021 – Present

Autonomous Navigation System for a Track Loader, Doosan Bobcat and Harvey Mudd College — Fall 2020 – Spring 2021

- Led team of five students to develop autonomous navigation capabilities for a Bobcat T650 track loader enabling autonomous driving to a destination in a typical construction environment with stationary and moving obstacles
- Reduced runtime to achieve a 26 Hz average update rate and allow for safe navigation at the T650's maximum speed of 17 km/h, a 430% improvement over the previous autonomous limit of 3.2 km/h
- Implemented the mapping and controls autonomy stack using less than 1 MB of total memory

Firmware Engineering Intern, Advanced Hardware Engineering Team, Zoox, Foster City, CA — Summer 2020

- Created an audio driver for processing 12-channel microphone audio data and an audio diagnostics platform which tracks heuristics-based abnormal audio events to trigger warnings based on configurable diagnostic policies
- Added testing functionality and manual controls to the hardware test application for a main motion controller to facilitate end of line testing and hardware development

IoT Device Fingerprinting System, Juniper Networks and Harvey Mudd College — Spring 2020

- With a team of four students, created a framework for analyzing patterns of network packets using a combination of Zeek signatures and machine learning to classify whether devices are IoT using primarily behavioral characteristics
- Achieved over 99% accuracy with device types present in our training set and 75% accuracy (6% incorrect, 19% inconclusive) for new device types, demonstrating higher generalizability than previous IoT fingerprinting methods

High-Level Synthesis of Co-Processor Hardware Accelerator, Leidos and Harvey Mudd College — Fall 2019

- With a team of four students, developed a parameterizable digital down-converter template using high-level synthesis
- Aimed to reduce the time required for hardware design space exploration by making it easy to perform trade-offs which impact metrics of interest such as throughput, latency, area, and power consumption

Robotics Engineer, Forever Oceans, Kona, HI — Summer 2019

- Developed underwater robotic systems for open-ocean fish farming
- Designed subsea winch capable of lifting 60lbs and PCBA which handles power and data transmission over tether