Surafel Anshebo

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Education

Virginia Tech   *May 2025 (Expected)*
MSc - Mechanical Engineering

Addis Ababa Science and Technology University   *May 2018*
BSc - Mechanical Engineering

Experience

Graduate Research Assistant, Virginia Tech   *May 2023 – Present*

- Developed a Dockerized simulation environment for ArduPilot SITL with Flask integration to simplify UAV testing workflows and ensure consistency across development setups.
- Created ground and air risk maps for BVLOS simulations using Leaflet.js and QGIS, enhancing flight planning by visualizing potential hazards and improving safety assessments.
- Designed and deployed flight management software to meet Association for Uncrewed Vehicle Systems International (AUVSI) standards. The system included modules for flight requests, pre/post-flight procedures, and safety reporting to ensure regulatory compliance and operational safety.

Line Process Engineer, Coca Cola Beverages   *Dec 2018 – Dec 2023*

- Collaborated with a team of three engineers to design an optimized level control system for an 8-ton boiler, enhancing efficiency, reducing risks, and complying with ISO 12100 safety standards, achieving $12,000 cost savings annually.
- Analyzed machine structures and operational data to detect abnormalities and conducted Root Cause Analysis (RCA) using SAP, enabling the optimization of Overall Equipment Efficiency (OEE) and minimizing production downtime.
- Consistently maintained 90% Machine Efficiency (ME) and 85% Unconstrained System Line Efficiency (USLE) by monitoring performance, addressing issues proactively, and ensuring smooth operations across the production line.
- Enforced compliance with Safety, Health, Environment, and Quality (SHEQ) standards to maintain a safe workplace and align with corporate and regulatory requirements.

Skills

Software: Python, C++, MATLAB, ROS, Flask, Docker, OpenCV, SolidWorks, QGIS, SAP
Hardware: Raspberry Pi, STM32, Arduino, Vicon motion capture, 3D Printing
Certifications: Part 107, SolidWorks Associate (CSWA)
Selected coursework: Applied Linear Control, Computer Vision, Advanced Mechatronics

Projects

Vicon Motion Capture for Indoor Flight   *Jan 2025*

- Conducted system calibration to minimize tracking errors, ensuring sub-millimeter accuracy.
- Implemented an Extended Kalman Filter (EKF) for sensor fusion enabling precise position and altitude estimation.
- Deployed ROS nodes on a Raspberry Pi companion computer to handle communication between the motion capture system and Pixhawk flight controller.

Full State Feedback Control for Simulated Drone Using Pole Placement   *Dec 2024*

- Optimized system dynamics using pole placement techniques, ensuring stable descent.
- Developed closed-loop control using Linear-Quadratic Regulator (LQR) and Luenberger Observer for accurate trajectory tracking with 5% settling time in 3 seconds in MATLAB.

Flood Mapping, Search and Rescue Operation Using S500 Drone   *Nov 2022*

- Mapped areas prone to flood hazards using aerial imagery processed in QGIS.
- Designed a gripper in SolidWorks to be mounted on S500 drones for delivering lifesaving vests.

Publications

- D. Aggarwal, **S.T. Anshebo**, K. Kochersberger, A.L. Abbott. "Comparative Study of Vision-Based Methods for Real-Time Traffic Monitoring" *XPONENTIAL 2024 Conference*, pp. 68–79. DOI: 10.52202/075106-0004.

Leadership

Treasurer, ASME Chapter at Virginia Tech   *Aug 2023 – Present*

- Managed $5,000 budget, ensuring compliance with ASME and university policies.
- Collaborated with team members and university administration to secure additional funding, increasing resources for student events and projects.
- Worked with a team to organize 3 workshops and events by engaging 25+ students in professional development.