Surafel Anshebo

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Education

Virginia Tech   Expected May 2025
Master of Science in Mechanical Engineering
Addis Ababa Science and Technology University   May 2018
Bachelor of Science in 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, flight procedures, and safety reporting to ensure regulatory compliance and operational safety.

Line Process Engineer, Coca Cola Beverages   December 2018 – December 2022
- Collaborated with a team of three engineers on a performance improvement project 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.
- Achieved 90% Machine Efficiency (ME) and 85% Unconstrained System Line Efficiency (USLE) by proactively monitoring performance, identifying and resolving issues, 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   January 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   December 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   November 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   August 2023 – Present
- Managed a $5,000 budget, ensuring policy compliance and accurate financial reporting for ASME and university standards.
- Organized 3 workshops with a team, managing logistics, schedules, and resources, while engaging 25+ students in CAD design, FEA, and system integration training's to enhance technical skills.