

Logan Vance

Robotics Systems & Controls Engineer

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PROFESSIONAL SUMMARY

Innovative and systems-oriented Robotics Engineer with over five years of professional experience developing, testing, and deploying autonomy stacks for warehouse mobile robots and industrial arms. Expert in ROS/ROS2, real-time control loops, and sensor fusion algorithms. Adept at bridging the gap between high-level path planning algorithms and low-level embedded hardware interfaces.

TECHNICAL SKILLS

- **Robotics Navigation:** ROS/ROS2, Nav2 Navigation Stack, SLAM (Cartographer), MoveIt2, URDF Modelling, TF2 Coordinate Transforms.
- **Control & Estimation:** Trajectory Generation, PID & LQR Controllers, Kalman Filtering (EKF), Robot Kinematics & Dynamics.
- **Software Development:** C++ (14/17/20), Python 3, CMake, Git, Docker, RT-PREEMPT Linux Kernel, Unit Testing (GTest/GMock).
- **Hardware & Protocols:** CAN bus, EtherCAT, SPI, I2C, UART, LiDAR, IMU Sensor Fusion, Digital Oscilloscopes, Logic Analyzers.

PROFESSIONAL EXPERIENCE

Senior Robotics Engineer

Synapse Robotics

Jan 2024 – Present

Pittsburgh, PA

- Led the migration of AMR fleet navigation from ROS1 to ROS2 Navigation Stack (Nav2), resulting in a 40% improvement in path planning efficiency and localization stability.
- Designed a custom C++ ROS2 node for real-time sensor fusion of solid-state LiDAR, stereo cameras, and wheel odometry using an Extended Kalman Filter (EKF).
- Implemented custom safety-critical control laws in C++17 on a real-time Linux platform, reducing robotic manipulator collision risks to zero.

Robotics Controls Engineer

Apex Automation

Jun 2021 – Dec 2023

Boston, MA

- Programmed Cartesian and joint-space motion control algorithms using MoveIt for automated picking arms, improving cycle times by 22%.
- Developed and calibrated kinematics calibration tools in Python to align depth sensor coordinate frames with a 6-DoF robotic arm.
- Conducted hardware-in-the-loop (HIL) testing of motor controller firmware using MATLAB/Simulink and EtherCAT communications.

KEY PROJECTS

Quadrupedal Locomotion Stabilization Controller

Apex Research Initiative

Mar 2022 – Aug 2022

Boston, MA

- Formulated a Model Predictive Control (MPC) balance controller for a custom 12-DoF quadruped, enabling locomotion over uneven terrain.
- Integrated contact sensors and IMU data to estimate ground reaction forces, dynamically adjusting joint torque commands in real-time.

Low-Latency EtherCAT Motor Driver Interface

Independent Development

Sep 2022 – Feb 2023

Pittsburgh, PA

- Authored a real-time C++ user-space driver utilizing the SOEM (Simple Open EtherCAT Master) library on a Raspberry Pi 4.
- Reduced packet jitter to under 30 microseconds, verifying real-time performance with a digital logic analyzer.

EDUCATION

Master of Science in Robotics Engineering

Vertex University

2019 – 2021

Pittsburgh, PA

- Specialization: Controls and Autonomous Systems. Thesis: *Visual-Inertial Odometry for Quadrotors under Extreme Shading*.

Bachelor of Science in Mechanical Engineering

Meridian Institute of Technology

2015 – 2019

Atlanta, GA

- Magna Cum Laude. Minor in Computer Science. Focus on Mechatronics.