Silas Gagnon

Contact

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Full stack robotics engineer with with a skill set ranging from mechanical design, to embedded software development. I am a student at Worcester Polytechnic Institute on an endless mission to understand the inner workings of everything.

Experience

WPI Goat Fast Racing — August 2024 - Present
Worcester Polytechnic Institute — Worcester, MA

- Worked on a team of 15 plus engineers to build a fully electric racecar for the Formula Hybrid competition.
- Retrofit 400V accumulator to be completely manufactured in house in under 7 weeks
- Designed custom PCB wheel speed sensor using analog quadrature hall effect sensors to measure rotation continuously
- Worked on design of safety systems and procedures for high voltages

USGS Student Contractor — May 2024 - August 2024
United States Geological Survey — Ann Arbor, MI

- Contributed to ROSBag data unpacking library to simplify and streamline programmatic data manipulation.
- Standardized conventions for robot position and orientation.
- Implemented 3D Point Cloud data processing and cleaning scripts to colocate a series of point clouds from GPS data.
- Worked on research vessels in the Great Lakes to gather scientific data with under water autonomous vehicles and sonar scanning technology.
- Processed images using a low pass filter to remove shadows and improve automated fish counting algorithms.

FIRST Robotics Team Captain — June 2022 - June 2023
FIRST Robotics Team 3636 — Portland, OR

- Led a team of 60 high school students in designing and building a 70 pound robot capable of autonomous navigation and localization in 6 weeks.
- Managed prioritization of sub team resources and coordination among design/CAD, electrical, mechanical, coding, and fabrication teams.
- Practiced Reliability Engineering in an “all or nothing” environment.
- Gained experience with fail safes and rapid iteration.
- Ranked 11th of 150+ teams, earning a spot in the 2023 FIRST World Championship in Houston, TX.
- Taught STEM and problem solving skills to younger students
- Designed a navigation system that allowed for millions of automatically generated paths to be autonomously executed by a robot.

Projects

Telometer

- Designed and implemented a telemetry protocol and visualization dashboard
- Capable of doing realtime data synchronization over any serial communication protocol (UART, CAN, UDP, Bluetooth, etc)
- Implemented to send values directly as binary with only 2 bytes of overhead per packet
- Used in robotics courses to enable real time data feedback and control loop tuning.
- Implemented the front end dashboard in zig with live 2d and 3d plots and visualizations
- Packaged with the Nix package manager

Wheel Speed Sensors

- Designed analog quadrature hall effect sensors to measure continuious rotation
- Created custom PCB that communicates analog potential over SPI to a microcontroller
- Implemented sensor processing algorithm and filter to calculate rotation speed.

Skills

- Programming Languages: C / C++, Zig, Python, Java, Kotlin, Nix
- Software Libraries: ImGUI, Eigen, ROS, OpenCV, Numpy
- CAD: OnShape, KiCAD, FreeCAD, Solidworks
- Operating Systems: NixOS, Arch, Ubuntu, Windows
- Manufacturing: 3d printing, CNC Router, CNC Mill, Laser Cutter
- Software Tools: Git, SSH, Vim, Gnu Debugger, Docker
- Equipment: Oscilloscope, Multimeter, Logic Analyzer, LCR Meter

Education

B.S. - Robotics Engineering
Worcester Polytechnic Institute
Expected Graduation May 2027

B.S. - Electrical and Computer Engineering
Worcester Polytechnic Institute
Expected Graduation May 2027

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