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Spenser Millburn – Resume/Portfolio

Robotics Software Engineer / Full Stack Engineer

Qualifications

Dedicated, enthusiastic and ambitious professional with excellent comprehension and retention ability. Breadth and depth experience in a broad spectrum of technical fields concentrated within Mechatronics/Robotics, EE, Computer Science and Mechanical Design.

CS: C++17, Python, Linux, Go, Typescript, React, Bash, *ROS(1,2), OpenCV, NumPy, QT (GUI), Jupyter*, Control Systems, *Simulation*, TCP/UDP, Websockets

EE: Advanced SMT Soldering, *Altium Designer*, I2C, SPI, CAN, Arduino/Raspberry Pi, FPGA, Oscilloscope, Logic Analyzer, Bed of Nails, Sensors & Actuators

ME: OnShape, Creo, Solidworks, AutoCAD, Additive MFG, CNC/CAM Machining (Mill/Lathe), DFM, Fluidics/Microfluidics, Thermal Analysis

Education

Northeastern University: Mechatronics Engineering, B.S.
Class of 2025, GPA 3.7

Leadership – NEU Robotics, Quadruped Project Manager & Software Lead

- Active leadership of multidisciplinary team of 75+ engineering students working to develop advanced quadruped (Robot Dog) research platform.
- Highly involved with the architectural design of the system, established a cross functional software team and spearheaded 10+ subteams.
- Substantial technical contribution to the development of CAPSTAN servo reduction mechanisms, ROS (Robot Operating System), Simultaneous Localization and Mapping, Computer Vision, Inverse kinematics and more.

Practical Experience

(September 2022 – Current) – Software Engineer II - *Walmart Advanced Systems & Robotics → Symbotic*

- R&D/Sustaining of differential-drive mobile robots in a production environment. (1500+ units, 1.9M moves/week)
- Implemented 112+ feature stories, fixed 66+ bugs, facilitated testing in a cross-functional research lab.
  - Reduced the #1 failure mode in production by 92.5% (a reduction of 600 sev-1 failures/month and 750k$ losses).
- Developed:
  - Command subsystems for Trajectory Generation and Multi Input Multi Output (MIMO) Drive Motor Control.
  - Core infrastructure with modern C++17 in a realtime QNX microkernel environment. Ported to linux in V2.
  - Platform level device drivers for mission critical localization sensors. IMU, Hall Effect, Laser.
  - Hierarchical state machines via a proprietary, event driven framework for multi-axis robotic orchestration.
  - Improved mobile robot navigation, localization and control algorithms to optimize for production performance.
- Containerized the embedded development toolchain with Docker. Cross-compilation for 4 CPU architectures.
- Implemented ETL data pipelines and deployed to a cloud environment (Azure), modernizing our observability stack.
- Mentored junior engineers and interns for a variety of projects including real time telemetry and simulation.

(March 2022- September 2022) – Robotics Engineer – *Building Machines Incorporated*

- Full ownership and architecture of a high-power (480V 50Hp) robotic fluid delivery system for additive-manufacturing.
- Designed, implemented, tested and integrated a full stack React GUI to override physical control panel.
- WebSocket interface and Flask python backend. Systemd linux service management.
- IOT integration of multiple I2C and SPI sensors/Actuators with custom PCBs and C++ drivers.
  - Modalities: Laser Time-Of-Flight, Depth CV, Pressure Transducers, Solenoid Valves, BLDC motor, Relays.
- Data acquisition, analysis and visualization with JupyterLab and Python.
- Electromechanical design, build, test of fixtures.

(March 2021- March 2022) – Engineering Technician – *Owl Labs*

- Rapid prototyping, prototype assembly and design. Supported 30+ FTEs.
- Professional fixture design, fabrication, testing and deployment. Production Throughput: (10000+ units / year)
- Thermal data acquisition and Test Engineering. (Python, Numpy, Matlab)
- Customer facing Embedded Linux and Android software development support.
- Data acquisition, analysis and visualization not limited to thermals, acoustics and airflow.

(August 2020- March 2021) – Engineering Technician – *Degree Controls Systems*

- Provide SMT rework and circuit analysis support.
- Project management of Engineering Change Order and Prototype Change Order documentation.
- Design PCBAs and electro-mechanical assemblies.
- Invented customer facing pythonic software, GUI design with PyQT5.
- Provide mechanical engineering CAD support of fixtures and jigs

(August 2018 – August 2020) – Operations Technician (Engineering Focused) – *Sartorius NA*

- Design, fabricate and document professional production jigs, ultimately generating a return greater than USD $50,000 in automated labor and recovered inventory.
- Designed, prototyped and established custom IOT automation server framework, developed exclusively in python3
  - Automates paperwork system, specifically targeting key KPI and Metric calculations.
  - Utilizes custom microcontroller clients to report live production data via a socket server.
  - Automates label printing and generation.
  - Provides a dynamic project management platform, in order to achieve better insight and communication to managers via the server's web based GUI
- Successfully modeled and presented a restructured production floorplan to executive level administration
- One of three technicians to manufacture, troubleshoot and certify highly accomplished medical device equipment (specifically flow cytometry) (Unit price: $330k USD)