David Boles

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Multidisciplinary engineer with a penchant for software. Passionate about helping build a more sustainable future.

Experience

Tesla—*Validation Engineer*
June 2022–Present

- Primary engineer responsible for project management, software, electrical design, bringup, and maintenance of Hardware-In-the-Loop (HIL) firmware testers for six vehicle subsystems, including brakes and air suspension.
- Defined tester requirements in collaboration with firmware and integration engineers on my team. Worked extensively with electrical and mechanical teams.
- Extended an in-house Software-In-the-Loop (SIL) simulation engine to have real-time HIL capabilities. Now used by several other teams.
- The simulation engine, written in Rust, is controlled via a Python API, using PyO3.
- Reliably achieved <2ms latency and jitter while concurrently simulating controller firmware and physics models.
- Conducted extensive mixed userspace and kernel tracing with LTTng to identify and mitigate unanticipated behavior in Linux' scheduling, filesystem, networking, and memory subsystems.
- Implemented integrations for CAN, Ethernet, and, planned for next quarter, EtherCAT as well as Modbus over RS-422.
- Utilized Wireshark and libpcap to implement and troubleshoot custom protocols built on top of Ethernet's data link layer.
- Contributed to MDF time-series data logger, which enabled test result visualization as well as further, automated post-processing and analysis.
- Implemented Pytest plugins for firmware artifact handling, tester configuration and flashing, trace storage, and results reporting.
- Helped maintain SIL CI infrastructure including working with SCons build scripts, Docker, and Jenkins.
- Reviewed and validated FreeRTOS-based firmware written in C on an ad-hoc basis.

Weekend Project—*Time Series Data Visualizer*

- Prototype high-performance renderer for live data and MDF traces.
- Web frontend accelerated with WASM and WebGPU; receives pre-decimated/resampled data from backend using WebSockets.

Education

Brown University—*3.9 GPA*
September 2018–May 2022

B.Sc. Computer Science
- Topics in Collaborative Robotics, Computer Vision, Deep Learning
- Formal Proof and Verification, Logic for Systems

B.A. Engineering
- Instrumentation Design, Sensors and Actuators for Real Systems
- Control Systems Engineering, Linear System Analysis, Digital Signal Processing
- Digital Electronics System Design

Skills

- Rust
- Python
- Linux Administration
- Git, SVN
- Docker
- Altium
- Rapid Prototyping
- User-Centered Design

Previous Experience

- Embedded C
- MATLAB
- Javascript, React
- Java
- Go
- Solidworks

Other Interests

- Gardening
- Baking
- Ukulele
- French