Derek Black

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EXPERIENCE

Altec Roanoke, VA
Staff Controls Developer *Aug 2017 - Present*

- Created a validation application for Altec's Load Moment Area Protection (LMAP) system that significantly reduced the product engineering team's manual testing workload. Leveraged Python, Kvaser's canlib, Flask, and React to automate the sending and receiving of CAN messages, and used Flask to create RESTful API endpoints that enabled React to communicate with the backend. Integrated a user-friendly front-end to enable live data visualization and test management.
- Engineered an internal tool using MATLAB, Simulink API, and App Designer that automated the setup and building of CAN Calibration Protocol (CCP) parameters, saving developers hundreds of hours of development time. The tool's user-friendly front-end streamlines the process and exposes an API that allows other developers to quickly build out additional automation applications.
- Cross-compiled and developed a C++ application for a Telematics Control Unit on embedded Linux using ARMv7 architecture with the rapidcsv library, along side the module's GPIO for live input recording, enabling regression testing of Altec ECUs by replaying live CAN traffic via SocketCAN interface, revealing firmware regressions and facilitating patching prior to shipment.
- Spearheaded the deployment, development, and management of an internal application using MATLAB that facilitated the release, distribution, and version management of various internally developed tools across multiple teams within the Altec controls department. Improved collaboration and reduced the risk of errors or conflicts, resulting in increased productivity and better overall outcomes.
- Developed a web page release and staging tool using Python, Vanilla JavaScript, Bulma, and Eel that integrated with SVN and an SQLite instance to speed up deployment for the Altec AXIS service tool.
- Utilized Python's pandas and numpy libraries to analyze customer machine metrics, gather insights for product enhancements, and inform critical product decisions. Leveraged SQL and Amazon Athena to efficiently pull large datasets, and utilized the boto3 library to seamlessly integrate with AWS services.
- Wrote and released multiple web pages leveraging HTML, Bootstrap, and custom CSS for Altec's AXIS service tool. Pages are utilized and interacted with by customers, service technicians and other Altec associates across multiple product lines.
- Designed fully contained software system package for lanyard detection that syncs state via CAN bus with other ECUs on Altec Cranes. Protects operators from engaging in unsafe work practices by preventing unit motion and engaging visual and audible alarms. Developed with MATLAB/Simulink and targeted at embedded devices with Simulink Coder.
- Integrated rotation interlock system that performs zone calculations based on feedback from CAN encoders into the Derrick product line, aiding in safer unit usage for equipment operators.
- Created Simulink-based I/O mapping system for Altec derricks ECUs, enabling easier deployment of custom unit applications without firmware updates. Saved countless man-hours and sped up product releases for Altec customers.

Kansas State University Manhattan, KS
Lab Instructor - Control of Mechanical Systems *Aug. 2016 - Aug. 2017*

- Conducted 45-minute lab lectures for 30+ students, demonstrating practical applications of control theory.
- Mentored students in programming concepts and development using MATLAB, resulting in improved performance in lab exercises and projects.

EDUCATION

Kansas State University Manhattan, KS
Master of Science - Control Theory, Mechatronics, and Software Development *May 2017*

- **Thesis**: Development and feasibility of economical hardware and software in control theory application

Kansas State University Mahattan, KS
Bachelor of Science - Mechanical Engineering *Dec. 2014*

PROJECTS

CAN Tools Library Open source Typescript library deployed via NPM that gives Typescript developers access to general-purpose CAN tools, such as CAN database parsing (Vector DBC files) and CAN message decoding. Utilized Rollup for isomorphic deployment, TSPeg (PEG style grammar) for the parser generator, Jest for testing, and CircleCI for continuous integration. Check out the project on GitHub: github.com/bit-dream/candied or npmjs.com/package/candied.

DBC Editor Web App Developed a web app that allows for the visualization and editing of Vector DBC files using NextJS, React, Tailwind, D3, and the Candied library. Implemented a directed graph visualization of network nodes/messages via the D3 library. Users can edit DBC files and decode raw CAN frames to their physical values. All React components leverage the Tailwind framework, and automated testing is performed with Playwright. Deployed with Vercel: candied-app.vercel.app

PROGRAMMING SKILLS

Programming: MATLAB, Python, Javascript, Typescript, Simulink, Stateflow, SQL, LaTeX, C, C++, HTML, CSS, Bash
Library/Frameworks: React, Next, Bootstrap, Bulma, Tailwind, Jest, D3, PostgreSQL, Pandas, Node, PyQt
Technologies/Other: git, SVN, CAN, CANape, CANoe, Jira, GitHub, Azure, Confluence, Grafana, Linux, MacOS, WSL