Dylan-Matthew Garza

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Objective

Computer Engineering student graduating in December 2024 seeking an engineering role in embedded Linux development, and Linux systems development.

Skills Summary

- Embedded Linux development with Yocto Project
- bitbake, OpenEmbedded, U-Boot, OP-TEE, TF-A
- Toolchains, SDKs, BSPs
- Systems Programming: C/C++, Rust
- Scripting: POSIX/bash/python
- git version control and command line interface
- Dynamic binary analysis with Intel's PinTool
- Full-stack web development: Web Assembly, Rust, javascript/typescript, HTML/CSS
- Micrcontroller development for Arm Cortex-M4
- Micrcontroller peripheral: CAN, DRAM, I2C, UART, SPI, JTAG
- Object-Oriented Programming for applications with C++ and Java
- TCP/IP,UDP
- Linux server administration
- Security: PKI, SSL/TLS
- Docker, qemu, NixOS

Education

B.S. in Computer Engineering and Minor in Mathematics Expected: December 2024
Western Michigan University - Kalamazoo, Michigan

Experience

ZF Group, Research and Development Intern August 2024 - Present

- Design and implement a device with capabilities to test different vehicle components to determine if specifications are met
- Streamline device testing and test data handling and interpretation
- Using Yocto Project to build a custom embedded linux image for the Arm Cortex-A7 architecture
- Integrate custom device tree into Linux kernel recipe
- Designed an interactive web application for testers implemented fully in Web Assembly with the Yew framework in Rust
- Designed a Rust backend application to handle HTTP requests and communicate to an onboard microcontroller (Arm Cortex M4) using interprocess communication (IPC) through the OpenAMP framework project
- Link to presentation: https://dylxndy.xyz/senior-design-presentation/

Resideo, Embedded Linux Engineer Intern May 2022 - August 2022

- Successfully integrated debuginfod, a file server, into CI/CD pipeline in order to make the debugging workflow and analyzing core files of embedded Linux images simpler and more efficient.
- Developed shell/bash scripts to automate tasks
- Learned about the Yocto Project to develop custom reproduceable embedded Linux images
- Wrote technical documentation and gave a presentation on how to utilize tools
- Learned the principles of agile development to improve software velocity, reduce bug count and decrease time to market

eMatrix Energy Systems, Assembly Technician May 2021 - August 2021

• Constructed and tested various components of battery packs and battery cells
• Worked with engineers on prototyping new designs of battery packs
• Followed safetey procedures to ensure a safe working environment

Projects

System Resource & Window Management Bar July 2024 - Present

• Developed a fully custom status bar utilizing Eww Widgets (standalone widget system implemented in Rust) for the Hyprland Wayland Compositor
• Dynamic workspace display implemented using C through UNIX sockets, interprocess communication and signal handling
• System statuses fetched real-time using compiled C and Rust binaries include SSID, Wi-Fi connectivity, IPv4 address, RAM usage, battery capacity, and time/date
• Styled in GTK SCSS
• Link to Project Github Repository

Simulation of Fixed-length Vector Architecture Superpipeline November 2023 - December 2023

• Simulated a pipeline for a vector processor in fully Object-Oriented C++
• Utilized Intel's PinTool to dynamically profile binary for vector instructions (AVX/AVX2) to generate a custom trace file
• Supported Variable single-instruction multiple-data (SIMD) lanes
• Implemented 6-stage pipeline (fetch, decode, issue, execute, commit)
• Out-of-order execution through Tomasulo's algorithm (method of dynamic instruction scheduling and out-of-order execution) with a fixed issue width

Dynamic Conveyor Belt Positioning System April 2023

• Designed and implemented a system utilizing an STM32 microcontroller
• Move an object on a conveyor belt from start to end position
• Using peripherals such as LED indicator, IR emitter, Ohm speaker, and relay switch
• Design H-Bridge motor driver module, and motor encoder module
• Write microcontroller program (using IAR Workbench and STM32CubeMX) that adjusts frequency/duty cycle adjustments based on input signals

Custom 10-bit CPU January 2023 - April 2023

• Designed a custom 10-bit ISA and simulated a 5 stage pipelined CPU using the Verilog HDL
• CPU was implemented with two-level memory hierarchy with cache and RAM.
• Branch predictor was also implemented as a 2-bit predictor with a branch history register and pattern history table
• Wrote machine code for bubble sort, string copy, and multiply programs

Certifications

LFD 460:Embedded Linux Developement with Yocto Project August 2022

Gained expertise in developing custom embedded Linux systems through the Yocto Project, encompassing advanced tool usage and IDE integration for efficient embedded product development.

Credly Badge | Linux Foundation Certificate