

Hussein Kaleta Muya

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Electrical Engineer with expertise in digital design, embedded systems, and PLC programming. Skilled in SystemVerilog, Python, C, C++, and VHDL, with a solid foundation in system-level design, hardware-software co-design, and real-time control systems. Passionate about building scalable, reliable systems and contributing to innovative engineering teams through strong technical and communication skills.

Work Experience

Assistant to Electrical Design Engineer

Aug 2024 - Present

Sea-Tac Electric | Kent

Design and develop electrical schematics and power distribution systems, ensuring system reliability,integration, and compliance with safety standards — paralleling the precision and innovation.

- Supported the testing and validation of electrical circuits, aligned with distributed systems and runtime environments, demonstrating strong system development skills.
- Collaborated with cross-functional teams, optimizing workflows and integrating components, reflecting experience in multi-disciplinary engineering teams and system optimization.
- Developed Python-based scripts using Dynamo and Revit API, automating workflows and improving efficiency by 20%, showcasing expertise in scripting and automation, critical for driving developer velocity and system performance.

Projects

Jan 2024 - Jun 2024

Sensor System for Detection of Air leaks(Embedded System Engineer)

Developed, tested and validated a wireless sensor system using accelerometers to detect air leaks through vibration analysis, achieving a deviation from linear response within 0.5%, noise level less than 20 µg/√Hz, and cross-axis sensitivity below 2%

- Developed Embedded Firmware & Distributed Systems: Designed and implemented distributed systems for real-time sensor data acquisition using SPI and synchronization on ESP32 microcontrollers, achieving sub-millisecond precision and seamless TCP communication over Wi-Fi.
- Optimized System Performance: Scaled accelerometer sampling rates from 1.1kHz to 9kHz, enhancing resolution, efficiency, and RF stability; applied signal processing (FFT) and machine learning (CNN) to improve accuracy in vibration analysis and leak localization.
- Advanced Algorithms & Low-Latency Communication: Applied distributed systems principles and optimized synchronization pipelines for multi-sensor systems, ensuring low-latency and high-accuracy performance under varied operational conditions.

RISC-V processor in SystemVerilog

Jan 2023 - Sep 2023

RISC-V Processor Design: Architected a pipelined RISC-V processor in SystemVerilog, achieving a 1.6x speedup over single-cycle designs through efficient microarchitecture optimization.

- Hardware-Software Co-Design: Optimized ALU, control units, and memory subsystems using RISC-V assembly, ensuring seamless execution and minimal pipeline hazards.
- Performance Validation: Developed testbenches and performed hazard analysis to enhance throughput and validate functionality across varied workloads.
- Conducted pipeline hazard analysis and performance tuning, applying microarchitecture techniques tominimize data hazards and optimize throughput.

Traffic Light Simulation with Ultrasonic Sensors (Embedded RTOS Project)

Apr 2023 - Jun 2023

Real-time Embedded System Development: Engineered a dynamic traffic control system using an RTOS tomanage traffic flow, demonstrating expertise in embedded systems and real-time task scheduling.

- Sensor Integration & Data-Driven Decision Making: Integrated ultrasonic sensors for vehicle detection,applying real-time data processing to dynamically adjust traffic lights and optimize performance, similar to real-time systems used in cloud infrastructure.
- Advanced Task Scheduling & Synchronization: Implemented preemptive task scheduling and resource management within the RTOS framework, improving system reliability and task execution across multiple real-time operations.
- Operational Safety & Innovation: Developed advanced features such as emergency vehicle priority and pedestrian crossing management, solving complex operational challenges and demonstrating proactive problem-solving for system efficiency.

Core Skills

Programming & Verification: SystemVerilog (UVM), Python, C++, MATLAB, Bash, VHDL, Analog circuit design and simulation (e.g. SPICE)

Digital Design & Verification: FPGA design, SoC verification, RTL design, Testbench development, FPGA/ASIC design, Test automation.

Embedded Systems: 8, 16, 32-bit microcontrollers, PCIe, I2C, SPI, USB, UART, RTOS, Setting up the stack in linker scripts and understanding the memory layout (FLASH, RAM, .data, .bss, and .text sections), PLC programming (ladder logic, control systems), ROS.

Debugging & Simulation: Oscilloscopes, JTAG, Logic Analyzers, ModelSim, Quartus, Vivado, Verilog testbenches Software & Tools: AutoCAD, Revit, CAD, Git, Jira, Linux programming, Agile methodologies, Docker, EC2, Cloud infrastructure

Signal Processing & ML: FFT, CNN-based classification, real-time data acquisition & filtering

Education

University of Washington

Bachelor of Science Electrical Engineering

Dec 2024

Relevant Coursework: Digital Design, Embedded Systems, Computer Architecture, Networking Protocols, Data Structure and Algorithms, Signal Processing,

Semiconductor Devices, UW Solar member: Contributed to the design and implementation of solar energy solutions for campus sustainability projects.

Bellevue College

Associate of Science Chemical Engineering

Dec 2021

Awards

Engine Capstone Showcase winner, third place

Jun 2023

University of Washington school of engineering: awarded for the significant work done on the wireless sensor system for detection of air leaks

Dean's List University of Washington, 2023

Recognized on the Dean's List for academic excellence and maintaining a high GPA.