Dianelys Rocha

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Summary

Embedded Software Engineer skilled in C/C++ firmware, Python computer vision, and embedded Linux (Yocto, FreeRTOS). Experienced with STM32, NXP i.MX8, and communication protocols (SPI, I²C, UART). Strong background in driver development and real-time computer vision systems.

Skills

Languages & Tools: C, C++, Python, Bash, MATLAB | Git, Docker, CMake
Embedded Systems: STM32, ESP32, NXP i.MX8MP | FreeRTOS, Yocto Linux
Specialties: SPI/I²C/UART/RS-232 | OpenCV (Python), NumPy, Pandas, driver dev, debugging (GDB, JTAG/ST-Link), STM32CubeIDE, Vivado, crosstool-NG

Experience

Software Engineer – Pixels On Target, Sunrise, FL (Sep 2023 – Present)
• Designed custom SPI protocol (STM32 master in C++, i.MX8 Linux slave in Python spidev) with framing, sequence numbers, and error handling.
• Built computer vision modules in Python (OpenCV, NumPy, Pandas) using geometric and graph-based methods for robust feature matching.
• Developed autofocus control algorithm in C++ and customized Yocto Linux builds with drivers and debug tools for i.MX8 targets.
• Mentored interns on embedded systems fundamentals, improving onboarding efficiency.
Software Engineer Intern – Pixels On Target, Sunrise, FL (May 2023 – Aug 2023)
• Developed I²C driver in C++ for haptic motor, enabling modular design and dynamic vibration patterns.
• Conducted hardware/software testing, identified critical issues, and improved system reliability through targeted adjustments.
• Assisted with embedded Linux bring-up and debugging, supporting board-level validation.

Selected Engineering Projects

Embedded Linux System – BeagleBone Black
• Built an ARM Cortex-A8 cross-compilation toolchain with crosstool-NG; verified with static/dynamic linking and custom libraries.
• Configured and deployed U-Boot bootloader, Linux kernel, device tree, and root filesystem on SD card for board bring-up.
• Implemented a character driver (LED/Morse code), enabling boot-time messages and user-space IOCTL control.
Embedded SoC System – Zybo Z7 (Zynq-7000)
• Designed Vivado block diagram integrating ARM Cortex-A9 with custom AXI4-Lite peripherals, GPIO, and Pmods (OLED over SPI, RTCC over I²C).
• Developed bare-metal C drivers in SDK for OLED text rendering and real-time clock interface; implemented GPIO input handling (switches/buttons) with LED feedback.
• Validated full HW/SW co-design: synthesis, bitstream, linker script, and ELF deployment/debugging on Zybo hardware.

Education

B.S. Computer Engineering – Florida International University (Jul 2024, Magna Cum Laude)
Coursework: Embedded Systems, RTOS, DSP, OS, Circuit Analysis (MATLAB: nodal/mesh, transients, Bode plots).