

SHOVAN SHAKYA

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Education

University of South Florida

Bachelors of Science in Electrical Engineering, 3.5 GPA

Tampa, Florida

May 2025

Skills

Languages: C, C++, Python, Verilog

Software Development Tools: Zephyr RTOS, OpenCV, Vivado, ROS2, Git

CAD Tools: Altium, KiCAD, LTSpice, Keysight ADS

Hardware: Oscilloscope, VNA/VSA, Spectrum Analyzer, Logic Analyzer

Certificates: Keysight Technologies RF and Microwave Level 1

Experience

Jaycon Systems

Palm Bay, Florida

Firmware Engineering Intern

September 2024 - Current

- Architected a Zynq SoC image processing state estimation solution helping win a NASA SBIR contract.
- Enhanced STM32 firmware in C by reducing SPI EMI for FCC compliance, adding ADC based temperature logging at 2 Hz, and integrating SPI double buffering to prevent DMA buffer overwrites.
- Developed and tested a connected component labeling (CCL) algorithm in C for ARM Cortex-A9 processor to accurately extract target blob coordinates at a 15 Hz update rate from 720p camera.
- Using High Level Synthesis (C++) to implement FPGA accelerated realtime image processing on Zynq 7000 SoC.
- Developing a CCL algorithm in SystemVerilog and integrated dual-port BRAM to transfer pixel coordinate data from custom IP to the Zynq processor in C++.
- Designed a PCB for DIP32 socket programmer adapter for flashing firmware on 500 audio chips.

Universal Creative

Orlando, Florida

Sensor Fusion Intern

May 2024 - August 2024

- Developed STM32 firmware in C for IMU interfacing over I2C, communicating with other STM32 modules via CANBUS, and transfer IMU data to a computer using UDP via Ethernet SPI.
- Designed a 4-layer STM32-based PCB (2cm x 2cm) with BNO088 IMU, Ethernet SPI module and TJA1051 CAN IC, supporting up to 30V input voltage.
- Created a Python application to synchronously record pose and camera data on a multi-stereo camera ROS platform.
- Created and tested a 1D Bidirectional CNN model for hand gesture recognition using pose data.
- Applied image processing techniques to detect cutouts on display screens to detect bugs and verify manufacture quality.

Monterey Bay Aquarium Research Institute

Moss Landing, California

Computer Vision Intern

June 2023 - August 2023

- Developed OpenCV based realtime disparity and distance estimation tool for fisheye stereo cameras with accuracy range of 5 meters (+- 300 mm) for desktop and VR.
- Used multiprocessing to perform disparity and tracking in parallel.
- Integrated FathomNet YOLOv5 deep sea organism tracking model with distance estimation.
- Used Sockets to send realtime frames, and distance information between Python OpenCV application and Unity VR.
- Added head tracking based pointer for a pilot-friendly User Interface for a in house VR Unity application.

Projects

Dynamic Bandpass Filter for Voice Modulation using NRF52

Ongoing

- Implemented DPPI/Timer-triggered ADC sampling for mic, reducing CPU involvement.
- Developing a gesture controlled dynamic bandpass filter using IMU for real-time voice modulation on an nRF52 MCU running Zephyr RTOS.
- Using Zephyr RTOS's scheduling to coordinate gesture recognition, audio processing, and Bluetooth streaming.
- Integrating Bluetooth for streaming both audio and IMU data, providing external device connectivity and real-time monitoring.

Functional Near Infrared Spectroscopy Headset (Capstone)

2024

- Designed a FPC PCB using Altium for a multichannel emitter and diode configuration.
- Developed a real-time, multichannel visualization and data logging application from STM32 using PyQtGraph.

RISC-V CPU on FPGA

2023

- Designed and implemented a 16-bit CPU for RISC-V based instruction set architecture on Basys 3 (Artix-7) FPGA.
- Testbenching, synthesis, and implementation done through Vivado and Verilog.