Saumya Shah

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Education

The University of Texas at Dallas **Dallas, Texas** **January 2023 – December 2024**

- Master of Science in Electrical Engineering **GPA: 3.78/4.00**
- **Relevant Coursework**: Microprocessor and Embedded Systems, VLSI Design, Computer Architecture, Advanced Digital Logic, Functional Verification, Testing and Testable Design, ASIC Design, Reconfigurable Systems

Nirma University **Ahmedabad, India** **July 2018 – June 2022**

- Bachelor of Engineering in Electronics and Communication Engineering.

Technical Skills

- **Languages:** C++, C, Python
- **Tools & Technologies:** STM32CubeIDE, PlatformIO, KiCAD, Arduino IDE, MQTT(Mosquitto), Git
- **Concepts:** Embedded Firmware Development, ARM Cortex-M Microcontrollers, Event-Driven Firmware Architecture, OTA Updates, Real-Time Data Acquisition
- **Protocols:** I2C, SPI, UART, MQTT, HTTP, 1-Wire, Wi-Fi, Bluetooth

Work Experience

Embedded Engineer **Winwinlabs** **April 2025 – Present**

- Developed a multi-function firmware platform on ESP32-S3 for real-time acquisition and streaming of DS18B20 and DHT22 sensor data via MQTT and WebSockets to a responsive browser-based interface.
- Integrated OTA firmware updates, web UI delivery from LittleFS, and persistent sensor configuration storage using NVS for seamless remote management.
- Architected an event-driven firmware framework enabling concurrent sensor polling, network communication, and user interaction with minimal latency and high reliability across varied IoT deployments.

Research and Development Intern **Thruster, India** **May 2021 – July 2021**

- Devised a circuit using an Arm Cortex M4 based STM32F4 controller to deliver signals to the motor driver and collect coil current and voltage data for future analysis.
- Revised the SRM motor driver assessment process by designing and deploying tailored algorithms that measured performance attributes, leading to a 30% reduction in evaluation time and improved decision-making capabilities.

Projects

Sobel Edge-Detection for Reconfigurable Computing **September 2024 – December 2024**

- Designed and implemented a Sobel filter on FPGA using HLS for hardware and ARM programming for software, enabling efficient image processing.
- Integrated the FPGA hardware accelerator with an ARM-based Hard Processor System (HPS) to achieve optimal system performance, reducing processing latency and improved detection efficiency by 14%.

Analysis of Branch Predictors and Cache Associativity **September 2023 – December 2023**

- Conducted a comprehensive analysis of diverse cache design strategies, assessing the influence on x86 CPU performance. Subsequently, derived an optimal configuration yielding the lowest Cycle Per Instruction (CPI) while maintaining cost efficiency.
- Evaluated the impact of changing variables on branch predictors through experimentation using advanced features from GEM5.
- Generated python scripts to improve the benchmarks' execution speed by 30%.

Sensor Data Acquisition and Cloud Integration **October 2021 – December 2021**

- Developed a concurrent data acquisition system on STM32F7 running FreeRTOS, efficiently collecting data from multiple sensors.
- Implemented data communication between STM32F7 and ESP8266 using USART to transfer sensor data.
- Optimized system resource management, ensuring smooth data collection and transmission in a multitasking environment.

4-Wheel Holonomic System **July 2019 – May 2020**

- Built a four-wheeled holonomic robot on STM32F4 and Arduino, developing SPI, I²C, and USART drivers to interface motor controllers, sensors, and a PS4 wireless controller.
- Designed fuzzy logic algorithms for precise maneuverability and semi-autonomous operation, achieving 90% accuracy.
- Conducted JTAG-based debugging and register-level analysis to validate data flow, optimize memory usage, and ensure stable real-time performance.

Custom PCB Design for Embedded and Robotic Applications **October 2018 – December 2021**

- Designed development boards featuring the LPC17xx microcontroller for embedded system development.
- Created custom PCB solutions integrating the STM32F4 Discovery board for advanced robotic applications.