Sahaj Singh

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TECHNICAL SKILLS

Programming Languages: C / C++, Python, VHDL, MATLAB, Bash, Java, Assembly, HTML5/CSS3, Javascript, Flutter
Tools, Frameworks & Technologies: Git, Jira, React, TensorFlow, PyCharm, Visual Studio Code, macOS, Linux, Windows, Android
Linux: Admin, Bash, Kernel Config, Package Mgmt (APT, YUM), Networking, UFW/iptables, FS Mgmt, cron, SSH
Relevant Courses: Embedded Systems, Digital Systems Design, Fundamentals of Digital Logic and Design

WORK EXPERIENCE

Software/Firmware Developer **Jan — April 2022**
picoTera Electronics Inc. Richmond, BC

- Developed advanced firmware in C/C++ for **PSoC6 and ARM Cortex-M4, M0 platforms** and ported the project from PSoC creator to ModusToolbox 2.4 for better compatibility.
- Implemented modifications to a **TensorFlow based Recurrent Neural Network (RNN) model written in Python** and **ported in C** for Cortex-M4 devices, reducing noise in audio denoising applications approximately from **90+ decibels down to 60 decibels.** Additionally, created a custom audio dataset to train the RNN model, increasing the variety of noise profiles for training by a factor of 3.
- Replaced dynamic gain with static gain, optimizing post-processing audio quality, and **boosting denoising performance by 25%.**
- Authored custom **cmake scripts for CMSIS libraries**, reducing memory usage and storage in complex operations and enabled Bluetooth Low Energy **(BLE) integration** between PSoC6 and an Android app, facilitating real-time data transmission.

PROJECT EXPERIENCE

Multi-threaded Memory Allocator: **Spring 2023**

- Developed a multi-threaded memory allocator in C, supporting **First Fit, Best Fit, and Worst Fit allocation algorithms.**
- Implemented features such as allocator initialization, allocation/deallocation interfaces, metadata management, compaction support, statistics reporting, multi-threading support, and uninitialization in C.
- Designed test cases and provided usage instructions to ensure the proper functionality and efficiency. Wrote custom Makefile for easy compilation and execution.

Simple Linux Shell: **Spring 2023**

- Developed an interactive **Linux shell in C**, capable of executing user commands in individual processes, and incorporated **support for internal commands** (exit, pwd, cd, help) to enhance user experience and operational efficiency.
- Implemented a command history feature, **preserving the last 10 commands**, and introduced the ability to execute commands from history, facilitating improved user productivity.
- **Enhanced shell interface** by displaying the current working directory in the prompt and extending the cd command to support intuitive navigation to home and previous directories using standard symbols.

Drone Controller and System: **Fall 2022**

- Designed firmware for a wireless drone system using a BeagleBone Green and Arduino Nano 33 IOT drone.
- Developed multiple control modes, integrated LCD display, and an ultrasonic sensor for gesture-based height control.
- Wrote a custom driver for a **UART-BLE module in C** for efficient BLE communication between the controller and drone.
- Incorporated watchdog and systemd scripts for automated restarts to handle any unexpected system crashes.

FASTrack - Reaction Time Game: **Summer 2022**

- Developed a reaction time-based game for the Xilinx ZedBoard, utilizing the **ARM7 assembly instruction** set.
- Implemented various game features such as multiple speed modes and user controls through switches. Utilized OLED display and LEDs for visual feedback.
- Demonstrated key concepts including timer interrupts, masking, OLED display usage, and Finite State Machines (FSMs).

EDUCATION

B.A.Sc. Computer Engineering — Honours **Sep 2020 — Sep 2025**
Simon Fraser University Burnaby, BC

LEADERSHIP EXPERIENCE

MATLAB — SFU Student Ambassador **Oct 2022 — Present**
MathWorks Burnaby, BC

- Organizing and hosting numerous programming and simulation based events revolving around **MATLAB and Simulink.**
- Helping in the process of creating meaningful relationships between MATLAB and professors/students at SFU. Providing support for students with questions related to MATLAB and Simulink.