

Sahaj Singh

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TECHNICAL SKILLS

Programming Languages: C / C++, Python, MATLAB, Bash, Java, VHDL, Assembly, HTML5/CSS3, Javascript, Flutter

Tools, Frameworks & Technologies: Git, Jira, React, Visual Studio Code, PyCharm, macOS, Linux, Windows, Android

Relevant Courses: Embedded Systems, Data Structures and Algorithms, Operating Systems, Database Systems

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 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 using !n and !!, 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 the ~ and - symbols respectively.

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 implemented 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.