Manush Patel

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Education

McMaster University Expected: April 2028
B.Eng, Computer Engineering (GPA: 3.7/4.0) *Hamilton, ON*

- Engineering Award of Excellence – Top 10% of Faculty
- Relevant Coursework: Data Structures, Logic Design, Circuit Analysis

Experience

Controls and Firmware Developer | Mac Formula Electric **– Hamilton, ON** Sept 2024 – Present

- Implemented C++ drivers for low voltage battery management systems, enabling stable cell-voltage reads and 30+ diagnostics used in pre-drive safety checks
- Migrated control logic from **Simulink models** to C++, allowing for Git-based review and simpler debugging
- Computed suspension travel from position sensors and delivered validated data to Vehicle Dynamics for setup and correlation with lap-time results

Embedded Software Engineer Intern | Lumatone – Toronto, ON April 2025 – Aug 2025

- Built **C firmware** on **BeagleBone/PICkit** to validate ADC inputs from hall-effect sensors, reducing QA time
- Cut calibration time by creating real-time sensor **visualization** using **Matplotlib**, replacing manual log review
- Debugged interrupt-status flags and input-handling logic in BeagleBone C firmware, improving reliability

Software Developer | Gerrits Engineering Ltd – Barrie, ON Jan 2025 – March 2025

- Automated engineering workflows with **n8n**, extracting structured data from PDFs into CSV for analysis
- Deployed AI agents integrated with **Supabase auth** and hosted on **Firebase**, reducing manual entry

Projects

STM32 Bootloader [Link]

- Built an **ARM Cortex-M** bootloader in **C** for an **STM32** microcontroller to validate firmware and manage application execution from internal flash
- Implemented flash erase and program routines with strict memory boundary enforcement to prevent corruption
- Configured linker scripts and startup logic to relocate the interrupt vector table, reset the main stack pointer, and safely transfer control to application code

Nav-Aid [Link]

- Designed an AI-powered navigation aid on **Raspberry Pi** that performs real-time street-sign detection and routes results to a custom tactile Braille board
- Built a **servo-driven** Braille-style interface, synchronizing actuators from **Python** to render tactile characters

CampusCart [Link]

- Built a full-stack marketplace using **React, Node.js, Express, PostgreSQL, and Tailwind CSS** for housing, textbooks, and services
- Implemented secure listings with **JWT authentication**, calendar synchronization, & media uploads via **AWS S3**
- Grew platform to **200 daily active users (DAU)** through campus outreach and iterative releases

Skills

Languages: C, C++, Python, JavaScript, Verilog

Protocols: CAN, UART, I2C, SPI, USART, CRC

Embedded & Firmware: STM32, BeagleBone, ADC/DAC, PWM, Interrupts, Timers, Oscilloscope

Tools & Platforms: Git, Simulink, Docker, Altium, AutoCAD, GoogleTest, FreeRTOS