Nehan Mohammed

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Education

McMaster University *April 2028*
Bachelor of Engineering, Computer Engineering - *GPA: 4.0/4.0*
Relevant Courses: Logic Design, Data Structures & Algorithms, Circuit and Electronic Device Analysis

Skills

Programming Languages: C/C++, Python, JavaScript, HTML/CSS, Verilog, PHP, SQL, Assembly
Developer Tools: Git/GitHub, Linux, VS Code, STM32CubeIDE, Intel Quartus Prime, LTSpice
Frameworks & Libraries: ROS2, Micro-ROS, Sckit-Learn, FastAPI, NumPy, Pandas
Hardware Platforms: STM32 Nucleo, Teensy 4.1, Raspberry Pi, Arduino

Experience

Software Developer — *McMaster Mars Rover Team* *Oct. 2024 – Present*

- Built ROS2 nodes and integrated **Micro-ROS** on a **Teensy 4.0** to send controller/keyboard inputs over **I2C** for 3-axis camera actuation, increasing the field of view of the rover by **100%** and eliminating blind spots to give operators full awareness.
- Expanded rover telemetry range by **1000%** (from **~1 km Wi-Fi** to **10+ km LoRa**) by building a custom communication stack, defining a compact payload schema for **GPS** coordinates, power-monitoring voltages/currents, and health codes.
- Configured **MCP9601** and **MIC184** temperature sensors over **I2C** and integrated them into **ROS2**, publishing thermal telemetry and driving an automatic fan-control node with calibrated threshold, improving system reliability during operation.

IT Technical Assistant — *Small Change Fund* *May 2025 – Aug 2025*

- Automated data management in **Bloomerang CRM** with **Python (Pandas)** and **REST APIs**, processing **22,000+ records**, updating **3,000+ user preferences**, flagging **2,000 invalid emails**, and cutting a **300-hour process to 48 hours**.
- Designed and deployed a **Google Drive notifier** using **Google Apps Script** and the **Drive API**, monitoring **60+ projects**, automatically alerting partners of file changes, and dynamically integrating new projects.
- Delivered real-time donation visibility for **100+ projects** by developing **PHP functions** integrated with an **SQL database** and **Chart.js** visualizations, boosting site traffic to **40,000+ monthly pageviews**.

Autonomous Software Engineer Intern — *Telebotics* *May 2025 – August 2025*

- Designed and integrated ROS2 nodes for teleoperation and safety monitoring, enabling sensor fusion of **IMU, LiDAR, GPS, and ultrasonic data**, and verifying performance in **Gazebo simulation**.
- Increased system reliability by implementing a heartbeat mechanism and live-update dashboard that cut debugging time by **40%**, giving the team real-time visibility into actuator and sensor health.
- Enhanced fail-safe behavior with **sub-200 ms** sensor timeouts, stopping-distance checks, closed-loop brake feedback, and a **LiDAR-based "Watchdog"** system that enabled emergency braking and triggered safety protocols during signal loss.

Projects

5-Stage Pipelined RISC-V Processor — *Verilog, Icarus Verilog, GTKWave* *October 2025*

- Built a **32-bit RISC-V RV32I** CPU with a 5-stage pipeline (Fetch, Decode, Execute, Memory, Writeback).
- Implemented **data-hazard handling via forwarding** (EX/MEM and MEM/WB) for RAW (Read after Write) dependencies.
- Eliminated **structural hazards** by separating **instruction** and **data** memories (Harvard-style IMemory/DMemory).
- Wrote targeted testbenches, and validated R-, I-, and S-type execution using **Icarus Verilog** and **GTKWave**.

Drift - ADHD Detection System — *Python, Scikit-Learn, FastAPI, Chrome Extension* *August 2025*

- Designed and trained a **logistic regression model** in scikit-learn inspired by a published research experiment, extracting 15+ behavioral features from mouse movement data to classify ADHD tendencies with an **81% test accuracy**.
- Implemented a reproducible machine learning pipeline with feature scaling and **cross-validated hyperparameter tuning**, ensuring stable performance across multiple training runs and preventing overfitting.
- Built a Chrome extension that tracked both normal cursor movements and interactions within an isolated game replicating the **research experiment**, streaming 60 Hz cursor data to a **FastAPI** backend for real-time ADHD probability predictions.

Hand Gesture Controlled Car — *C++, Python, Arduino, Raspberry Pi* *May 2024*

- Engineered a 4-motor robotic car using an **Arduino Uno** for precise PWM motor actuation and a **Raspberry Pi 4** for high-level coordination and video streaming, achieving seamless hardware–software integration across platforms.
- Developed custom glove controllers with embedded **MPU6050 gyroscope sensors**, processing real-time orientation data in **C++** and transmitting commands over **HC-05 Bluetooth** to enable accurate, low-latency gesture-based navigation.
- Implemented a first-person driving interface by streaming live video from a **Raspberry Pi camera** to a mobile device mounted in a 3D-printed headset, creating an immersive and responsive VR-like user experience.