TANVIR SINGH

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Education

McMaster University Hamilton, ON
Bachelor of Engineering in Computer Engineering (Co-op) *Sep 2021 – Apr 2026*

Relevant Courses: High-Performance Programming, Computer Architecture, Embedded Systems, Principles of Programming (C/C++), Algorithm Design & Analysis, Digital Systems Design, Logic Design, Operating Systems

Experience

Software Application Developer Hamilton, ON
McMaster Aerial Robotics & Drones Team *Jan 2025 – Jan 2026*

- Implemented autonomous navigation, including waypoint tracking, obstacle detection, and flight stability, using **Python** and **C++**, tested in various simulation environments with $\sim$ **95%** waypoint accuracy.
- Built a full-stack drone tracking dashboard using **React** and **Next.js** with **PostgreSQL** and API endpoints supporting map **CRUD** (points/lines), including remove/save states, containerized with **Docker** for reliable testing and deployment.
- Deployed a mobile-friendly team website built with **React** and **Next.js** on **Vercel/AWS** to showcase club updates.

Software Quality Engineering Intern Markham, ON
Veoneer Canada Safety Systems *May 2024 – Aug 2025*

- Engineered software tools and dashboards with **Python**, **C#**, **Java**, and **React/TypeScript**, and created **Power BI** reports to track quality metrics across **10+ subsystems**, improving reporting speed.
- Automated quality reporting workflows using **Python**, **PowerShell**, **SQL** queries, Web APIs, and **Power Automate**, integrated into **CI/CD** pipelines to deliver repeatable runs, resulting in $\sim$ **40%** time savings.
- Streamlined ECU and satellite module testing by $\sim$ **15%** by modifying and validating circuit boards and schematics while **querying and updating** module test/quality records in an **Oracle** database.

Software Engineer Intern Mississauga, ON
Alphavima Technologies Inc. *May 2023 – Aug 2023*

- Developed a mobile app for the GiveLife365 software tool, using **Java** for backend services and **React** with **HTML** and **CSS** for UI/UX.
- Shipped software updates and improved frontend features for **5+ departments** using **Angular**, **TypeScript**, **Vue.js**, and **Node.js**, and built new endpoints while maintaining existing **Ruby on Rails** APIs.
- Managed backend **CRM/ERP** databases to ensure accurate analytics and effective communication between teams.

Projects

3D LiDAR Sensor

- Designed a **360° LiDAR** device using a **VL53L1X ToF sensor** (up to **4m**) mounted on a **28BYJ-48 stepper motor** for 3D scanning/rendering.
- Programmed a **TI MSP-EXP432E401Y** board in **C++** for motor step control, ToF sensor input, **I2C** data handling, and **UART at 115200 baud** to stream scan data to a PC for post-processing and visualization.
- Processed scan data at **11.25°** steps and generated 2D/3D environment plots in **Python (Pandas, Matplotlib)**.

Hardware Implementation of an Image Decompressor

- Created a **Verilog** system to transmit **YUV** data via **UART**, buffer to **SRAM** on an **Altera DE2** board, and support a **320×240** compression pipeline **(RGB to YUV, DCT, quantization)**.
- Integrated an **FSM-driven VGA controller** and **display pipeline** to render reconstructed frames in real time, with **0 data mismatches** across validation tests.

Custom Pacemaker Device

- Constructed and configured a pacemaker device to monitor and regulate a patient's heart rate via bidirectional telemetry between the **Device Controller-Monitor (DCM)**, **Simulink**, and external hardware.
- Assembled a real-time **Python (Tkinter)** GUI to monitor heart rate data and control pacemaker operating modes.

Quizler App

- Prototyped the UI/UX for a collaborative educational app at **DeltaHacks**, focusing on clear workflows and usability.
- Launched a "Brainstorm Room" using **JavaScript**, **HTML**, and **CSS** to enable synchronous student collaboration.

Skills

Languages: C/C++, C#, Python, Java, JavaScript, Verilog HDL, SQL
Web Development: React, Next.js, Ruby on Rails, Node.js, Express.js, Angular, TypeScript, HTML, CSS, Tailwind CSS
Software/Technologies: Vercel, Docker, PostgreSQL, DynamoDB, AWS, pgAdmin, CI/CD (GitHub Actions, Jenkins), Git, Agile, Scrum, Pandas, Linux, Quartus II, PSpice, LTspice, Keil
Hardware: PLCs, Microcontrollers, Microprocessors, Arduino, AD2 Board, Raspberry Pi, Altera DE2 (FPGA)