

Ayaan Desai

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EDUCATION

Biomedical Engineering (Co-op), B.Eng.

2024 – 2029

Toronto Metropolitan University

Toronto, ON

Relevant Coursework

2025

Electric Circuits • Python Programming • Mechanics of Materials • Digital Systems • Radiation Physics

SKILLS

Programming: Python (NumPy, SciPy, Pandas, OpenCV), C/C++, MATLAB

AI & ML: CNNs, LSTMs, time-series modeling, computer vision, feature extraction, model evaluation

Biomedical Engineering: EMG signal processing, biosignal filtering, real-time control systems

Tools & Technologies: TensorFlow, PyTorch, Fusion360, SolidWorks, KiCad, ESP8266/32, Wi-Fi control

Core Engineering: Embedded systems, systems integration, rapid prototyping, generative CAD workflows, FPGA/CMOS implementation

Soft Skills: Technical leadership, interdisciplinary collaboration, project ownership, stakeholder communication

Certifications: IBM SkillsBuild – **AI Literacy Digital Credential (2025)**

EXPERIENCE

Production Engineering Student

May 2025 – Aug 2025

Hartmann Canada

Brantford, ON

- Analyzed high-frequency sensor data and machine diagnostics to identify inefficiencies in automated production systems.
- Implemented engineering-driven reliability improvements using structured root-cause analysis and data-informed decision-making.
- Worked cross-functionally with mechanical, electrical, and quality teams to enhance system uptime and throughput.

Pharmacy Assistant

Dec 2023 – Aug 2024

U.G.M Pharmacy

Hamilton, ON

- Processed 100+ prescriptions daily with strict accuracy, ensuring compliance with medical and regulatory standards.
- Prepared medication compliance packaging for elderly and chronic-care patients to support treatment adherence.
- Enhanced workflow efficiency and developed strong attention to detail in a high-volume clinical environment.

PROJECTS

KneeSense – Smart ACL Rehabilitation Knee Brace (Co-Captain)

2025 – Present

- Leading development of a wearable smart knee brace integrating EMG/EEG sensors and dual-IMU tracking for ACL rehabilitation feedback.
- Co-captain of the team representing Toronto Metropolitan University at the True North National Competition (March).
- Focused on real-time biomechanics monitoring, recovery analytics, and scalable medical-device design.

TrueMotion – High-Density EMG Assistive Device using Machine Learning

2025 – Present

- Developing a non-invasive assistive system that decodes fine muscle intent using high-density EMG arrays and neural-network architectures.
- Implemented a CNN-LSTM pipeline for temporal feature extraction and low-latency classification of EMG activation patterns.
- Created electrode interface hardware and full signal-chain schematics (KiCad), with custom structural designs in Fusion360.
- Performed cost and market modeling, projecting a 200-unit break-even and demonstrating scalable feasibility.

3D LiDAR Scanner with Generative AI CAD Reconstruction

2025

- Engineered a custom LiDAR scanning platform using embedded C++ firmware (microcontroller and Time-Of-Flight sensor) and 3D-printed components to capture dense point clouds.
- Developed algorithms for real-time spatial mapping and geometric reconstruction from raw LiDAR data.
- Built an AI-assisted pipeline that transforms point-cloud data into generative CAD models, enabling automated surface reconstruction and parametric design generation.

Prosthetic Hand with EMG + Vision-Based Control

2025

- Designed a 3D-printed prosthetic hand actuated by servo motors and controlled using both EMG signals and webcam-based intent detection.
- Implemented Python + OpenCV gesture detection and streamed control signals over Wi-Fi to an ESP8266 microcontroller.
- Performed performance benchmarking; used wired communication for faster response times, achieving sub-150 ms latency.