# Aarav Modi

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## Technical Skills

**Languages:** Python, TypeScript, JavaScript, SQL, Java, C++, HTML/CSS
**Frameworks:** React, Next.js, Django, FastAPI, Flask, Node.js, Express, Spring Boot, Tailwind CSS, Angular
**Tools:** PostgreSQL, Dagster, Docker, Git, Azure DevOps, GCP, AWS, Pandas, NumPy, Cursor, Claude Code

## Education

**University of Waterloo** Expected May 2029
*Bachelor of Applied Sciences in* ***Systems Design Engineering*** *Waterloo, Canada*

## Experience

**Machine Learning Engineer** Jan 2026 – Present
*Upside Robotics* *Waterloo, Canada*

- Trained **PPO reinforcement learning models** using **DSSAT** and **PettingZoo** to optimize nitrogen strategies, improving simulated corn yield by **40%** across **5+ Ontario farms** under varying seasonal conditions.
- Built scalable **Python data pipelines** processing **10GB+** of weather, soil, and yield data and trained models on **AWS** for large-scale machine learning experimentation and distributed training workflows.
- Developed an automated **ETL pipeline** on **AWS EC2** using scheduled **cron jobs** to extract millions of PostgreSQL records, load **200K+ new rows daily** into a **Redshift data warehouse**, and dashboards in **Power BI**.

**Software Engineer** Aug 2025 – Dec 2025
*Canadian Imperial Bank of Commerce (CIBC)* *Toronto, Canada*

- Built **React–Django** dashboard for **25+ projects**, batching **REST APIs** to cut JIRA calls by **67%**.
- Engineered **Dagster ETL pipelines** for **100GB+** data, saving **2+ days** monthly via parallel orchestration.
- Developed a **Python/GraphQL GitHub** activity tracker for **40+ offshore engineers** using **Redis** to automate velocity analytics and provide **automated stakeholder reporting** across **500+ monthly commits**.
- Implemented **Jenkins/Docker CI** pipelines and **PostgreSQL read replicas** supporting high-availability reporting systems, sustaining **99.9% uptime** under **15k+ concurrent query loads**.
- Integrated **ML models** via **Scikit-learn** and **FastAPI** to detect anomalies, cutting debugging time by **40%**.

## Projects

**CRai (Cry-Analyzer AI)** | *Python, Librosa, FastAPI, Modal, TensorFlow* Sep 2025

- Built an **ML pipeline** using **Librosa** to classify **neurological risk indicators** from infant cry patterns.
- Trained **CNN models** on **MFCC and spectrogram** features, achieving **92% accuracy** on labeled datasets.
- Deployed inference APIs via **FastAPI on Modal**, optimizing latency through **request batching** and integrating **Suno** for adaptive, AI-generated acoustic responses based on real-time classification.
- Integrated **LLM (Cerebras)** pattern explanation to assist non-clinical interpretation of complex model outputs.
- Presented at **HackMIT 2025**, recognized for innovation in **AI-driven signal analysis** and cloud deployment.

**Living In Healthy Space – NASA Design Challenge** | *Blender, NumPy, Pandas* May 2024

- **Grand Prize Winner** out of **4,000+ global teams** in a **NASA-sponsored** challenge; designed a high-fidelity **3D orbital colony model** and presented strategic research in Los Angeles, securing a **$2,500** scholarship.
- Built **Python**-based ecosystem simulations using astrobiological data, testing **100+ scenarios** for sustainability.
- Designed a **3D colony model** in **Blender** with topology and adaptive systems for habitat visualization.

**Founder - LockerLink.ca** | *Next.js, TypeScript, Firebase, PostgreSQL, Tailwind CSS, Computer Vision* Nov 2025

- Launched a social platform for OVA volleyball athletes and coaches with **100+ users** across **15+** Ontario clubs.
- Designed backend data models supporting **1,000+ profile attributes** and **300+ athlete–coach connections**.
- Used **SAM3** and pose estimation to extract performance metrics (e.g., vertical jump, spike velocity) from video.