Yatharth (Yuvi) Jain

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Education

University of Waterloo — Waterloo, ON
Bachelor of Computer Science (BCS), Honours, Co-operative Education Program — *Sep. 2026 – Apr. 2031*

Experience

Waterloo Rocketry — Waterloo, ON
Firmware Developer, Controls Subsystem — *Sep. 2026 – Present*

- Write **C** firmware on an **STM32** under **FreeRTOS** for the canards that steer the rocket mid-flight
- Reworked the SD card retry logic in the canard board's **FatFS** flight logger so a failed sync no longer re-writes the same buffer, removing duplicate chunks from flight logs

Intel AI For Youth — Tokyo, Japan
AI Researcher — *Oct. 2025 – Jan. 2026*

- Analyzed **70,000+ recordings from 202 speakers** with **HuBERT** speech embeddings and the **Montreal Forced Aligner**; errors clustered in r/l, "th", and lip-rounded consonants (preprint)
- Built a full-stack pronunciation coach that splits a learner's speech into phonemes and flags the sounds furthest from American English

Celebal Technologies — Tokyo, Japan
Data Science Intern — *Jun. 2025 – Aug. 2025*

- Built **time-series forecasting** and **anomaly detection** models (regression, classification) on the company's raw internet traffic data to predict load for capacity planning and flag anomalies such as outages
- Owned the pipeline end to end, from cleaning raw traffic data and engineering features to training and evaluating models; presented results and recommendations to senior developers

Projects

Machine Learning Library in Rust | *Rust, no ML or autograd crates* — 2025 – Present

- Building a PyTorch clone from scratch in **Rust** on raw `Vec<f32>`; next up are strided tensors, layers and optimizers, fast matmul, and reinforcement learning agents
- Implemented **reverse-mode automatic differentiation** with every op gradient-checked against finite differences; trained an MLP on XOR and fit polynomials with it
- Wrote a Flappy Bird clone and a **neuroevolution** trainer (rank-weighted elitist selection, per-weight mutation) that taught agents to play it with no labelled data

Pyronac | *NASA Space Apps 2026* | *Python, DuckDB, React, TypeScript* — Nov. 2026

- Merged NASA's **MODIS** and **VIIRS** satellite fire detections into one continuous fire record
- VIIRS counts several times more hot spots for the same fire, so MODIS years are rescaled to match, cutting monthly error from **78% to 9%**
- Built a planner that uses the record to site fire bases near towns: 25 sites chosen on 2003–2015 data covered **67%** of later fire near towns, vs. **23%** for random sites

Micromouse Autonomous Robot | *C++, ESP32, CAD, Flood Fill, A* Search, PID Control* — 2025

- Designed and built a maze-solving robot to All Japan Micromouse Contest specifications: CAD, 3D-printed chassis, component selection, and **C++** firmware on an **ESP32**
- Programmed flood-fill exploration and an A*-planned speed run, with **PID** wall-following control

Technical Skills

Languages: Rust, C++, C, Python, SQL, TypeScript/JavaScript, Bash
Frameworks & Tools: React, Node.js, FastAPI, Flask, Docker, Git, pytest
ML & Data: PyTorch, scikit-learn, pandas, NumPy, DuckDB, Matplotlib
Embedded & Hardware: STM32, FreeRTOS, ESP32, PlatformIO, FatFS, PID control, CAD, 3D printing