Jianhao (Jacky) Zhao

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Skills

- CPP, C, Java, Python, Verilog
- Circuit Design (KiCad, Altium)
- Web development
- Performing board debugging with oscilloscopes, DMMs, waveform generator, etc.
- Developing machine learning models using Pytorch and NumPy
- Microsoft Office
- Film Editing
- Versatile and a quick learner, effective problem solving and critical thinking skills

Education

University of Toronto - Toronto, ON *Sept. 2023 – Apr. 2028 (expected)*

B.A.Sc. in Computer Engineering + PEY Co-op

Intended Minors: Artificial Intelligence

Relevant Courses: Computer fundamentals (C/C++), Engineering Strategies and Practice, Digital Systems (Verilog), Introduction to Electronics

Curricular Experience

Team Leader – Toronto, ON *Jan. 2024 – Apr. 2024*

Course: Engineering Strategies & Practice II

- Assigning weekly tasks and monitoring team members' work, making sure the team stays on the plan.
- Reporting and communicating weekly progress with Gantt chart to the engineering manager (EM) or course instructor.
- Coordinating team working schedules and bi-monthly meeting plan with clients.
- Exceptional ability to create, adapt and modify professional documentation for both clientele and engineers during the various stages of project development.

Project Manager – Toronto, ON *Jan. 2025 – now*

Course: Software Design and Communication

- Developed an interactive city mapping application in C++, leveraging EZGL and GTK for graphics rendering and user interface.
- Integrated OpenStreetMap (OSM) and Google Places APIs to display real-time points of interest, including restaurant info like cuisine and open status. Built an interactive GUI with features such as street name search, intersection highlighting, and zoomable maps.
- Implemented efficient pathfinding using A* algorithm, handling one-way streets and turn penalties to provide driving directions
- Designed a user-friendly GUI with features like street name search, partial name matching, clickable intersections, and visual route display.
- Used Git for version control and collaborated in a team, managing tasks and milestones for smooth development and delivery.
- Coordinating team working schedules and meeting plan for each milestone.

Game Designer – Toronto, ON *Mar. 2025 – now*

Course: Computer Organization

- Built a 2D platformer game inspired by Super Mario using C on a Nios IV processor running on an Altera DE1-SoC FPGA board.
- Handled game logic, state transitions, and player-object interactions using custom finite state machines (FSMs).
- Implemented VGA output to render game objects, character movement, and collision events using memory-mapped graphics.
- Demonstrated proficiency in embedded C, low-level memory management, and hardware-software interfacing.
- Used Git for version control and collaborated effectively in a team-based development workflow.
- Coordinating team working schedules and meeting plan for each milestone.

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Extracurricular Experience

University of Toronto Robotics Association 2025 Hackathon - Toronto, ON *Feb. 2025 – Feb. 2025*

- As a team of 6, We built AeroCare — an AI-powered drone delivery system designed to autonomously detect and deliver medical packages.
- Uses OpenCV + YOLO to detect dropping zones via an ESP32-CAM and communicate with Arduino Uno to activate Stepper motor control.
- Work with sensors such as barometer and ultra sonic sensors with Arduino UNO to activate the parachute releasing mechanism.

Website Backend Aid - Toronto, ON *May. 2024 – Aug. 2024*

- Assisted a professor from ECE department in improving a website, designed to aid over 200 students within the ECE faculty at the University of Toronto.
- Utilizing Discord.py to develop web applications and implement Discord Bot for students' communication across class channel.
- Implementing Discord REST API automating tasks via Discord's API.
- Utilizing database integration Django ORM for Storing, querying, and managing data efficiently.
- Handling API Keys and Bot Tokens with Secure Configuration and Token Management.
- Utilizing Git command for source code management.

Electrical Team member, SAE Aero Design Team, Unmanned Aerial System, University of Toronto Aerospace Team (UTAT) - Toronto, ON *Sep. 2024 – Present*

- Focus areas: Sensor and computer integration, Motor testing and motor-propeller matching, Circuit design and integration
- First year on the team:
  - Designed and optimized flight system of the UT-24 Minerva and PADA planes. Working with electrical components such as receivers, servo motors, ESC, BEC, GPS, avionics battery, etc.
  - Won the 1st place design report award at the 2024 SAE Aero Design West competition.
- Currently working on designing the plane for the 2025 SAE Aero Design Competition involving minimizing plane weight and enhancing electrical system stability by designing a custom PCB with Altium to improve flexibility and performance

Personal Website Development - Toronto, ON *Dec. 2024 - Present*

- Designed and developed a personal portfolio website from scratch to showcase projects, skills, and achievements.
- Utilized HTML, CSS, JavaScript, React to build a responsive, user-friendly design optimized for various devices.
- Hosted the website using Cloudflare for temporary use and is currently working on deploying website with Nginx on Raspberry Pi.

De1Soc FPGA Game Design - Toronto, ON *Oct. 2024 – Nov. 2024*

- Designed and implemented the game logic for a Connect 4 game on an FPGA using Verilog (VHDL).
- Developed a VGA module to render the game board and dynamically display player moves in real time. Generating heatmaps using NumPy for analysis of model for optimization and improve modeling.
- Implemented win condition detection (horizontal, vertical, diagonal) and visual feedback using HEX displays.
- Overcame challenges in timing synchronization and pixel mapping to ensure smooth gameplay and visual accuracy.

Image Recognition Using a Convolutional Neural Network - Toronto, ON *Aug. 2024 - Present*

- Utilized PyTorch to build and train a convolutional neural network to recognize hand-written digits from the MNIST database.
- Currently using NumPy to grow knowledge of gradient descent and derivatives of popular mathematical functions to build efficient neural networks.
- Pushing model to Github to better understand workflow and create an introductory model that is friendly for others seeking to learn machine learning.
- Generating heatmaps using NumPy for analysis of model for optimization and improve modeling.

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University of Toronto Robotics Association 2024 Hackathon - Toronto, ON *Jan. 2024 – Jan. 2024*

- My team and I built a plant optimization device that will demonstrate the soil moisture level and offer plant care suggestions for farmers or plant enthusiasts to better take care of their plants.
- Information will be output to the LCD display screen and input data is retrieved from a soil moisture sensor and temperature sensor, photodetector and NTC Thermistor Temperature Sensor. Software Programming is done with C++ and is transmitted to sensors by Arduino Uno.
- Received positive feedback and suggestions for improvement from the judges.

Self - recoverable Rocket design team leader - Vancouver, BC *May. 2022 - May. 2023*

- Manufacture of Rocket design with Fusion 360.
- Circuit Design (power system)
- Launching and navigating control programming
- Outreaching for presentations and external resources
- Presenting our project to the public representing the school tech department

Volunteering Experience

Science World - Vancouver, BC *Jun. 2022 – Jul. 2022*

Science Facilitator assistant

- Help Science Facilitators to offer visitors a memorable experience at Science World.
- Assist with customer service supporting visitor's experience.
- Explain Science-related knowledge and theory from each gallery at Science World to the visitors.

Vancouver Youth Symphony Orchestra - Vancouver, BC *Sep. 2019 – Mar. 2023*

Orchestra practice and performance preparation assistant

- Making sure the preparation of each rehearsal is done and fit conductor's requirement.
- Coordinating and planning rehearsal and yearly performance locations and logistics.