John Zhang

Portfolio
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EDUCATION

University of Waterloo Class 28'
*Bachelor of Applied Science in **Computer Engineering** - President's Scholarship of Distinction $2000* *Waterloo, Ontario*

EXPERIENCE

Research Assistant January 2025 - NOW
Alberta Machine Intelligence Institute (Amii) supervised by Prof. Grzegorz Kondrak & Ning Shi (Ph.D.) *Edmonton, Alberta*

- Automated data processing Python scripts, reducing **processing time by 40%** and improving **submission score by 27%** through optimized entity translation using Python **entity-classification** libraries like spAcy and Hugging Face Transformers for the **SemEval 2025 contest submission**.
- Integrated automation tools for data annotation and model evaluation, **reducing manual labeling time by 50%** and enhancing dataset quality, which aided in **post-contest paper submission** by providing reproducible and well-documented results.

Autonomy Software Developer September 2024 – NOW
WARG (Waterloo Aerial Robotics Group) *Waterloo, Ontario*

- Developed scripts and optimized algorithms for **GPS data transmission**, waypoint navigation, and visual tracking efficiency
- Developed **ground-side scripts in Python** with **Mavlink** to transmit **GPS location data** from a **Raspberry Pi** to a ground station via **FTP/TCP**, improving data transfer efficiency **by 43%**
- Wrote test scripts with **PyTorch and NumPy** to validate waypoint navigation and landing accuracy, **achieving a 18% reduction in errors** and enhancing system reliability

Full Stack Developer Jan 2025 – March 2025
H-O-M-E AI *Calgary, Alberta*

- **Led development** of a mobile voice-ordering feature by deploying a **LLaMA** model on **EC2** and integrating a **Node.js REST API** for **speech-to-order** conversion, reducing overall ordering time and improving user accessibility.
- Improved 3D modeling application **load speed by 39%** by refactoring **legacy React components** and implementing code-splitting and lazy loading in **TypeScript**, enhancing user retention and reducing bounce rates.

Firmware Developer Sept 2023 – April 2024
UWaterloo BioMechatronics Design Team *Waterloo, Ontario*

- Developed **firmware** and data collection methods for **electromyography sleeve** that monitors changes in muscle fibers.
- Optimized **ESP32 client-side program** for BLE data transfer, improving memory management and latency, and **reducing program build time by 25%.**
- Improved EMG sensor feedback **display accuracy by 28%** and **reduced response time by 20%** through debugging signal processing algorithms and optimizing a **Kalman Filter** for effective noise reduction.

PROJECTS

Gesture Tracked Navigator | *Python, Tensorflow, OpenCV, NumPy, Keras, MediaPipe* *April 2025*

- Developed a real-time **computer vision system** enabling gesture-based device control using **OpenCV and MediaPipe**, with **90% accuracy** hand landmark detection and gesture tracking.
- **Designed** and **fine-tuned two CNN models** in TensorFlow to accurately classify **spatial hand gestures** and **temporal point sequences**, enabling consistent, low-latency recognition of user-defined inputs.

State Machine Developer Assistant | *Flask, Gemini, Monaco Editor, React Flow, Next.js, TypeScript, CSS* *March 2025*

- Created a **visual node-based IDE** for designing complex state machines or projects with **React Flow and Monaco Editor**, allowing developers to **model** logic visually and **convert** it to structured OOP code.
- Integrated **Gemini LLM and Flask** backend to parse **abstract syntax trees** and dynamically generate Python class hierarchies from custom nodes, **automating** boilerplate.

Stock Simulator | *Django, Matplotlib, ApexCharts, Pandas, NumPy, SqLite, React.js, TailwindCSS* *Feb 2025*

- Built a **full-stack** stock simulation platform using **Django** and **React** to simulate trading with real-time visualizations, including portfolio performance and market trends via **Matplotlib** and **ApexCharts**.
- Implemented a **persistent leaderboard system** with **SQLite** and **Django REST API**, enabling global user tracking.

TECHNICAL SKILLS

Languages: Python, Java, C++, C, SQL, TypeScript, JavaScript, VHDL, Verilog, HTML/CSS
Libraries: PyTorch, Tensorflow, NumPy, Pandas, OpenCV, Next.js, React.js, Vue.js, Node.js, Express.js, MongoDB, SqLite, Tailwind
Tools: Git, Docker, Firebase, MongoDB, AWS, MatLab, Quartus, ArduinoIDE, STM32CubeIDE, VS Code, Linux, Ubuntu