Haijing (Lily) Wang

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Education

University of Toronto Toronto, CA
Bachelor of Applied Science and Engineering , Minor in Business, AI, and BioMed *Expected Graduation: May. 2025*

Mulgrave School Vancouver, CA
International Baccalaureate Diploma *Sep. 2016 – Jun. 2020*

Relevent Courses

Specilizing Areas: Computer Hardware and Computer Network, Electromagnetics and Energy Systems, Systems Control, Communications and Signal Processing, Computer Software
Software: Programming Fundamentals, Software Communication and Design, Operating Systems, Algorithm and Data Structures, Intro to Machine Learning, Computer Security, Introduction to Artificial Intelligence, Introduction to Database, Applied Fundamentals of Deep Learning
Hardware: Digital Systems, Computer Organization, Computer Network, Circuit Analysis, Electrical Fundamentals, Introductory Electronics

Experience

C++ Graphic Information System Apr. 2021
University of Toronto

- Developed a program that visualizes and solves path-finding problems using **A* and multi-Dijkstra** algorithm in maps of any city in the world
- Optimized traveling salesman problem using **Greedy algorithm**, 2.5-opt, 3-opt, simulated annealing and multi-threading.
- Utilized **OSM database and GTK** to display detailed information and created icons about the geographical feature for novice users, achieving usability, responsiveness, and stability.

ARM Assembly Love Maze Apr. 2021
University of Toronto

- Developed an open software maze project running on **DE1-SoC** in which the character in the game is moved by PS/2 keyboard (WASD).
- Suprises collected in the maze are shown on seven-segment display and VGA character buffer, and collision is detected using interrupt.

Python Othello Game April. 2024
University of Toronto

- Analyzed Reversi game to identify the best moves and the winning percentage of these moves.
- Developed an **algorithm** implementing **Minimax** recursively to optimize moves through α-β **pruning**, **depth limiting**, **caching states**, and a **custom heuristic**. This resulted in creating the most advanced computer player, surpassing the AI developed by the course instructor.

Python Realtime Face Mask Detection December. 2023
University of Toronto

- Leveraged three diverse datasets comprising over 8,800 images, including the **MAFA**, **WIDER FACE**, and **Kaggle Face Mask Detection** datasets, to train and validate an advanced face mask detection model, ensuring robust model training with well-balanced label distribution.
- Implemented extensive preprocessing and augmentation techniques, such as **random photometric distortions**, **cropping**, **flipping**, and **normalization** to enhance the model's performance and generalizability, all while standardizing image sizes for consistent input quality.
- Enhanced the **Single Shot Detection (SSD)** architecture by integrating a **VGG16 base network**, additional **convolutional layers**, a **feature fusion module**, and an **auxiliary convolution pyramid** to create a highly accurate and efficient model for detecting faces with or without masks, achieving superior performance metrics over the baseline **YOLOv8** model.

SQL Toronto Waste Collection Database Analysis April. 2023

University of Toronto

- Designed and implemented a comprehensive **Entity Relationship (ER) schema** for waste collection management in Toronto, enhancing operational efficiency through data-driven insights.
- Developed **complex SQL queries** to optimize waste collection logistics, including truck maintenance scheduling, pickup paths, driver schedules, and waste type and location analysis, significantly improving service delivery and resource allocation.
- Integrated **SQL** with **Python** to build robust functionalities for dynamic scheduling of waste collection trips, routine and emergency maintenance for various technical equipment, and adaptive rerouting for emergency shutdowns, thereby boosting operational adaptability and reliability.

Python Dual-Task ML Lab: Data Imputation and Text Classification December. 2023

University of Toronto

- Pioneered the development and training of an **autoencoder** for the **UCI Adult Data Set**, utilizing an innovative **denoising technique** to accurately reconstruct missing **categorical features**, significantly enhancing data integrity and utility.
- Architected and engineered a **character-level recurrent neural network** to effectively classify SMS text messages as "spam" or "not spam", expertly leveraging **torchtext** for optimized **data processing** and **batching**, thereby streamlining workflow and improving model performance.

Internship Experience

Winmage June. 2020 – Aug. 2020

- Winmage mainly focuses on designing, manufacturing, and producing scanners as wells as developing image and video input and output devices.
- Designed a sales manual consisting of features, software characteristics, and technical specifications for three of the scanners in the company
- Self-learned **photoshopping** and typographic design skills
- Gained knowledge about how scanning speed can vary according to different computers, drivers, applications, and operating systems.

Coltene - Scican May. 2023 – May. 2024

- Contributed to the development of an advanced platform that utilizes **artificial intelligence** to proactively predict machine flaws. This platform leverages sophisticated **AI algorithms** to analyze operational data in real-time, enabling **predictive maintenance** and significantly reducing downtime.
- Resolved various issues related to the non-delivery of machine data to **cloud services** using **Python** and **C**. Additionally, identified and addressed website issues by utilizing **SQL** and **JavaScript** to ensure smooth and efficient operational functionality.
- Developed compliance test cases aligning with internal and hospital safety policies. Documented service details in the **Management Information System (MIS)**, including unit cycles, serial numbers, cycle faults, defects, corrective actions, and spare parts usage.
- Engineered a suite of sophisticated tools in **C** and **Python**, significantly advancing the software development process by automating the preparation of coding environments and streamlining workflow efficiencies.

Technical Skills

Familiar Systems: Windows, Linux, MacOS
Programming: Main in C/C++, Verilog, ARM Assembly, MATLAB, SQL, Python; Familiar in JAVA, HTML; Familiar using git, GDB, Valgrind, GTK, OSM Database;
Analysis/ Simulation: MATLAB, Quartus Prime, ModelSim, Typhonn HIL, Logism, CPUlator, FPGA Monitor, NI Multisim, SimuLink, VNC
Other Tools: Adobe Photoshop, Adobe Lightroom, Excel, Word, Powerpoint

Extracirricular Activities

External Vice President - Association For Chinese Engineers June. 2023 – June. 2024

- Cultivated and strengthened partnerships with diverse sponsors, fostering mutually beneficial relationships.
- Orchestrated collaborative events between the club and sponsors, amplifying the club's visibility and sponsor engagement while efficiently managing resources to meet sponsor needs.