

Jonathan Zhu

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EDUCATION

University of Toronto

4.0 GPA

Honours B.Sc., Computer Science

Sep 2024 – May 2028

- \$3000 renewable entrance scholarship

TECHNICAL SKILLS

Languages: Python, C, C++, C#, JavaScript, Java, SQL, HTML, CSS

Frameworks/Libraries: React, ImGui, OpenGL, Django, Flask, SQLAlchemy, Node.js, Express.js, Selenium

Technologies: Git, Bash, Docker, MongoDB Atlas, PostgreSQL

PROJECTS

LooGuessr (a Social Media, GeoGuessr Game) | [GitHub](#) React, Express.js, Node.js, MongoDB, Mongoose

- Worked on using Node.js, Express.js, Mongoose and MongoDB to create the backend
- Implemented login and profile pages using React and CSS
- Used Axios to handle asynchronous HTTP requests from users
- Awarded \$300 for 3rd best use of Mappedin API at Hack the North 2024

Gesture Drawing | [GitHub](#) C++, ImGui, OpenGL, PostgreSQL

- Developed a light-weight image scroller app to help artists find images to practice figure drawing using ImGui
- Used OpenGL to render images and UV texture coordinates to zoom in and out of images
- Implemented custom file browsing system using std::filesystem and dirent.h to allow users to open desired images or image directories
- Used PostgreSQL to store images that users contribute

Garbage Classifier | [GitHub](#) Flask, PyTorch, OpenCV, Hugging Face

- Implemented a convolution neural network using PyTorch achieving **80%** accuracy in classifying different types of trash (e.g. plastic, paper, hazard, organic)
- Utilized pre-existing datasets from Hugging Face to train Garbage Classifier Model
- Integrated OpenCV for real-time image capturing and processing of items users' provided in front of webcams
- Utilized Flask to deploy static HTML pages

Optimizing Subarray Comparisons With Array Value Updates | [Research Paper](#) Python

- Explored different data structures to help optimize the problem of comparing the equivalence of equal lengthed subarrays within an array
- Developed from scratch a $O(\log N)$ solution (as opposed to the $O(N)$ solution) that utilizes range query data structures to optimize subarray comparisons
- Proved the logarithm run time of subarray comparisons by analyzing the time complexity of operations offered by range query data structures (such as the Binary Indexed Tree)

ACHIEVEMENTS

Canadian Computing Competition (CCC) Senior, Hosted By The University of Waterloo 2024
Group 2 Honour Roll, top 3% of participants

Euclid Mathematics Contest, Hosted By The University of Waterloo 2024
Top 26% of participants

LEADERSHIP EXPERIENCE

Game Development Club, Co-founder/President

Sep 2022 – Jun 2024

Colonel By Secondary School

- Taught weekly lessons about different game development concepts like player movement, ray-tracing, collision detection, and much more to more than 60 peers.
- Organized weekly club schedule and mentoring cycles using Google Classroom