

# Jesse Jiayi Xu

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## Education

University of Toronto

Honours Bachelor of Science - Computer Science Specialist, Mathematical Sciences Minor

September 2021 – Present

## Skills

**Programming Languages:** Python, JavaScript, TypeScript, Java, C#, C, Shell Script, RISC-V Assembly.

**Libraries:** Django, Pygame, Numpy, Pandas, Matplotlib, OpenAI-Gymnasium, Scikit-learn, TensorFlow, OpenCV, Streamlit, React.js, Next.js, Node.js, JavaFX, Swing, Android Jetpack, Pthread, OpenMP, MPI.

**Tools:** Git, Docker, Linux, Jira, MariaDB, MySQL, Redis, Grafana, LaTeX, Markdown.

**Workflows:** Git flow, Agile Development, CI/CD, Software Testing Life Cycle (STLC), Unit Testing.

## Research Experience

Machine Learning-based Schedule Builder

December, 2023 – March, 2024

Advised by Prof. Chi-Guhn Lee

University of Toronto

- Built a schedule builder with **Pygame** and **Numpy**, wrapped into a custom **OpenAI Gymnasium** environment.
- Created a deep learning model based on **Reinforcement Learning Deep Q Network** using **TensorFlow**.
- Improved training efficiency by 36% using **mini-batch**; tweaked reward function for 24% increase in performance.

## Project Experience

City Prediction: A Machine Learning Project

March, 2024 – April 2024

A machine learning model that predicts a city based on survey questions.

- Preprocessed and performed EDA on survey data with 1500 entries with **pandas**, **numpy** and **matplotlib**.
- Explored and compared multiple machine learning models with **Python Scikit-learn**, including **kNN**, **Random Forest**, **Naive Bayes**, **Logistic Regression**, and **Multi-layer Neural Network**.
- Trained and tweaked the hyperparameters of a **Multilayer Perceptron**. Improved training accuracy from 80% to 91%, validation accuracy from 78% to 88%, and achieved a final test accuracy of 82%.

Command Silo: A Terminal Command Manager

January, 2024 – April 2024

A full stack project consisting of CLI, Backend, and WebUI.

<https://github.com/Command-Silo>

- Reduced feature development time by 15% through efficient Agile practices and collaborating with **Jira** and **GitHub**.
- Achieved a 19% increase in user interaction by refactoring the CLI with **Python** and **Curses** for a more intuitive user experience; integrated tightly with **bash** to increase tracking accuracy by 20%.
- Implemented the backend for command storage with **Python Django** and **MariaDB**.
- Created the WebUI with **Next.js**, tested and deployed automatically with **GitHub Actions** and **Netlify**.
- Deployed the **Llama2 Large Language Model (LLM)** locally; allowed users to generate shell scripts based on their commands; increased user productivity by 30%.

Order Management: A Distributed Order Management Service

January, 2024 – April 2024

A distributed high performance OMS server that handles thousands of user order requests per second.

- Implemented the order management service with **Java** and **Redis**; containerized the service with **Docker**.
- Achieved 6,200 requests/s on a two-server cluster built with **Docker Swarm**; performed stress test with **Grafana K6**.

Danmaku Kakashi: An Open Source Browser Extension

December, 2023 – Present

A Chrome Extension that shows user comments on top of the YouTube video player.

<https://dm-kks.com>

- Developed the Chrome extension with **React.js**; built the backend with **Python Django** and **MariaDB**.
- Achieved 250+ active users in the first month post-launch, with 90+% user satisfaction.
- Reduced deployment time by 40% and minimized errors by building a **CI/CD** pipeline with **GitHub Actions**.

Signado: A Web-based Sign Language Recognizer

April, 2023 – May 2023

A progressive web app that runs a machine learning model in browser.

DeerHacks Hackathon 2023 Winner

- Created the web app with **responsive UI** in 3 days using **React.js**.
- Used **Tensorflow.js** to run sign recognition model in the browser, achieved 80+% recognition accuracy.
- Continuously deployed the app on **Netlify** with a **serverless** architecture, reduced load time by 27%.

## Awards & Honors

AWS Certified Cloud Practitioner (CLF-C02)

2024

Amazon Web Services (AWS)

Winner of DeerHacks | With the Signado Project

2023

DeerHacks Hackathon hosted by University of Toronto

Top 1 in 50 teams

University Entrance Award of Merit

2021

University of Toronto

Top 10%