

Joshua Zhang

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EDUCATION

University of Washington

Intended B.S. Electrical and Computer Engineering

Seattle, WA

June 2025

INTERNSHIPS

Department of Homeland Security

Summer Intern

June 2023 - Aug. 2023

Washington D.C.

- Performed an in-depth research study evaluating the precision of Vicuna-GPTQ in document processing, leveraging 74 distinct prompts for comprehensive assessment.
- Improved the accuracy of Large Language Model(LLM) document processing by 30+% connecting it with a **ChromaDB** Vector Database, demonstrating the practical applicability of LLMs for document processing and information retrieval.
- Integrated Text-Generation-Webui with **LangChain** using an proxied OpenAI server, allowing Vicuna to communicate with LangChain tools.
- Created the baseline framework in **Python** for future information retrieval research within the OCIO DHS.

RELEVANT EXPERIENCE

Advanced Robotics at UW

Controls Team Software Engineer

Sept 2023 - Current

Seattle, WA

- Revamped Sentry robot code in C++, implementing substantial enhancements for improved functionality.
- Maintains Taproot, an open-source framework for Robomaster robots, used by most teams within the US.
- Developed comprehensive test suites utilizing GMock, ensuring robust code performance.

FweefwopCTF Web Developer

Software Developer

May 2021 – June 2022

Cupertino, CA

- Helped run Capture the Flag competition with 70 unique problems, 600+ participants from 28 different countries, and 40,000+ submissions.
- Developed 15 web problems with unique exploits using **PHP**, **Python**, **Javascript**, **SQLITE**, and more.
- Set up **Docker Containers**, giving each individual problem its own secure environment.

PROJECTS

Spotify Recommender | *Python, Flask, Scikit-learn, NextJS, React, Typescript, Tailwind*

- Applied One Hot Encoding, MinMax, and Z-score to normalize columns of data.
- Used Cosine, Euclidean, and Manhattan distance formulas to generate vector embeddings for 12,000 songs.
- Created a Flask API server in **Python** to fetch song recommendations.
- Built a frontend using **React**, giving users a graphical visualization of songs and their recommendations.

WildEye AI | *Flask, Tensorflow, NextJS, React, Typescript, Tailwind*

- Trained a model based on **Tensorflow** Inception_V3 capable of identifying 90 different animal species from photographs with an 86% test accuracy.
- Used **Javascript**, **Python**, and **SQL** to build a NextJS & Flask, allowing users to browse the image database.

Identifying NEOs using Tensorflow in NASA WISE data | *Tensorflow, Python*

- Used **Tensorflow** to identify 40+ Near Earth Objects (NEOs) within NASA's WISE database via an image subtraction technique that identified movement within different photos.
- Identified synthetic NEOs with 96% accuracy and real NEOs with 91% accuracy.

TECHNICAL SKILLS

Languages: Typescript, Javascript, Python, Java, C++, SQL, HTML/CSS, Bash

Frameworks: React, Next, Vue, Nuxt, Tailwind, Tensorflow, PyTorch

Developer Tools: Git, VSCode, Visual Studio, Microsoft Azure, Firebase, Eclipse, Burp Suite

Libraries: Pandas, NumPy, Matplotlib, Scikit-Learn, SciPy, Seaborn, BeautifulSoup

Awards: USAPhO Top 400 (2021, 2022), National Cyber Scholar (2022, 2023)