Alexander Kim

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Education

Hamilton College Clinton, NY

Bachelor of Arts in Mathematics, Minor in Music GPA: 3.5/4.0 *Aug. 2021 – May 2025*

Dean's List (All Semesters), Emerson Summer Research Fellowship Recipient (2024)

Relevant Coursework: Deep Learning, Linear Algebra II, Data Structures & Algorithms, Electronics and Computers

Experience

Software Engineering Intern Mar 2025 – Aug 2025

tmc *Boston, MA*

- Architected cross-platform (React Native) mobile invoicing MVP with TypeScript. Fine-tuned PyTorch OCR and exposed via Sanic REST API in Docker for horizontal scalability.
- Automated receipt parsing and integrated with Memgraph & TigerBeetle database pipeline for the Desktop MVP.
- Built and documented end-to-end OCR testing pipelines in Jupyter for iterative model evaluation.

ML Research Fellow May 2024 – Aug 2024

Hamilton College *Clinton, NY*

- Deployed "Automatic Vocal Register Analysis (AVRA)" React app via Docker image for 2000 students. Integrated React, PostgreSQL, scikit-learn, PyTorch SVM and CNN to give real-time vocal feedback.
- Trained SVM/CNN on ≈14K pop-music spectrograms. Achieved 96.2% test accuracy for CNN classification and 94% test accuracy for SVM classification.
- Authored technical preprint on ML vocal classification methods, submitted to arXiv and under review for formal publication.

Research Intern June 2022 – Aug 2023

BCH Musculoskeletal Informatics Group *Boston, MA*

- Developed Python mesh-repair algorithms correcting 10% of synthesized surgical meshes, improving VirtualHip planning accuracy.
- Engineered and tested surgical simulation algorithms, accelerating physician planning of PAO and VDRO procedures by up to 20%.
- Annotated ≈2.5K clinical notes and over 100 MRI segmentations, contributing to improved performance of segmentation and NLP pipelines in the VirtualHip software.
- Co-authored "Intermediate Domain Finetuning for Weakly Supervised Domain-Adaptive Clinical NER" in ACL Anthology.

Projects

SOFIA – Offline LLM Agent (14 Github Stars) | *Python, LLM, MCP, Shell, OpenCV* Feb 2025 – July 2025

- Engineered custom middleware for Ollama mistral-small3.1 to enable LLM vision, MCP, and tool use with total user control over privacy.
- Implemented OpenAI and Ollama agent loops with OmniParser OCR for robust local computer use via mouse and keyboard control.
- Wrote custom local MCP servers for Google tools enabling Gmail automation and calendar assistance.

tensorkit-learn | *C++, Python, Machine Learning, Shell* Jan 2025 – July 2025

- Designed and programmed ML library (C++ & Python) implementing tensors, dataloader, MLP, SVM, and GLM.
- Wrote 32 unit tests to check functionality and speed across tensor ops and algorithms.
- Implemented setup shell script to build and add the library to the user's virtual environment.

braindump – Personal Blog | *JavaScript, Postgres, Docker, Node.js* Mar 2025

- Designed and built personal tech blog with HTML, CSS, vanilla JS frontend deployed on a NVIDIA Jetson edge device, with initial supabase backend eventually migrated to local.
- Wrote JavaScript migration program to convert from Supabase to full-stack private hosting via an old PC and ZeroTier VPN.

Technical Skills

Languages: Python, C/C++, SQL (Postgres), TypeScript, Java, React, R, LaTeX
Frameworks: React, Node.js, Flask/Sanic, MCP, CUDA
Developer Tools: Git, Docker, Linux, Google Cloud Platform
Libraries: PyTorch, scikit-learn, pandas, NumPy, Matplotlib, OpenCV