David Haolong Lee

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Education

University of Southern California (USC) Los Angeles, California

Master of Science in Computer Science • GPA: 3.92/4.0 Aug 2024 – May 2025

Bachelor of Science in Computer Science (Engineering Honors) • GPA: 3.84/4.0 Aug 2020 – May 2024

Technical Skills

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

Tools & Frameworks Git, Linux, Google Cloud, PyTorch, React, Scikit-Learn, Espresso, JUnit, Firebase

Coursework Machine Learning, Object-Oriented Programming, Operating Systems, Algorithm Design

Professional Experience

Research Assistant *Interactive and Collaborative Autonomous Robotics Lab* Jun 2022 – Present

- Engineered an open-source **Python** library to modularize quality diversity algorithms into reusable, object-oriented components, improving code reusability and streamlining their implementation and comparison.
- Devised a novel gradient-based feature diversification algorithm that uncovered 4x more unique features in high-dimensional spaces compared to state-of-the-art methods.
- Accelerated density estimation by 1.5x and neural network evaluation by 2x using **PyTorch** and **JAX** optimization techniques.

Teaching Assistant (Discrete Math & Algorithms) *USC* Jan 2023 – May 2024

- Built an open-source **Python** library for dynamic programming visualization, boosting student comprehension through real-time feedback, interactive learning, and iterative practices.
- Assessed assignments and mentored 150+ students during office hours on algorithm design, proofs, and mathematical reasoning.

Co-Founder *Licon Graphics* May 2022 – May 2023

- Finetuned **Stable Diffusion** model in **PyTorch** to generate high-fidelity and high-novelty subject-driven images.
- Deployed scalable generative pipelines on **Google Cloud**, reducing inference latency and enabling real-time image delivery.

Projects

dpvis (dpvis.readthedocs.io) Jan 2024 – Aug 2024

- Developed an open-source Python library that features auto-generated, interactive visualizations for dynamic programming algorithms, including self-testing features that prompt users with interactive questions about the algorithm's steps.
- Managed a team of five in monthly sprints and weekly stand-ups to gather stakeholder feedback and drive iterative development.
- Designed a decoupled, event-driven architecture (**Plotly Dash + Python**) to support modular feature expansion and maintainability.
- Implemented industry-standard development practices: **GitHub Workflows** for code reviews, **pytest** for comprehensive unit testing, and **mkdocs** for professional documentation, drastically reducing manual overhead.
- Streamlined the deployment of interactive web apps to **Google Cloud** using **Docker** containers and **GitHub Workflows**, with dynamic preview environments and custom subdomain routing.

pyribs (pyribs.org) Jun 2022 – Dec 2023

- Maintained an open-source **Python** library for implementing quality diversity algorithms, earning 200+ stars on GitHub.
- Addressed 15+ bug reports and feature requests on GitHub to improve API consistency and reduce redundancy across modules.
- Extended the library with gradient-based optimizers under object-oriented patterns, maintaining backwards compatibility and improving efficiency for differentiable tasks by 2x.
- Authored detailed **Jupyter Notebook** tutorials on upgrading legacy algorithms with modern threshold adaptation techniques.

USC DoorDrink Jan 2022 – May 2022

- Built an **Android** application (**Java + Jetpack Compose**) enabling local coffee shop discovery, mobile ordering, and caffeine tracking.
- Integrated **Goolge Maps API** to enable real-time routing and location-based filtering to enhance user experience.
- Structured a real-time database using **Firebase** with event-driven updates for live order tracking and restaurant availability.
- Developed robust test suite using **Espresso** and **JUnit** to ensure fault tolerance and UI responsiveness.