Brandon Yuan

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Experience

Machine Learning Intern May 2025 - Dec 2025
Commonwealth Center for Advanced Manufacturing *Disputanta, VA*

- Implemented a computer vision pipeline to segment stainless steel microstructure images and calculate average grain sizes, improving analysis speed by **20x** and accuracy by **6x** compared to manual methods.
- Developed a 3D data visualization tool for Phase3D height maps, enabling enhanced inspection of additive manufacturing quality through point cloud rendering, pixel history, and row/column profiles.
- Built a real-time motion capture system using ZED Fusion and 3D environment reconstruction to animate a Unity-based avatar for workspace simulation and ergonomic analysis, completing the project **79%** under budget.
- Developed a full-stack ergonomic analysis software that computes ergonomic scores for body posture in real time.

Webmaster May 2025 - Present
Taiwanese Student Association *Charlottesville, VA*

- Built a React/TypeScript and Node.js website for **300+** members, working with leadership to deliver org updates.
- Designed scalable UI components aligned with TSA branding, enabling intuitive UX and easy future maintenance.
- Developed an event platform for **500+** attendees with real-time point tracking, prize redemption, and schedules.
- Implemented an NFC tag rewards system with Supabase and PostgreSQL to sync and persist attendee points.

Undergraduate Teaching Assistant August 2024 - Present
University of Virginia - Computer Systems and Organization 2 *Charlottesville, VA*

- Supported **400+** students and collaborated with course staff to address student challenges and improve the course
- Led quiz grading, evaluated exams and assignments, and reported lab performance trends to the professor.

Projects

Hoos Trash | *Flutter, Dart, Firebase* August - December 2025

- Built an Android mobile app using Flutter to gamify litter collection across UVA Grounds.
- Implemented Google OAuth and Firebase with real-time leaderboards for secure authentication and engagement.
- Published to the Google Play Store, supporting real-world users in a production environment.

Sportify | *Python, Django, Heroku, Amazon S3, Google OAuth* January - May 2025

- Designed and developed a full-stack web platform allowing users to request, lend, and manage sports equipment, using Django for backend logic and PostgreSQL for structured data storage.
- Integrated Amazon S3 for secure media storage, enabling users to upload images with real-time retrieval.
- Integrated Google OAuth for secure, passwordless user authentication, streamlining the sign-in process.

Analyzing Contributing Factors in Car Crashes | *Python, sklearn, Pandas, NumPy* January - May 2025

- Processed **100K+** Virginia crash records and applied KMeans clustering to identify high-incident zones.
- Optimized preprocessing with feature engineering and stratified sampling, placed **2nd** in ML4VA Spring 2025.

SipC Compiler | *C++, ANTLR, TIPC, Cmake, Catch2, LLVM* August - December 2024

- Built a full compiler supporting arrays, loops, and operators with **99%** test coverage using Catch2.
- Designed custom LLVM optimization passes achieving **400%** faster execution and **90%** smaller code size.

Technical Skills

Python, Java, JavaScript/TypeScript, C/C++, SQL, Node.js, React, LLVM, Pytorch, Git, TensorFlow, MongoDB, Express.js, Docker, Linux, Agile/Scrum, Test Driven Development, Object Oriented Programming, Machine Learning

Education

University of Virginia Charlottesville, VA
*Bachelor of Science in Computer Science, **3.8 GPA*** *Aug. 2022 – May 2026*

- **Coursework:** Artificial Intelligence, Machine Learning, Software Engineering, Data Structures and Algorithms, Discrete Mathematics and Theory, Linear Algebra, Data Science Systems