Brandon Yuan

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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, Software Development Essentials, Compilers, Data Structures and Algorithms, Computer Systems and Organization, Discrete Mathematics and Theory, Linear Algebra, Statistics, Probability, Intro to Cybersecurity

Experience

Machine Learning Intern May 2025 - Present

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 and accuracy.
- Developed a 3D visualization tool for Phase3D LPBF height map data, enabling enhanced inspection of additive manufacturing quality through point cloud rendering, pixel history, and row/column profiles.
- Integrated real-time human body key point data into a virtual simulation to support interactive modeling, virtual training workflows, and ergonomic analysis for performance and safety optimization.
- Developed a standardized ML framework to streamline deployment across CCAM projects, reducing project overhead and improving maintainability.

Webmaster May 2025 - Present

Taiwanese Student Association *Charlottesville, VA*

- Developed a dynamic website using the MERN (MongoDB, Express.js, React, Node.js) stack to enhance TSA's digital presence.
- Ensured brand consistency by aligning the site's visual and functional elements with TSA's official image, supporting a cohesive digital identity for **300+** members.
- Created detailed sitemaps and wireframes during prototyping to improve site architecture and user experience.

Undergraduate Teaching Assistant August 2024 - May 2025

University of Virginia - Computer Systems and Organization 2 *Charlottesville, VA*

- Supported **400+** students through office hours, lab guidance, and one-on-one assistance, reinforcing advanced systems concepts.
- Taught topics including virtual memory and page tables, multithreading, parallel processing, networking, and caching in lab sessions.
- Led grading for all course quizzes and assisted with evaluating exams and assignments.

Projects

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

- Analyzed Virginia traffic crash data using DBSCAN and KMeans clustering to identify high-incident crash zones, comparing performance with silhouette score, Calinski-Harabasz, and Davies-Bouldin indices.
- Engineered features and performed dimensionality reduction and encoding on categorical data (e.g., lighting, road surface) to enhance clustering effectiveness.
- Reduced dataset bias caused by the over-representation of daytime/dry-road crashes by stratifying the data into condition-specific subsets, ensuring insights remained valid under adverse-condition under-sampling.
- Placed **2nd** in ML4VA Spring 2025.

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

- Developed a compiler supporting features like boolean types, arrays, for loops, and various operators.
- Achieved **99%** code coverage by designing comprehensive tests with Catch2.
- Implemented code generation using LLVM bitcode, enabling advanced optimizations and efficient execution.
- Delivered optimizations that reduced code size by up to **90%** and improved runtime performance by **400%**.

Technical Skills

Python, Java, JavaScript, C/C++, SQL, Node.js, React, LLVM, Pytorch, Git, TensorFlow, MongoDB, Express.js, Full Stack Development, Object Oriented Programming