John Zeng

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Education

Purdue University — West Lafayette, IN

Bachelor of Science — *Expected May 2026*

- Double Major: Computer Science & Artificial Intelligence
- Coursework: Data Mining and Machine Learning, Intro to AI, Analysis of Algorithms, Data Engineering in Python
- Extracurricular: Purdue Men's Rugby, USA Rugby U19 Nominee
- SAT: 1520

Experience

Computer Vision Researcher — March 2024 – Present

Digital Enterprise Center — *West Lafayette, IN*

- Problem: In assembly lines that employ human technicians, foreign objects (tools, drill bits, etc.) can be left behind, causing damage to machinery and products.
- Leading a team of two to build a program that identifies when foreign objects are left behind and notifies the operator by implementing a **two-stage segmentation** architecture.
- Implemented an automated documentation process to enhance clarity for future developers by leveraging **GitHub Actions** and **Pages** to maintain an up-to-date, accessible API documentation site.
- Built a desktop application prototype for a real time multi-camera detection system using **Rust**, **Tauri**, and **Svelte**.
  - Optimize frame rate by **5x** with a combination of **asynchronous runtimes** and **multi-threading** to process camera inputs and inference in parallel.
- Applied **image augmentation** to generate synthetic data, effectively addressing data collection and labelling challenges posed by a short-staffed team.

Head Teaching Assistant for Advanced + Regular Programming — Summer 2024

The Harker School — *San Jose, CA*

- Taught lessons in memory allocation, object and data-type basics, recursion, and coding standards.
- Provided clarification to junior TAs for ambiguous assignment instructions and grading rubrics.
- Led review sessions to explain frequently missed test questions and difficult concepts.

Investment Analyst Intern — Summer 2022

Draper Dragon — *San Mateo, CA*

- Researched **metaverse/blockchain gaming** space and presented to general partners about the nuanced differences in industry leaders' platform designs along with their respective drawbacks and benefits.
- Wrote two investment memos detailing company financials, market opportunity, risk factors, platform/product description, competition, valuation, company history, and team history.

Projects

Rugby Drill Simulator | *Python, PyGame*

- Using Python and PyGame to simulate a common rugby passing drill "infinite passing" to demonstrate a phenomenon I call player oscillations
- Mathematically determines if and when a player will oscillate between two lines given any valid drill configuration and number of total passes.
- Includes proofs and lemmas supporting the algorithm's correctness and efficiency.

Shell | *Lex, Yacc, C++, CMake*

- Created a shell interface capable of executing commands with **subshell**, if/while statements, script execution, and **wildcarding** in addition to basic terminal functions like **pipes**, env variables, and **file system traversal**.

Git Tutorial | *Markdown*

- Educated inexperienced developers on the basics of Git
- Covered topics such as cloning, branching, committing, and pushing.
- Provided examples of and solutions to common problems like **merge conflicts** along with links to further research.

Technical Skills

Languages: Rust, Python, Java, C, C++, Javascript/Typescript, HTML, CSS
Frameworks: Ultralytics, Tensorflow, Keras, Pytorch, Astro, Svelte, Tauri, TailwindCSS
Libraries: OpenCV, Imgaug, NumPy, Pandas, PyGame