Aarav Jain

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EDUCATION

Purdue University | Purdue Engineering — **West Lafayette, IN**
Candidate for Bachelor of Science in Computer Engineering — Expected *May 2028*

SKILLS

Languages: Python, HTML/CSS/JavaScript, C/C++, Java, SQL
Technologies: React, TypeScript, React Native, Docker, AWS, Git, NextJS, Pinecone, Langchain, NumPy

WORK & LEADERSHIP EXPERIENCE

Algoverse
Machine Learning Researcher — Aug. 2024 – May. 2025

- Developed and deployed a novel evaluation framework using Python and statistical analysis to quantify sycophantic behavior in multi-turn LLM conversations, identifying a **47% accuracy decline** over extended interactions
- Engineered an end-to-end testing pipeline leveraging OpenAI, Llama, and Claude APIs; integrated TruthfulQA and MMLU datasets from Huggingface to test **5k+ conversation samples**, measuring accuracy degradation and sycophantic tendencies
- Co-authored a research paper documenting the "Truth Decay" methodology, experimental pipeline, findings, and best-practice recommendations; **Published at the NAACL 2025 Student Research Workshop (SRW)**

CodeConnect
Co-Founder, Event and Leadership Manager — Aug. 2023 – Dec. 2024

- **Co-founded a coding tutoring nonprofit**; authored beginner-to-intermediate curricula in Python, HTML/CSS, and JavaScript through **15+ hands-on projects** and solution sets aligned to core CS concepts and real-world web development
- Organized and led **10+ public library events** (workshops and clubs) **serving 70+ students**; delivered weekly 1-on-1 mentorship, pair programming, and project-based learning to reinforce fundamentals and teach new coding skills
- Built the website in React and Typescript with a mobile-first, accessible UI; included mentorship and program pages, event schedules, and self-serve registration flows with node-mailer to streamline outreach, sign-ups, and student onboarding

PROJECTS

Marvel Oracle | Python, Typescript, NextJS, Pinecone, Langchain — github.com/Aarav-J/marvel_rag

- Implemented a chatbot with accurate information, context-aware responses, persistent chat history, and multi-chat sessions
- Embedded **9k Marvel Wiki articles into a Pinecone vector** index via a BeautifulSoup4 pipeline using automated parsing
- Architected a Retrieval Augmented Generation (RAG) platform using Langchain and Pinecone with dense search, metadata filtering, and top-k tuning for real-time chat with **30% increased answer relevance** compared to regular LLMs
- Developed and deployed a NextJS application with a FastAPI backend to deliver an interactive Marvel chatbot experience

Bridge | Next.js, ReactJS, TypeScript, Socket.IO, Express, WebRTC, Supabase — github.com/Aarav-J/bridge

- Designed and implemented a structured turn-based video debate system, matching users across opposite ends of the political spectrum using a quiz-based profiling algorithm and real-time topic selection, to enforce civility in debate.
- Built the backend infrastructure using Socket.IO/WebRTC for real-time communication and cross-spectrum matchmaking.
- Developed the front-end architecture using Next.JS, React, and Typescript to create a platform for onboarding and debates

Stock Simulator | Python, JavaScript, ReactJS, Supabase, Zustand — github.com/Aarav-J/Aaravsim

- A trading simulator where users can view real-time stock prices, practice buying and selling stocks, and track portfolio gains
- Engineered a **Python service that integrates a third-party stock SDK** to aggregate key market statistics (price, volume, and history) exposed through a REST API, with server-side caching to cut external calls and reduce latency
- Implemented a Supabase (Postgres) data layer for users, portfolios, trades with authentication and session management

RouteNote | Python, Yolo, NextJS, Typescript, OpenCV — github.com/Aarav-J/routenote

- Trained a **YOLOV11 model** in Python to detect climbing holds on wall images, outputting precise bounding boxes.
- Annotated 100+ climbing wall images for hold detection, creating a labeled dataset that improved route classifier accuracy
- Built a YOLO-based color classifier that filters holds by HSV color and confidence scores enabling precise route detection
- Developed a Next.JS + Firebase frontend integrated with the route detection API for user notetaking on routes and holds