Aarush Agarwal

aarusha@andrew.cmu.edu | (408)-594-8710 | LinkedIn | GitHub: AgarwalAarush | Website: aarushagarwal.dev

EDUCATION

Carnegie Mellon University   *Expected Graduation, May 2027*

Bachelor of Science in AI & CS, School of Computer Science
- QPA: 3.65, CMU School of Computer Science Dean's List (Fall 2024)

Mountain View High School   *Aug 2020 - May 2024*
- Weighted GPA: 4.64/4.00, Unweighted GPA: 4.00/4.00

EXPERIENCES

Shopify | *Machine Learning Engineer Intern*   *May 2025 - Aug 2025*
- Developed a more robust buyer-fraud detection system by implementing machine learning models with VertexAI, optimizing data pipelines with BigQuery and Dataflow, and applying targeted feature selection to improve predictive accuracy and reduce training iteration time.
- Built a Neo4j-powered distributed AI agent network at Shopify, utilizing specialized AI agents that collaboratively process tasks through graph traversal queries, enabling intelligent task decomposition that noticeably improves agentic output. Patent pending.

Carnegie Mellon Physics Lab | *CUDA Research Assistant*   *Aug 2024 - Present*
- Co-authored paper focused on a binning-based parallelized K-Nearest Neighbors algorithm, achieving up to a 200x speedup over FAISS (Facebook AI Similarity), Annoy (Spotify), and SCANN (Google) in low-dimensional spaces.
- Transitioned Python autograd and gradient functions to C++ and CUDA extension implementations and integrated with PyTorch JIT serialization, achieving a 10% decrease in KNN runtime.

PROJECTS

Medicly | *ML Lead*   *Sep 2025 - Present*
- **Grand Prize (1/250+ teams)** at HackCMU 2025 with sponsors including Anthropic, Citadel, Stripe, Jane Street, & HRT
- Engineered a multimodal pipeline with pose estimation, structured kinematics, joint-angle prediction, 3D mesh rendering, and LLM-powered reports to cut physical therapy evaluation time from 14 days to 10 minutes and deliver personalized recovery insights

Nova | *Personal Exploration*   *Jan 2025 - Present*
- Architected a multi-modal agentic AI voice assistant, integrating Whisper ASR, LangChain orchestration, dual TTS engines, wake-word detection, and intent classification to enable real-time system automation and conversational voice interaction.
- Built a macOS application in SwiftUI, featuring real-time voice visualization, seamless text/voice mode switching, CoreData-backed persistence, Keychain API key security, and sub-100ms latency TTS systems.

MV Test Tracker | *Backend Lead*   *Feb 2023 – Jan 2024*
- Designed and built a robust backend using Firebase and Firestore, implementing real-time data synchronization, secure user authentication, and a custom scheduling optimization algorithm that reduced server call overhead by 40% and ensured even test distribution across multiple classes.
- Gained overwhelming support from district administration and 50+ teachers. Impacted 1200+ students at high school.

Rover | *ML Lead*   *Aug 2021 – July 2023*
- Built semi-autonomous rover with a rocker-bogie chassis for terrain-adaptive detection-mission autonomy.
- Implemented YOLO and DfD vision stack for real-time obstacle recognition and distance estimation, enabling collision avoidance for safe navigation.

SKILLS

Languages C++, Python, SQL, C, Java, JavaScript, Lua | **Familiar:** Ruby, R, Bash, SML

Software Tensorflow, PyTorch, CUDA, Vue.js, React, Firebase/Firestore, Git, DBT, GCP, Neo4j, PostgreSQL, Supabase, OpenCV