Aarush Agarwal

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EDUCATION

Carnegie Mellon University *Expected Graduation, May 2027*
Bachelor of Science in AI & CS, School of Computer Science Dean's List High Honors

EXPERIENCES

CMU Language Technologies Institute | *ML Researcher* *Jan 2026 - Present*
- Researching dynamic Mixture-of-Experts (MoE) architectures under Chenyan Xiong, developing adaptive routing that allow models to autonomously expand capacity for private data without degrading general reasoning capabilities.
- Developing novel adaptation methods for Mixture-of-Experts (MoE) architectures to new modalities (vision, medicine, financial time series) by leveraging techniques like Low-Rank Adaptation (LoRA) and insights from multimodal research like MoE-LLaVA.

Felicis | *Venture Fellow* *Jan 2026 - Present*
- Selected as a Venture Fellow in a highly competitive program focused on leveraging AI and technology for real-world impact; partnering with Felicis to identify, support, and accelerate early-stage student founders across campus.

Shopify | *Machine Learning Engineer Intern* *May 2025 - Aug 2025*
- Improved a buyer-fraud detection system with VertexAI, optimized BigQuery/Dataflow pipelines to increase predictive accuracy by 3%, and applied targeted feature selection to reduce training iteration time by 70%. Designed transformer-based models for fraud detection; improving embedding layers and temporal representations
- **Filed a patent** for a novel AI framework where distributed, specialized agents use Neo4j graph traversal to collaboratively decompose and execute tasks, enhancing output quality.

CMU Physics Lab | *CUDA Researcher* *Aug 2024 - Oct 2025*
- Co-authored paper on binning-based kNN; delivered 100x speedups over industry standards (FAISS, SCANN) in low-dimensional benchmarks.

PROJECTS

Healthier | *Backend & ML* *Jan 2025*
- **2nd Healthcare at NexHacks**

Mimir | *Fullstack* *Nov 2025*
- **Grand Prize at CMU Claude Builder Hackathon**

Haven | *Backend* *Oct 2025*
- **Awarded 1st Place in YC & Fetch.AI Tracks and Best Startup at CalHacks** for an intelligent patient care and hospital management system coordinating clinical agents. Architected the agent infrastructure (Fetch.ai, Claude); developed an rPPG heart-rate monitoring pipeline (OpenCV, FastICA) and a real-time voice intake agent (LiveKit, Groq).

Yumi | *Backend & ML* *Oct 2025*
- **Awarded 3rd Place (3/150+ teams) at HackHarvard** for an agentic food network that learns food profiles to eliminate social dining friction. Built a FastAPI backend featuring NLP-based sentiment analysis, intelligent taste profiling, and multi-user preference merging, integrated with PostGIS spatial search and Twilio voice automation.

Medicly | *ML Lead* *Sep 2025*
- **Awarded Grand Prize (1/200+ teams) at HackCMU 2025** for a platform that slashes physical therapy eval time from 14 days to 10 minutes. Sponsors include Anthropic, Citadel, Stripe, Jane Street, & HRT. Engineered a multimodal pipeline with pose estimation, structured kinematics, and 3D mesh rendering, and LLM-powered recovery reports.

SKILLS

Languages C++, Python, SQL, C, Java, JavaScript, Swift, Lua | **Familiar:** Ruby, R, Bash, SML | **Software** TensorFlow, PyTorch, CUDA, Vue.js, React, Firebase/Firestore, Git, DBT, GCP, Neo4j, PostgreSQL, Supabase, OpenCV, Pandas, AWS, FastICA, Groq, LiveKit, Fetch.ai, rPPG | **AI Experience** Reinforcement Learning, CUDA, Computer Vision, Multi-Agent Systems, GNNs, MoE, JIT
AWARDS: USACO Gold