

# AVNEET SINGH

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## WORK EXPERIENCE

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### Amazon

- Software Development Engineer | C++, Java, Kotlin, Python Seattle, WA (August 2024 – Present)
- Work on the Display Ads team owning a high-throughput, low-latency **Ads Recommendation Systems** (C++/Java) powering all display ads on Prime Video; processes **millions of requests per second**.
  - Built a **C++** traffic-replay load generator (token-bucket RPS shaping, tunable concurrency, S3-driven samples, auto-scaled workers, p95/p99 tracking); standardized for service SLA validation across **Prime Video**.
  - Used a custom sampling **profiler** to isolate hot paths in the ads service; shipped optimizations (batched cache gets, pre-sized collections, fewer copies) that cut **p99** by **~20 ms** over time.
  - Led 2 engineers to expand our main service into **Southern Europe** via multi-region **IaC** with AWS CDK (VPCs, ALBs, CI/CD); enabled **4×** European ad opportunity, and **~\$20M** projected 2025 lift.
  - Built a **Python** AWS Lambda that compresses video/ad metadata and caches responses in **ElastiCache/Redis**; reduced payload size and shaved **~5 ms** from **p99** E2E latency; improved availability by **0.05%**.
  - Build backend microservices in **Kotlin** and **Java**, and performance tooling in **C++**; provision stacks, pipelines, metrics, dashboards, and alarms with AWS CDK (**Python**) as IaC.
  - Led the design, implementation, and global launch of a Personalized Promotional Banner on the Prime Video Home Page (Q1 2025), resulting in **\$15M** incremental annual revenue.

### Edge Case Research

- Software Engineer Intern | Golang, Vue.js Pittsburgh, PA (April 2023 - September 2023)
- Conducted feature development to a full-stack web app using **Golang** and **Vue.js** to monitor safety metrics in autonomous vehicle systems; developed a **tree-node visualization tool** to display key performance indicators (client claims, evidence and resolutions) to streamline cross-team insights.

## PERSONAL PROJECTS AND COMPETITIONS

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### KaizenOS – Agentic AI Voice Assistant (iOS)

(January 2024 – July 2024)

- Built an **agentic AI** voice assistant in **Swift/SwiftUI** that plans and executes actions (Apple Shortcuts + EventKit) for calendar/tasks/notes, using **GPT-4o** for reasoning and dialogue.
- Integrated **Firestore Auth** and custom memory (context window cache); the project attracted a **500-user** waitlist and reached **30k+** impressions across social media.

### SIG's Cracking the Code Challenge | 2nd Place

(October 2023)

- Secured **2nd place** in the Susquehanna International Group's Cracking the Code Challenge at Carnegie Mellon University during my senior year of college.

### Carnegie Mellon University picoCTF Competition

(March 2023)

- Played a pivotal role in the CMU Pico CTF by assuming a leadership position and driving our team to a **top 100 placement** out of 6000 teams, in a competition of international stature; demonstrated problem-solving skills and expertise in the areas of **reverse engineering** and **binary exploitation**.

## EDUCATION

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### University of Pittsburgh

Pittsburgh, PA (August 2020 - May 2024)

- **Degrees:** Honors Bachelors in Computer Science, Minor in Neuroscience
- **Relevant Coursework:** Data Structures and Algorithms, Computer Networks, Object Oriented Design, Probability & Statistics, Linear Algebra, Operating Systems, Computer Architecture, Differential Equations

## SKILLS AND INTERESTS

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**Programming Languages:** Python, C++, Kotlin, Java, C, Typescript, SQL

**Tools and Infrastructure:** Linux, AWS, ECS, Docker, Git, CI/CD, iGraph, S3, Lambda, CloudWatch

**Libraries/Frameworks:** NumPy, Pandas, React.js, REST API, OpenCV, GraphQL

**Interests:** Tabla (have performed solos internationally), Ultimate Frisbee (team captain), Running, Chess