Omar A. Mohamed

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Education

California Polytechnic State University, San Luis Obispo **GPA: 3.6/4.0**
B.S. in Computer Science *Expected Graduation, Jun. 2028*

- Honors & Awards: President's List, Dean's List (4x).
- Related Coursework: Data Structures, Algorithm Design and Analysis, Computer Organization, Object-Oriented Programming, Systems Programming, Database Systems, Distributed Systems, Software Engineering.

CodePath
Web Development (WEB103), AI Engineering (AI201), Technical Interview Prep (TIP102)

Technical Skills

Languages: C++, Python, JavaScript, TypeScript, SQL, Java, Go, HTML/CSS
Systems & Networking: Linux, POSIX sockets, TCP/IP, IPv4, threading, Redis, WebRTC, LiveKit
Frameworks & Technologies: Next.js, React, Node.js, Flask, SocketIO, PostgreSQL, REST APIs, OAuth 2.0/OIDC, PKCE
AI/ML: PyTorch, Transformers, PEFT, QLoRA, Claude API, OpenAI API, LangChain, ChromaDB, scikit-learn, pandas
Tools: Git, GitHub, Docker, Vercel, Netlify, Render, Google Colab, Codex, Claude Code

Experience

Sandbar Health **Jul. 2026 – Aug. 2026**
Software Engineering Intern *Remote*

- **Architected and shipped a production AI-powered broker tool** to streamline broker workflows as the **sole engineer**, delivering document processing, plan comparison, carrier selection, exports, and outreach workflows across **28 HTTP endpoints** with Next.js, TypeScript, PostgreSQL, and REST APIs.
- Diagnosed and rebuilt invitation, callback, and secure multi-organization routing flows using **WorkOS AuthKit, OAuth 2.0/OIDC, and PKCE** to **reduce observed broker sign-in failures from approximately 80–90% to zero**.
- Improved production reliability by implementing **182 authentication test blocks (approx. 321 runtime cases)** and **approximately 30 mutation checks**. Tested against real identity-provider infrastructure and resolved **4 layered defects**.

Algoverse **Mar. 2026 – Jul. 2026**
Machine Learning Researcher *Remote*

- To improve code-generation performance, implemented and evaluated **On-Policy Distillation** on **Qwen2.5-Coder-1.5B** with **PyTorch**, **Transformers**, **PEFT**, and **QLoRA**, increasing **HumanEval pass@1 from 43.3% to 60.4%**.
- Designed ablation studies when **Simple Self-Distillation** produced noisy self-generated targets, and introduced a **code-extraction preprocessing pipeline**, increasing performance from **70/164 to 77/164**.
- Debugged evaluation benchmark failures while building **reproducible single-GPU training and evaluation pipelines** on Colab to restore HumanEval results from **0/164 to 72/164**. Co-authored a **manuscript on LLM self-improvement**.

CS+AI Club **Sep. 2025 – Present**
Director of Meetings (prev. Meeting Facilitator) *San Luis Obispo, CA*

- Lead a **5-person team** to deliver biweekly AI programming by collaborating with executive board, setting the roadmap, coordinating presenters, and reviewing technical content, contributing to the club's growth to **˜1,000 Discord members**.

Projects

Improv Faceoff | *Python, Flask-SocketIO, Redis, LiveKit* Sep. 2026 - Present

- Built and deployed a **real-time 1v1 improv training game** in **30 hours** on a **3-person team**, enabling remote players to match, communicate over live video/audio, complete synchronized 60-second rounds, and receive **AI-generated feedback**.
- Architected a **Python/Flask-SocketIO backend** with **Redis**-backed atomic matchmaking, server-authoritative state, action validation, disconnect cleanup, and match-scoped **LiveKit** rooms for **networked multi-user coordination**.

Minecraft TCP Proxy | *C++, Linux, POSIX Sockets, TCP/IP* Sep. 2026

- Created a **concurrent C++ TCP proxy on Linux** that relayed real Minecraft gameplay between internet-connected players and a local server. Validated **2 simultaneous players** and **3–5 reconnect cycles** through a Playit tunnel.
- Implemented **bidirectional TCP forwarding** with POSIX sockets, per-client session threads, **partial-write handling**, half-close semantics, and thread-safe session tracking to safely relay concurrent client connections and handle disconnects.

New News AI | *Next.js, TypeScript, GPT-4o-mini, OpenAI APIs, Tavily MCP, WebRTC* May 2026

- Created a **multi-agent news platform** on **Vercel** during a **13-hour** hackathon on a **2-person team**, enabling users to discover and validate breaking-news stories through **real-time voice conversations**.
- Developed agents end-to-end to support autonomous analysis and context-aware discussions, using **GPT-4o-mini, OpenAI tool calling, Tavily MCP, OpenAI Realtime API, and WebRTC**, enabling iterative news validation and dynamic follow-up retrieval.