FARZAM AHMAD

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TECHNICAL STACK

Python, TypeScript, Go (familiar), C#, React, FastAPI, WebRTC, Docker, Caddy, Redis, PostgreSQL, Kafka (conceptual), Terraform (familiar), AWS, Elastic Beanstalk, Celery, WebSockets, GPT-4/5 APIs, Whisper, TTS, LangChain, pgvector, FAISS, PyTorch, RDKit, .NET, Vite, ShadCN/UI, OAuth2, JWT, REST, Git

EXPERIENCE

Generative AI – Full Stack Software Developer – e*Cornell (Cornell University)* July 2025 - Present

- Architected and deployed real-time "Audio SIMs" using WebRTC and OpenAI Realtime API, enabling low-latency, two-way voice interaction and transcript streaming for immersive training scenarios.
- Extended realtime simulation **support to mobile platforms**, validating WebRTC session stability and audio event handling within the Canvas mobile app deployment of the learning environment.
- Refactored legacy simulation codebase from jQuery to modern ES6 modules, improving load times, maintainability, and integration with React-based components for upcoming mobile compatibility.
- Developed prompt injection mitigation strategies and led functional testing across multiple edge cases; created internal testing evidence and prompt rationale documentation
- Built a custom MCP server to extend Realtime API capabilities, handling tool calls and channel-side events directly; implemented this integration *before official documentation existed* through reverse-engineering and live protocol inspection.
- Diagnosed and reported a critical bug in OpenAI's prompt UI that sent an incomplete MCP endpoint URL ("Redacted") instead of the configured full URL, preventing proper connection; produced internal reproduction logs and patch recommendations.
- Refactored front-end state management to eliminate duplicate API calls and ensure thread consistency during concurrent Realtime sessions.
- Authored system design and API documentation to support future iterations, tool migration, and reproducibility across research and engineering teams.

Independent Software Researcher & Developer - *AI & Full Stack Developer* May 2023 – July 2025

- Developed full-stack applications leveraging Python, Django, React, and Docker, with a focus on real-time systems, crypto integrations, and AI-enhanced search.
- Built BTCGambler, a real-time crash gambling game using Bitcoin Core, custom WebSocket infrastructure, net payout optimization, and a secure OAuth-based SSO system.
- Created Molbase, a neural-accelerated molecule search platform using RDKit, PostgreSQL, GNN embeddings, and multi-mode search with substructure and similarity support.
- Developed DocGen.AI, a local-first documentation assistant enabling companies to embed and query private codebases with secure Ollama model sessions, real-time status updates, and a modular React + FastAPI stack.
- Engineered local AI tools for secure enterprise use, including code documentation generation via Dockerized LangChain + OpenAI pipelines with retrieval-augmented generation (RAG).
- Designed scalable APIs and background workflows using Celery for event-driven systems involving crash simulation, payout logic, molecule ingestion, and job queue management.
- Explored vector databases (e.g. FAISS), Hugging Face transformers, and custom T5 fine-tuning for speech-to-text ASL translation and contextual document search.

- Built containerized pipelines for parsing and indexing 6M+ molecules from PubChem using RDKit, PostgreSQL, and async Python for large-scale data ingestion.
- Created live preview documentation portals using MkDocs + GitHub Pages to centralize demo links, feature walkthroughs, and uptime info.

Software Engineer - *Scilligence* Jan 2022 - May 2023

- Developed and maintained a web-based platform for analyzing and visualizing large chemical datasets, leveraging technologies such as C#, .NET, JavaScript, and SQL to ensure robust and scalable solutions.
- Collaborated with a cross-functional team of chemists, biologists, and data scientists to design and implement new features, enhancing the platform's functionality and user experience.
- Led the development of a key module that seamlessly integrated two web applications, resulting in a significant increase in platform efficiency and overall functionality.
- Automated git workflows and dependency setup with a Bash script to streamline development and cut down environment-switching overhead.
- Enhanced software performance and reliability through meticulous code refactoring and optimization, ensuring the platform operated smoothly and efficiently under various conditions.
- Built reusable front-end components and backend APIs for user-defined queries, compound registration, and chemical property lookups
- Provided mentorship and technical support to junior team members, as well as researchers and customers, fostering a collaborative and supportive work environment.
- Participated in customer demos and technical onboarding calls, translating scientific requirements into development tickets and implementation plans
- Documented features and bug fixes using an internal project management framework, ensuring clear communication and traceability throughout the development process.

REALTIME & SYSTEMS EXPERTISE

Built low-latency audio pipelines using WebRTC + OpenAI Realtime API for real-time voice interaction and multi-assistant simulations. Deployed containerized FastAPI backends with Redis session orchestration and automated TLS via Caddy. Experienced with scalable, event-driven systems and end-to-end performance tuning for sub-300 ms latency.

RECENT PROJECTS

DocGen.AI – *Local-first AI assistant for querying private codebases and generating docs/tests*
Python, TypeScript, FastAPI, React, Docker, Celery, Ollama, Redis, ShadCN/UI
Documentation & Live Link

Molbase – *Neural-accelerated chemical search engine for 6M+ molecules using RDKit and GNNs*
C#, Python, TypeScript, Docker, PostgreSQL, RDKit, React, GNN, MaterialUI
Documentation & Live Link

BTC Crash – *Real-time Bitcoin crash gambling game with provably fair logic and live payouts*
Python, JavaScript, React, Docker, WebSockets, Celery, Bitcoin Core, Material UI
Documentation & Live Link

EDUCATION

Web Development - App Academy Aug 2021-Dec 2021
BS Chemistry - Le Moyne College - 3.7 GPA Aug 2014-May 2018