

Vansh Gupta

+91-9407544861 | vanshgupta1490@gmail.com | linkedin.com/in/vansh7 | github.com/Vansh-7 | leetcode.com/vansh-7

EDUCATION

Thapar Institute of Engineering & Technology

B.E. in Computer Engineering; CGPA: 9.28/10.00

Patiala, Punjab

Sep 2023 – Jun 2027

TECHNICAL SKILLS

Languages: Python, TypeScript, JavaScript, SQL, C++, C

Backend & APIs: FastAPI, RESTful APIs, WebSockets, asyncio, Pydantic, JWT, SQLAlchemy

Databases: PostgreSQL, SQLite, Relational Data Modeling, Alembic

AI / ML / LLM: Machine Learning, Generative AI, RAG, Agentic AI, MCP, Embeddings, HNSW, LangChain, LangGraph, TensorFlow/Keras, scikit-learn, NumPy, Pandas

Tools & DevOps: Git/GitHub, Docker, AWS, GitHub Actions CI/CD, pytest, Playwright, Linux, Bash/Shell

Core CS: Data Structures & Algorithms, OOP, Operating Systems, DBMS, Computer Networks

PROJECTS

Nabla – Vector Database & RAG Platform | Python, React, FastAPI, PostgreSQL

[GitHub](#)

- Built a React/TypeScript console for document ingestion, semantic search, RAG chat, and D3/PCA vector visualization; integrated FastAPI REST APIs with PostgreSQL-backed application data.
- Implemented HNSW, KD-tree, and exact nearest-neighbor search over 768-dimensional embeddings; integrated CrossEncoder reranking and streamed LLM responses.
- Engineered JWT/Argon2 authentication, tenant-scoped retrieval, and WAL/snapshot crash recovery; validated 750 mutations across 5/5 recovery test rounds.

Zoom Clone – Real-Time Video Conferencing | Next.js, FastAPI, WebRTC

[GitHub](#) | [Live](#)

- Developed a React/Next.js conferencing application supporting four simultaneous participants through mesh WebRTC, FastAPI WebSocket signaling, and STUN/TURN connectivity.
- Built REST APIs and SQLite/SQLAlchemy persistence for meeting scheduling and history; implemented capability-token authorization, host controls, chat, and rate limiting.
- Validated four-participant audio/video calls and screen sharing; documented 132 passing backend tests and 37 passing Chrome browser tests using pytest and Playwright.

NES Emulator | C++17, Computer Architecture, Win32/OpenGL

[GitHub](#)

- Implemented a 6502 CPU emulator with 151 documented opcodes and 12 addressing modes, integrating 2C02 PPU and 2A03 APU models through a memory-mapped system bus.
- Integrated six cartridge mappers, OAM DMA, NMI/IRQ handling, and 3:1 PPU-to-CPU scheduling for graphics and audio execution.
- Validated CPU execution against expected `nestest` output, tested commercial games including Super Mario Bros. 3, and debugged APU audio generation.

EXPERIENCE

Thapar Institute of Engineering & Technology – ELC

Patiala, Punjab

Experience Learning Center Intern

Jun 2024 – Jul 2024

- Developed a YOLO-based computer vision pipeline using KITTI camera/LiDAR data for object detection and visualization in a team Navigation & Path Planning rover project.

ACHIEVEMENTS & LEADERSHIP

- LeetCode Knight** (peak rating 1957); solved 700+ problems; ranked 789/37,970 (Top 2%) in Weekly Contest 508.
- Merit Scholarship:** INR 2 lakh tuition waiver for ranking in the Top 10% of Computer Engineering.
- Amazon ML Summer School:** Selected among the Top 3,000 of 130,000+ applicants.
- Ranked **Top 1500** in Google India's Big Code Challenge.
- ACM Core Team Member:** mentored 50+ students and coordinated 60+ developers across 3 hackathons supporting 15+ full-stack applications.