

Satyam Kesharwani

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EDUCATION

National Institute of Technology, Kurukshetra

Bachelor of Technology in Computer Engineering; CGPA: 8.88/10

Kurukshetra, India

Aug 2023 – May 2027

EXPERIENCE

Software Engineer Intern

Jan 2026 – Present

Ministry of Defence-sponsored project, National Institute of Technology Kurukshetra

Kurukshetra, India

- Sole student developer on an MoD-sponsored security project; built a security analysis suite of **46 interconnected modules** to detect and mitigate threat vectors, following secure-coding practices.
- Analyzed high-volume **firewall, antivirus, DNS and Windows event logs** to model user behavior and flag threats; followed SDLC practices through design, implementation and testing.

IoT & Machine Learning Research Intern

Jan 2025 – Present

National Institute of Technology Kurukshetra

Kurukshetra, India

- Built an offline battery-diagnostics system on an **ESP32** whose Residual-Physics Neural Network reaches **$R^2 = 99.70\%$** (XGBoost: 98.46%); **second author, IEEE NE-IECCE 2026** [paper].
- Compiled the PyTorch model to INT8 C++ with the EON Compiler for fully offline inference on the ESP32.

Machine Learning Research Intern

Jun 2024 – Dec 2024

National Institute of Technology Kurukshetra

Kurukshetra, India

- Fine-tuned a Vision Transformer on images built from sandbox behavior reports of **4,280 Android apps: 99.78% accuracy** for ransomware detection; **lead author, ICDAM 2025 (Springer)** [paper].
- Built the Python pipeline from CuckooDroid reports to features and images; compared CNN and RF baselines.

PROJECTS

AtomicKV: Distributed Key-Value Database | C++17, Linux epoll, B-Tree, Gossip, AWS EC2

[GitHub](#)

- Built a **production-grade distributed database from scratch** on a single-threaded **Linux epoll** event loop.
- Tiered storage: **LRU cache** plus a **Bloom filter** for instant misses, backed by a custom on-disk **B-Tree**.
- Implemented a **consistent hash ring** with virtual nodes, masterless **Gossip** failure detection, async replication with read-repair and anti-entropy for fault tolerance, and **Lamport clocks** for last-write-wins conflict resolution.
- Load-tested with 200 concurrent clients (80K requests): **10,000+ req/s** at **~16 ms** average latency (p99 ~40 ms); deployed as a multi-node AWS EC2 cluster.

Custom Memory Allocators & Order Matching Engine | C++17

[GitHub](#)

- Wrote **Linear, Stack, Pool and Free-List allocators** from scratch and used the pool in a price-time-priority **limit order book**, so the matching path never calls new/malloc.
- 1M alloc/free ops (median of 7 runs, -O2): **pool ~2.5×** and **linear ~15×** faster than glibc new/delete.

Shortify: URL Shortener with Multi-Layer Caching | Node.js, PostgreSQL, Redis, Docker, AWS [Live](#) | [GitHub](#)

- In-process LRU and **Redis** caches over **PostgreSQL**, a Bloom filter for unknown codes and a Redis lock against cache stampedes: **7.12 ms** average redirect latency under k6 (50 virtual users, 100% success).
- Base62 Snowflake IDs, a Redis-backed **token-bucket rate limiter**, Docker deploys to **AWS EC2** through a GitHub Actions **CI/CD** pipeline.

TECHNICAL SKILLS

Languages: C++17, Python, JavaScript (Node.js, Express.js), SQL; familiar with Java, Bash

Backend & Systems: Linux (epoll, sockets), multithreading, REST APIs, PostgreSQL, Redis, MongoDB, MySQL

Cloud, Tools & ML: AWS (EC2, S3), Docker, Git, GitHub Actions, k6, PyTorch, TensorFlow, scikit-learn

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

ACHIEVEMENTS

- LeetCode Knight** – max rating 1908 (top 5%), 650+ problems; global rank 412 of 35,968 in Weekly Contest 497
- Amazon ML Challenge** – rank **313** of 26,636 teams (2026); rank 2,313 of 19,556 teams (2025)
- Amazon ML Summer School 2025** – selected
- Led 4-member teams: **3rd of 515** at Excalibur 2025; **Grand Finalist** (top 11 of 206) at Case on Point 2025