

ANIRUDH SARVE

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PROFESSIONAL SUMMARY

Backend & Distributed Systems Engineer with expertise in building high-throughput microservices, ACID-compliant transactional ledgers, and distributed locking mechanisms. Experienced in architecting atomic concurrency controls with Redis, zero-heap streaming pipelines, and connection-pooled databases (PostgreSQL, MySQL, MongoDB). Strong foundation in operating system primitives, memory management, and asynchronous I/O architectures.

EDUCATION

Vidyalankar Institute of Technology (VIT), Mumbai — B.E. in Computer Engineering

Expected May 2028

Cumulative GPA: 8.90 / 10.0 | Affiliated with University of Mumbai

Relevant Coursework: Operating Systems, Database Management Systems, Computer Networks, Distributed Computing, Data Structures & Algorithms, Object-Oriented Analysis & Design.

Sonopant Dandekar Shikshan Mandali — HSC (Class XII, PCMB)

May 2024

Score: 92.60% | Distinction in Mathematics, Physics & Computer Science

TECHNICAL SKILLS

Languages: TypeScript, JavaScript (Node.js), Python, Java, C++, SQL, Go (Basics).

Backend & Distributed Systems: Node.js, Express.js 5, FastAPI, RESTful APIs, gRPC (Basics), WebSockets (Aby, Socket.io), Distributed Locks (Redis Redlock / SET NX EX), Message Passing, Server-Sent Events (SSE).

Databases & Storage: PostgreSQL, MySQL (mysql2 pooling), MongoDB (Replication & Sharding basics), Redis (In-Memory Caching & Atomic Primitives), Qdrant (HNSW Vector Store), SQLite FTS5.

Architecture & Infrastructure: Microservices, Event-Driven Architecture, Concurrency Control, ACID Transactions, Connection Pooling, Docker, Linux/POSIX, Git, AWS (EC2, S3), Google Cloud Run.

PROFESSIONAL EXPERIENCE

NxtChaptr — Software Developer (Backend & Distributed Infrastructure)

Nov 2024 – Aug 2025

- Architected backend infrastructure for high-concurrency event drops, orchestrating atomic distributed inventory reservation via **Upstash Redis (SET key val NX EX 120)** to eliminate double-spending and database lock contention on 1-of-1 vintage catalog items.
- Built low-latency WebSocket communication using Aby to broadcast instant reservation states, cart expirations, and stock adjustments across thousands of concurrent mobile clients.
- Automated third-party logistics reconciliation by interfacing with Shiprocket REST APIs, designing idempotent webhook processors that dynamically calculate volumetric shipping tariffs and record ledger margins.
- Streamlined backend photo ingestion by offloading compute to the edge with WebAssembly, reducing media payload processing overhead on core application servers by over 70%.

Exposure: Node.js, Express, Upstash Redis, MongoDB, WebSockets, Distributed Locks, REST APIs, Microservices.

Wroomie — Software Developer (Backend Systems)

Nov 2023 – Jan 2024

- Developed resilient backend services for user profile ingestion, property catalog management, and automated roommate matching using Node.js and Express.
- Optimized geospatial querying on MongoDB using 2dsphere indexing and compound filters, slashing query execution time by **35%** under concurrent location searches.
- Implemented JWT-based authentication, role-based access control (RBAC), and transactional media processing pipelines using Cloudinary.

Exposure: Node.js, Express, MongoDB Geospatial, RESTful API Design, Security & Auth.

FEATURED TECHNICAL PROJECTS

ACID-Compliant Multi-Warehouse Inventory Ledger with Connection Pooling & 2FA Verification

Technologies: Node.js, Express 5, MySQL2, Nodemailer, JWT

- Architected a multi-facility warehouse management backend guaranteeing zero inventory discrepancies across concurrent receipt, transfer, and dispatch cycles.
- Enforced strict ACID transactional isolation (START TRANSACTION ... COMMIT) over raw MySQL connection pools, ensuring stock decrements verify availability before committing and rolling back atomically on collision.
- Implemented two-factor email OTP authorization (Nodemailer) for high-value write-offs and bulk inventory adjustments; built structured transactional audit logs preventing unauthorized inventory tampering.
- Designed comprehensive RESTful endpoints with parameter validation, rate limiting, and centralized error handling middleware.

Non-Blocking Chunked Multipart Data Streaming Pipeline with Ephemeral Cloud Storage & WebSockets

Technologies: Node.js, Express, Cloudinary Streaming API, Socket.io

- Engineered a streaming file-transfer microservice handling submissions up to 400 MB by piping incoming multipart chunks directly into cloud object storage, preserving **O(1) constant server memory** and eliminating process heap crashes.
- Implemented real-time bi-directional progress tracking using Socket.io to deliver exact byte-level transfer metrics to clients.
- Configured automated background lifecycle workers with Node-Cron to securely purge expired file references and clean up temporary storage allocations.

Neuro-Symbolic 3-Way Parallel Retrieval Pipeline (FTS5, Regex, Dense ONNX Embeddings)

Technologies: Python, FastAPI, SQLite FTS5, ONNX, Reciprocal Rank Fusion

- Engineered a high-throughput multi-modal standards compliance backend querying 19,423 Bureau of Indian Standards (BIS) documents for e-procurement audits.
- Implemented a 3-way parallel hybrid retrieval engine combining O(1) regex lookups, SQLite FTS5 BM25 lexical indexing, and 384-dimensional dense ONNX embeddings (bge-small-en-v1.5) via Reciprocal Rank Fusion (RRF).
- Built a deterministic numerical constraint evaluation engine parsing physical dimensions, grades, and ratings from tender documents to eliminate semantic false-positives.

Interactive Operating System Kernel Process Scheduler & Contiguous Memory Allocator

Technologies: Python, CustomTkinter, Matplotlib

- Built a kernel simulation engine modeling CPU process scheduling algorithms (preemptive and cooperative FCFS, Shortest Job First, Round Robin with dynamic quantum, and Priority Scheduling) on live Gantt charts.
- Implemented contiguous physical memory allocation models (First-Fit, Best-Fit, and Worst-Fit) simulating a partitioned 1024 MB address space with real-time internal/external fragmentation tracking.
- Developed an interactive visualization layer capable of handling high-frequency state updates while simulating deadlock avoidance and race-condition scenarios.

Distributed Concurrency Controller with Atomic Redis Locks & Real-Time Event Telemetry

Technologies: Node.js, Upstash Redis, Ably WebSockets, Express 5

- Built an atomic reservation engine handling burst concurrency spikes during live drop windows, resolving lock acquisition and timeout expirations in <5 ms.
- Integrated event-driven WebSocket broadcasts synchronizing real-time reservation timers across connected mobile and desktop sessions.

HONORS & LEADERSHIP

- **Core Member, ISRO Smart India Hackathon (SIH 2026):** Designed real-time telemetry streaming and state-estimation pipelines for problem statement PS 26168.
- **Robotics Autonomous Team, Indian Rover Challenge (IRC):** Implemented ROS telemetry communication and serial sensor data ingestion in C++ and Python.
- **Scholastic Distinction:** 8.90/10.0 CGPA at VIT Mumbai; 92.60% in HSC Board Examination.