

Madhusudan Singh

Software Engineer — Backend & Distributed Systems

 madhusudan210733@gmail.com  +91-8769382074  India  LinkedIn  Portfolio  GitHub

SKILLS

Languages — Java, Python, Rust, C/C++, JavaScript/TypeScript, SQL

Backend & Systems — Spring Boot, gRPC, Temporal, Distributed Systems Design, Event-Driven Architecture, Resilience4j, Idempotency & Exactly-Once Semantics, Concurrency

Data & Cloud — MySQL, DynamoDB, S3, AWS Lambda, EC2, Docker, Kubernetes, CI/CD, Git

AI & Agents — LangGraph, LangChain, RAG, DSPy, PyTorch, Gemini/OpenAI APIs, Pinecone/Milvus

PROFESSIONAL EXPERIENCE

JAVIS Technologies

Software Engineer, Backend

Mar 2023 – Present

(Intern: Mar – Sep 2023) | Bengaluru, India

- **Schema-Driven Ingestion Compiler** — Led the design of a multi-tenant ingestion platform that compiles column metadata, versioned rulesets, and per-tenant/industry overrides into a single immutable execution profile; eliminated all per-client code and reduced the codebase **95% (12,000 → 600 lines)**.
- **Compile-Time Dataflow Optimization** — Built a compiler pass that derives the operation dependency graph from declared read/write sets, auto-parallelizes independent foreign-key lookups, and coalesces identical operations into single batched calls — a **1M-row** file resolves against each master table in a **handful of queries instead of a million**.
- **Durable Execution Engine (Temporal)** — Implemented a **zero-business-logic** interpreter executing compiled profiles: **crash-resumable mid-file**, multi-leg parallel execution, row-level error accumulation, and version-pinned profiles for reproducible replay.
- **Async Execution Framework (Spring Boot Starter)** — Designed and **drove adoption of** a platform library now **embedded across all JAVIS backend services**, standardizing job lifecycle, **transactional outbox** dispatch, leased workers, retries, idempotency, and completion callbacks; **eliminated async boilerplate for every domain team**, who now implement only business handlers.
- **Distributed Correctness** — Guaranteed **effectively-exactly-once** execution via at-least-once delivery plus idempotent effects: unique idempotency keys, compare-and-set state transitions, lease/heartbeat/reaper crash recovery, and zombie-write protection; validated by CI **chaos tests** across all three dual-write crash windows.
- **High-Performance Backend** — Improved API response times **9x** by migrating legacy REST services to **gRPC** and rolling out generic I/O fixes **organization-wide**; scaled writes to **1M+ rows** per file via parallel processing, server-side prepared statements, and a proprietary bulk-I/O layer replacing ORM with vanilla **JDBC**.
- **Rust on AWS Lambda** — Designed a serverless SKU ingestion pipeline in Rust, leveraging memory safety and zero-cost concurrency to process large Excel datasets with minimal memory and cold-start overhead.
- **Multi-Tenant Resilience Engineering** — Built weighted-fair dispatch, priority lanes, per-tenant rate limiting, **Resilience4j** circuit breakers, jittered retry with capacity-capped budgets, and a runtime-toggled degradation ladder — giving **every JAVIS service** graceful degradation by default: the system degrades to **delayed** under load, never to **lost**.

Endura AI | Aureus AI

Founder

Nov 2024 – Dec 2025 | Bengaluru, India

- **Multi-Agent Financial Automation** — Architected a **LangGraph** multi-agent system for Chartered Accountants with direct **Tally** integration, automating bookkeeping and month-end close workflows end to end.
- **Tenant-Isolated RAG Pipeline** — Built a segregated retrieval architecture enforcing strict data isolation at client/company/folder scope, with **Gemini**-based document parsing and **DSPy/Pydantic**-enforced structured extraction for audit-grade accounting records.
- **Autonomous Reconciliation Agent** — Developed a bi-directional **QuickBooks** sync engine ingesting **10,000+** bank transactions with confidence-scored auto-categorization, collapsing manual month-end reconciliation from **7–8 days to 3–4 hours**.

EDUCATION

Indian Institute of Technology Roorkee

B. Tech. | Electrical Engineering

2019 – 2023 | Roorkee, Uttarakhand

PROJECTS

Sansad AI (Multi-Agent Prediction Market) | Stack: Next.js, AI Agents, Vercel

- Real-time multiplayer game where users compete against **autonomous AI agents** with distinct personas that analyze data and debate outcomes to generate live market predictions.

Text-to-image generation using GANs | ARIES, IIT Roorkee

- Trained a stacked GAN producing photorealistic images from text descriptions on **CUB-200-2011** — 200 species, 11,788 images.

ACHIEVEMENTS

Competitive Programming

- ACM ICPC Preliminary Round 2021: **All India Rank 221**.
- **LeetCode** rating: 2100+ | **Codeforces** rating: 1735 (**Expert**) | **CodeChef** rating: 2013 (**5★**)