Vishesh Rawal

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PROFESSIONAL PROFILE

Final-year Computer Science student focused on **Systems Engineering** and **Distributed Backend Architectures**. Experienced in building high-throughput systems using **Go, Rust, and Node.js**. Specialized in **RAG pipelines**, **database internals**, and **L4/L7 networking**. Proven track record through open-source contributions to **Google DeepMind** and IEEE-published research in **Zero-Trust security**.

TECHNICAL EXPERTISE

BACKEND	Scalable API Design (GraphQL Federation, REST), Event-Driven Systems (Kafka, RabbitMQ), Microservices (FastAPI, NestJS, Node.js), Distributed Locking.
SYSTEMS	Rust (Memory-mapped I/O), Go (High Concurrency), CPU/Memory Profiling, Lock-free Data Structures, Write-Ahead Logging (WAL), LSM Trees.
DATA & AI-OPS	VectorDBs (ChromaDB, Pinecone), PostgreSQL (Schema Optimization), Redis (Connection Pooling), RAG Architectures, LLM Inference Optimization.
SECURITY & SRE	OAuth 2.0/JWT, RBAC, Zero-Trust Architecture, Prometheus/Grafana (SLIs/SLOs), L7 Proxying, Nginx.
CLOUD & OPS	AWS (IAM/VPC Hardening, EC2, S3), Docker, Kubernetes (CKA methodology), CI/CD Pipelines, Infrastructure as Code.

WORK EXPERIENCE

THE GEMINI INDIA — Jun 2025 – Aug 2025

Developer Intern | *FastAPI, Kafka, ChromaDB, Redis, DistilBERT* — Ahmedabad, India

- Engineered an **Intelligent Triage Engine** using an event-driven ingestion pipeline with **FastAPI and Kafka** to automate international client log processing.
- Integrated **ChromaDB** for RAG-based retrieval and implemented a **Redis semantic cache** to significantly lower LLM inference latency.
- Fine-tuned a **DistilBERT** model for automated ticket classification, achieving **100% automated detection** of critical failures and **>90% precision** in triage routing.

BACKSLASH COMPUTING SOCIETY (TIET) — Sept 2022 – Feb 2024

Software Engineer & Infrastructure Lead | *AWS, GraphQL, Prometheus, Docker* — Patiala, India

- Led a 10-member engineering team to migrate production services to a **containerized microservices architecture** on AWS, serving 1,000+ active users with **99.99% uptime**.
- Developed a unified **GraphQL API layer** and secured the system using **OAuth 2.0/JWT** with RBAC and database connection pooling for high-traffic stability.
- Established comprehensive SLI/SLO monitoring via **Prometheus and Grafana**, reducing incident response times through automated alerting and **L7 Load Balancing**.

TECHNICAL PROJECTS

GOOGLE DEEPMIND OPENSPIEL — [PR #1426]

C++, Python, CMake, GitHub Actions

- Modernized the build pipeline via **cibuildwheel** and **PEP 517/518** to implement Windows wheel support for C++ extensions.
- Unblocked universal pip installations and stabilized cross-platform CI/CD using GitHub Actions matrices.

CCWC: HIGH-PERFORMANCE SYSTEM UTILITY — [GitHub]

Rust, Memory-Mapped I/O, Multithreading

- Built a CLI tool using **mmap** and **lock-free multithreading** to minimize data copying and thread contention.

- Profiled CPU/memory usage to eliminate bottlenecks, sustaining **93% higher throughput** than standard GNU coreutils.

ASTEROIDOS: 32-BIT X86 OPERATING SYSTEM [GitHub]

C, x86 Assembly, Kernel Development

- Authored a functional kernel from scratch, implementing a **Virtual Memory Paging System** for process isolation.
- Developed hardware-level **Interrupt Service Routines (ISRs)** and a custom syscall interface to manage context switching.

RESEARCH & RECOGNITION

IEEE PUBLICATION (INC4 2025) Jan 2025

Primary Author | Zero-Trust & ML-Driven Network Security

- Developed a real-time monitoring framework using **Scapy** to validate transient TCP flows against Zero-Trust baselines.
- Implemented an anomaly detection engine using **K-Means Clustering** and ephemeral flow detection to identify unauthorized access with high precision.
- Optimized system overhead by engineering **selective port scanning with cooldowns**, reducing false positives and resource consumption during live deployment at **Thapar University**.

TECHNICAL ADVISOR @ HACKMIT Sept 2024

Massachusetts Institute of Technology (MIT) | Distributed Systems

- Selected as a mentor for MIT's flagship hackathon, advising international teams on **backend scalability**, **system architecture**, and distributed data consistency.

ACADEMIC HONORS 2022 – 2026

Thapar Institute of Engineering & Technology (TIET)

- Ranked in the **top 1% of individuals** mentored in a 30-year career by the Associate Head of CSE, recognized for exceptional technical aptitude in systems and networking.

EDUCATION

THAPAR INSTITUTE OF ENGINEERING & TECHNOLOGY (TIET) May 2022 – May 2026

Bachelor of Engineering in Computer Science and Engineering Patiala, India

- **Relevant Coursework:** Data Structures & Algorithms, Operating Systems, Computer Networks, Database Management Systems (DBMS), and Software Engineering.