

SURAJ KUMAR



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Education

Siddaganga Institute Of Technology

August 2023 - present

Bachelor of Engineering in Artificial Intelligence and Data Science (CGPA: 9.38) — 2023-27

Tumkur, Karnataka

Coursework: Data Structures and Algorithms, Object-Oriented Programming, System Design, Operating Systems, Networking, Database Management Systems, Design and Analysis of Algorithms, Machine Learning

Skills

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

Frameworks & Libraries: React, Next.js, Node.js, Express, Flask, Bun, Nginx

Databases & Backend: PostgreSQL, MongoDB, Redis, Prisma, REST APIs, JWT

Systems: Multi-Agent Systems, Distributed Systems, Message Queues, LiveKit

Tools: Git, GitHub, Postman, Docker, AWS

Projects

PodNex — Distributed Async Job Processing Platform

[Link](#)

- Designed and deployed a distributed job processing system on **AWS EC2** with Docker and nginx reverse proxy; used **AWS S3** for durable object storage.
- Built async pipeline using BullMQ and Redis with retry logic, exponential backoff, and fault injection tests validating queue reliability under failure scenarios.
- Developed REST APIs with session auth, API keys, and webhook delivery; wrote tests covering CORS, error handling, and authentication edge cases.
- Tech:** Next.js, TypeScript, Node.js, PostgreSQL, Prisma, AWS, Docker.

Kuma — Personal Assistant System

[Link](#)

- Built a full-stack assistant using multi-agent architecture with task orchestration, persistent memory, and modular service integration across independent processes.
- Integrated external services (Gmail, Calendar, Drive, GitHub); designed error recovery for API failures, token expiry, and network timeouts.
- Designed concurrent session management using Redis queue isolation across distributed processes; implemented real-time communication with LiveKit and JWT auth.
- Tech:** React, TypeScript, Bun, Express, PostgreSQL, Prisma, Redis.

Mini TCP/IP Stack — Userspace TCP Implementation in C

[Link](#)

- Implemented a userspace TCP stack in C using raw sockets, bypassing the OS TCP layer entirely; manually constructed every header byte and drove the full state machine (**CLOSED** → **ESTABLISHED** → **TIME_WAIT**).
- Built reliability layer with retransmission timers using **exponential backoff** (1s–64s, 5 retries), sliding window flow control tracking in-flight bytes against peer's advertised window, and cumulative ACK processing.
- Validated wire-correctness via **Wireshark** packet captures — confirmed correct seq/ack progression, clean four-way teardown, and successful HTTP GET/response over the custom stack against a live server.
- Tech:** C, Raw Sockets, Linux, Docker, iptables, Wireshark.

Achievements

- Won an in-person **Capture The Flag (CTF)** competition among 52 teams and 140+ participants, solving challenges in *web, cryptography, forensics, and virtual machines*.
- Ranked **304th** out of 6000+ teams in the **Amazon ML Challenge 2025**.
- 1st Place** in **Cyber Etymology** at *Browse*; **2nd Runner-Up** in **UI/UX Design** at *Browse*; **1st Runner-Up** at "Research Gate" Hackathon for *Sayan* (Govt. scheme app).
- Solved **375+ LeetCode problems**; achieved contest rating of **1703**.
- Organized a **hackathon** for AI Brewery; conducted a **Generative AI workshop** (40+ participants) and a multi-day **Web Development workshop** for juniors.
- Ranked in the **Top 10%** among 1200+ teams at *The Great Bengaluru Hackathon* with *FinTalk*, an AI-powered finance assistant.

Position Of Responsibility

AI Brewery

June 2025 – Present

- Led AI and web development initiatives; validated project outputs across team deliverables.

Finance Secretary

Decoders

May 2024 – Present

- Organized coding events and challenges; promoted coding culture across campus.

Member