

# Amar Kumar

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## EDUCATION

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### Bachelor of Technology – Computer Science & Engineering

South Asian University, Delhi, India 2024 – 2028

## TECHNICAL SKILLS

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

**Frameworks & Libraries:** React.js, Node.js, NestJS, Express.js, Prisma ORM, tRPC, TanStack Query, Zustand, Framer Motion

**Backend & APIs:** REST APIs, JWT Auth (access + refresh tokens), Socket.IO, WebSockets, Role-Based Access Control

**Databases:** PostgreSQL (pgvector), MySQL, MongoDB, Redis

**DevOps & Tools:** Docker, Docker Compose, Git, GitHub, Render, Vercel, Railway, GitHub Pages, VS Code

**CS Fundamentals:** Data Structures & Algorithms, OOP, System Design, Competitive Programming, Graph Algorithms

**AI / ML:** RAG pipelines, LLM integration (Gemini API), Social Network Analysis, NumPy, Pandas

## EXPERIENCE

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### Research Intern – Social Network Analysis

South Asian University, Delhi, India 2026 – Present

- Processed and analyzed large-scale graph datasets (10k+ nodes) to detect community structures and measure influence propagation using Python, NetworkX, and graph centrality algorithms (PageRank, betweenness, degree).
- Built automated data pipelines for preprocessing, feature extraction, and visualization of social network data, cutting manual analysis effort by ~60%.
- Applied distributed information diffusion models to study how information spreads across network topologies; findings contributed to ongoing faculty research.
- Documented methodology and results collaboratively, translating complex graph theory into reproducible experiments.

## PROJECTS

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### Hostel Management Platform — SmartHack Hackathon

*NestJS · React 19 · TypeScript · PostgreSQL · Prisma · Socket.IO · Docker · Gemini API · pgvector*

- Architected a production-grade full-stack hostel management system from scratch; deployed frontend on Vercel, backend on Render, and containerized the full stack with Docker Compose for local orchestration.
- Designed a role-based access control system (Student, Warden, Admin) with JWT authentication using short-lived access tokens and HTTP-only refresh token cookies; implemented 10+ RESTful API endpoints for room allocation, complaints, and admin dashboards.
- Built a RAG-enabled AI chatbot using Gemini API with pgvector embeddings over a PostgreSQL knowledge base; incorporated live room and complaint data retrieval with intent classification for context-aware responses.
- Implemented real-time complaint status notifications via Socket.IO; engineered anonymous complaint submission with salted-hash identity preservation and token-based public tracking.

[GitHub](#) | [Live Demo](#)

### FreshSip — Full-Stack Juice Bar Ordering Platform

*React 19 · TypeScript · tRPC · Express · MySQL · Drizzle ORM · Razorpay · Docker · Railway*

- Built and deployed a full-stack ordering platform for a local juice bar, enabling customers to browse a customizable menu, view dynamic pricing, and pay via Razorpay UPI integration.
- Designed an end-to-end type-safe API layer using tRPC and Express with a MySQL database managed through Drizzle ORM.
- Built a real-time admin dashboard for order management with live status sync (Pending → Confirmed → Ready → Completed) reflected instantly on customer screens.
- Containerized the application with Docker and deployed to Railway, serving live customer traffic in production.

[GitHub](#) | [Live Demo](#)

## RELEVANT COURSEWORK

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Competitive Programming • Full Stack Development • Software Engineering • Data Structures & Algorithms • AI and Soft Computing • Social Network Analysis • Logical Aptitude & Problem Solving

## ACHIEVEMENTS

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- Won 1st Prize at AvishkarX — CSI × SAU's Ideathon, a university-wide innovation and idea-pitching competition organized by the Computer Society of India chapter at SAU.
- Solved 100+ DSA problems on LeetCode and Codeforces, focusing on graphs, trees, dynamic programming, and arrays.
- SmartHack: Built and deployed the Hostel Management Platform as part of a hackathon, earning 6 GitHub stars and 4 forks from the community.
- Consistently maintained structured self-study blocks alongside internship work, executing a focused full-stack + DSA preparation roadmap targeting SDE roles.