

Nirmal Kumar

Dehradun, Uttarakhand, India

☎ +91 9508671771 ✉ singhnirmalkr5@gmail.com [in linkedin.com/in/nirmal-kr-singh-988764267](https://www.linkedin.com/in/nirmal-kr-singh-988764267)

github.com/nirmalkr01 [Portfolio](#)

Education

University of Petroleum and Energy Studies (UPES)

Dehradun, India

Bachelor of Technology in Computer Science (Major: AI & ML)

2022 – 2026

- CGPA: 7.6/10.0

Technical Skills

Languages: Java, Python, C, JavaScript, SQL, Kotlin

Backend Engineering: Node.js, Express.js, FastAPI, REST APIs, Microservices, OAuth 2.0, JWT

Databases: Firestore (NoSQL), MongoDB, MySQL, AWS RDS

DevOps & Cloud: AWS (EC2, S3), Docker, CI/CD Pipelines, Git, Linux, Backblaze B2, Vercel

AI/ML: TensorFlow, PyTorch, YOLOv8, OpenCV, Groq API, Google Cloud Vision

Projects

Code Yantra (EdTech Backend) | *Node.js, Express.js, Firestore*

2025

- Architected a scalable backend for an EdTech platform, designing RESTful APIs to handle **test scheduling** and student performance analytics.
- Optimized Firestore NoSQL schema for high-frequency read/write operations, reducing data retrieval latency for the student dashboard.
- Built a social feed system with real-time synchronization for likes/comments, ensuring high concurrency handling.

Zapis (Secure Automated Contactless Academic Integrity) | *Node.js, Next.js, Python*

2024

- **Patent Secured** for a contactless attendance platform supporting **20,000+ concurrent logins** with 99.9% proxy elimination.
- Designed a 3-layer security architecture utilizing **IP Verification, Geofencing, and Face Recognition** (FastAPI/Python ML) to validate physical presence.
- Optimized infrastructure costs by integrating **Backblaze B2** for storage and AWS for compute, handling high traffic loads efficiently.

Granth (AI-Powered Multi-Modal Platform) | *Next.js 15, FastAPI, Groq, Firebase*

2025

- Developed a conversational AI assistant using **Groq API** and **Google Vision**, enabling multi-modal processing of PDFs, images, and code with sub-second streaming responses.
- Integrated **Google Search API** for real-time information retrieval (RAG) and built intelligent project workspaces with persistent history.
- Designed a responsive UI with Next.js App Router and Tailwind CSS 4, featuring code syntax highlighting and markdown support.

Experience

Software Engineering Intern

Sep 2025 – Present

Indian Institute of Technology (IIT) Roorkee

Roorkee, India

- Developed **LX Plotter Desktop**, a high-performance Kotlin application using **Compose for Desktop** to transform raw hydraulic survey data into professional river profile plots (X-Sections/L-Sections).
- Designed a **Modular Layered Architecture** with an integrated Auto-Update System, leveraging **Gradle** for automated MSI packaging and **Vercel** for high-availability distribution.
- Implemented precision-grade dynamic coordinate mapping and smart partitioning logic to split extensive profiles across multiple PDF pages using **Apache PDFBox**.
- Live Application: [Download Latest MSI Release](#)

Computer Vision Systems Intern

June 2025 – July 2025

Indian Institute of Technology (IIT) Roorkee

Roorkee, India

- Developed **WeedVision**, a real-time edge AI system using **YOLOv8** and **TensorFlow Lite** on Raspberry Pi to detect crops and weeds with high precision.
- Trained deep learning models on a **Supercomputer Environment** using the MFWD dataset, applying advanced data augmentation with **Albumentations**.
- Optimized inference speed via **INT8 quantization** and ONNX conversion, achieving near real-time performance on low-power edge hardware.