

ALOK KUMAR SAHU

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PROFESSIONAL SUMMARY

Results-driven Computer Science undergraduate with a strong foundation in **full-stack development**, **artificial intelligence**, and **cloud infrastructure**. Skilled at delivering end-to-end SaaS products using React, Next.js, Node.js, FastAPI, and Python. Experienced in REST API architecture, relational and NoSQL database systems, real-time protocols (WebSocket, WebRTC), and deploying ML models in production. Adept at leveraging Firebase, Supabase, Docker, and Cloudflare for scalable cloud-native solutions. Eager to contribute to high-impact teams in software engineering, AI/ML, or cloud platform roles.

EDUCATION

Bachelor of Technology (B.Tech) — Computer Science & Engineering 2024 – 2028
Veer Surendra Sai University of Technology (VSSUT), Burla Sambalpur, Odisha

Coursework: Data Structures & Algorithms, Object-Oriented Programming, Database Management Systems, Computer Networks, Operating Systems, Software Engineering, Discrete Mathematics, Linear Algebra

Intermediate (Class XII) — Science, PCM 2021 – 2023
Saraswati Vidya Mandir, Neelakantha Nagar Berhampur, Odisha

Matriculation (Class X) 2008 – 2021
Saraswati Sishu Vidya Mandir, Neelakantha Nagar Berhampur, Odisha

TECHNICAL SKILLS

Languages	Python, JavaScript, TypeScript, C, C++, SQL, HTML5, CSS3, Bash
Frontend	React.js, Next.js 14, Tailwind CSS, Framer Motion, Three.js, React Three Fiber, shadcn/ui, Vite
Backend	Node.js, Express.js, FastAPI, REST APIs, WebSocket, WebRTC, Socket.io
Databases	PostgreSQL, MongoDB, SQLite, Firebase Firestore, Supabase
AI / ML	TensorFlow, ONNX Runtime, XGBoost, Scikit-Learn, LangChain, Groq API, OpenAI API, NLP, Computer Vision
Cloud / DevOps	Google Cloud Platform (GCP), Firebase, Cloudflare Workers & Pages, Docker, CI/CD, Git, GitHub, Linux, Vercel
Tools	VS Code, Figma, Postman, Jupyter Notebook, Alembic, pgAdmin
Concepts	Data Structures & Algorithms, Object-Oriented Programming, System Design, Microservices, Agile, Test-Driven Development

PROJECTS

MediVerse AI — Healthcare Screening Platform 2025

Tech: Next.js 14, FastAPI, Supabase, PostgreSQL, TensorFlow, ONNX, Docker, Cloudflare | [Live Demo](#)

- Architected a full-stack **AI-driven healthcare platform** featuring 6 diagnostic modules that serve active users across multiple screening categories.
- Trained deep learning classifiers for X-ray pathology detection (ResNet/EfficientNet), ECG rhythm analysis (1D-CNN), skin condition recognition (MobileNetV3), and brain tumor MRI segmentation, all optimized with ONNX Runtime for sub-second inference.
- Created a diabetes risk predictor using gradient-boosted trees (XGBoost) alongside a prescription digitization pipeline powered by Tesseract OCR.
- Engineered a symptom analysis module utilizing TF-IDF vectorization coupled with logistic regression to generate clinically structured responses.
- Designed the backend API layer with FastAPI, JWT-based authentication, PostgreSQL via Supabase, and schema migrations through Alembic.
- Containerized services with Docker and hosted on Azure Container Apps with a Cloudflare Pages frontend, maintaining **99.5% uptime**.

TradeSense Pro — Financial Analytics Dashboard 2025

Tech: Next.js 14, Firebase, Cloudflare Workers, Tailwind CSS, Chart.js | [Live Demo](#)

- Launched a **fintech SaaS dashboard** delivering live stock market insights with interactive charting, portfolio management, and technical indicator overlays (RSI, MACD, Bollinger Bands).

- Constructed a serverless API gateway on Cloudflare Workers with KV caching to aggregate data from Alpha Vantage and FMP endpoints while safeguarding credentials on the edge layer.
- Integrated Google Sign-In via Firebase Auth and persisted user watchlists and holdings in Firestore with granular security rules.
- Developed a capital gains calculator supporting STCG/LTCG tax brackets and brokerage fee estimation for Indian equity markets.
- Crafted a cinematic glassmorphism interface with scroll-triggered animations using Framer Motion, fully responsive across desktop and mobile viewports.

SmartChat X v5.0 — Multi-Protocol Communication System

2024 – 2025

Tech: React 18, FastAPI, WebSocket, WebRTC, Groq API, SQLite, Tailwind CSS | [Live Demo](#)

- Designed a real-time messaging platform with TCP/UDP/WebSocket multi-protocol routing and AI-assisted protocol selection for optimal latency.
- Enabled peer-to-peer video conferencing through WebRTC with screen sharing at 1080p/30fps, ICE candidate negotiation, and NAT traversal via STUN servers.
- Incorporated LLM capabilities (Groq — Llama 3.3 70B) for conversational AI assistance, smart reply generation, toxicity filtering, message summarization, and multilingual translation.
- Secured private channels with encrypted storage, token-based access control, and robust session lifecycle management.
- Leveraged WebRTC DataChannels for direct browser-to-browser data transfer, bypassing server hops to minimize round-trip latency.

Personal Portfolio — 3D Interactive Website

2024 – 2025

Tech: React, Three.js, React Three Fiber, Framer Motion, Node.js, Groq API | [Live Demo](#)

- Shipped a 3D portfolio site with particle systems rendered via React Three Fiber, scroll-driven animations, and a glassmorphism visual language.
- Integrated an AI chatbot backed by a structured knowledge graph with intent classification and subgraph extraction, cutting token consumption by over 70x.
- Optimized load performance through lazy-loaded 3D scenes, adaptive device pixel ratio, and edge-cached responses for seamless mobile browsing.

ACHIEVEMENTS & CERTIFICATIONS

- **Google Cloud Arcade Champion (2024)** — Cleared advanced cloud engineering labs spanning GCP infrastructure provisioning, Kubernetes orchestration, and BigQuery analytics.
- **Open-Source Contributor** — Submitted pull requests, performed code reviews, and resolved issues across multiple community repositories on GitHub.
- Deployed and maintained **4 custom-domain applications** in production, each serving real users with consistent **99%+ availability**.

EXTRACURRICULAR ACTIVITIES

- Active participant in VSSUT Burla's technology community; competed in hackathons, algorithmic programming contests, and technical workshops.
- Curates a GitHub profile with **15+ repositories** covering full-stack applications, machine learning experiments, and DevOps automation scripts.
- Self-motivated learner currently exploring AI agent frameworks, retrieval-augmented generation (RAG) pipelines, and cloud-native distributed architectures.