Saurav Kumar

LinkedIn — GitHub — Portfolio

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Education

- **Indian Institute of Technology, Mandi** 2023 – 2027
  B.Tech in Bioengineering; CGPA: 8.02/10 *Mandi, HP*
  - **Relevant Coursework**: Data Structures & Algorithms, Machine Learning, Computing and Data Science, Probability and Statistics

Experience

- **HIMPACT LAB, IIT Mandi** Aug 2024 – Dec 2024
  Frontend Developer (Intern) *Mandi, HP*
  - **Initial UI Development**: Architected and developed the first production-ready UI for **Incline**, leveraging Django templates, HTML/CSS, and vanilla JS. Delivered responsive layouts for cross-device compatibility.
  - **Backend Integration**: Set up Django backend to serve Leaflet.js-based interactive maps; displayed real-time server-side plots and developed endpoints that responded to map clicks for dynamic location data retrieval.
  - **Project Handoff**: Contributed to the first production-ready version before handing over to a new developer; current site available at incline.iitmandi.ac.in.

Technical Skills

- **Languages**: Python, C++, JavaScript, Perl
- **Frameworks**: React,ROS, TensorFlow, Django, Streamlit
- **Tools**: Git, Linux, Docker, SolidWorks, Raspberry Pi, Arduino
- **Concepts**: Sensor Fusion, Kalman Filtering, Data Preprocessing, Control Systems

Projects

- **AquaSweep – Underwater Rover with Edge and Motion Detection** GitHub
  Python, OpenCV, Flask, ROS, Arduino, Raspberry Pi *Jan 2025 – Jun 2025*
  - **Live Streaming + UI**: Built MJPEG-based camera pipeline delivering 20 FPS video stream over LAN with 200ms latency using Flask sockets. Enabled stable operator feedback in underwater environments.
  - **Edge AI for Algae Detection**: Implemented modular OpenCV pipelines with edge, motion, and algae detection; achieved ˜93% accuracy in lab tests. Activated modes via keyboard shortcuts.
  - **Depth Stabilization System**: Controlled 8 thrusters via ROS–Arduino communication layer. Fused IMU and Bar30 depth sensor with Kalman filter for autonomous depth holding (error margin: ±3cm).
- **Vaya – Your Local Healthcare Connection** GitHub
  Python, Django, Django Channels, Groq API (Llama3), RAG *Aug 2025 – Present*
  - **Full-stack Healthcare Platform**: Architected and developed a full-stack platform for doctor discovery, appointment booking, and digital report management. Enabled secure authentication for patients and doctors.
  - **AI-Powered RAG System**: Engineered a two-step RAG pipeline to ground AI recommendations in live database data. The system prevents hallucinations by retrieving approved doctors and their IDs from the database before passing them to the AI for final recommendation.
  - **Real-time Communication**: Built a real-time, persistent chat feature using Django Channels. Enabled secure, live messaging between patients and doctors for specific appointments.
- **Maze Solver – Interactive AI Pathfinding Visualizer** GitHub
  Python, Django, BFS/DFS/A/Dijkstra, Reinforcement Learning, Docker* *Jul 2025*
  - **AI-Augmented Pathfinding**: Implemented interactive visualizations for BFS, DFS, A*, Dijkstra, and IDDFS; added live traversal animations with path cost and visited node tracking.
  - **Deployment + CI/CD**: Deployed via Docker and Render with GitHub Actions-based auto-deployment. Live at mazesolver.
  - **RL Agent Integration**: Trained Q-Learning and DQN agents on custom grid environments; integrated into UI as auto-solvers with visual feedback and reward trajectory plots.
  - **GNN-Based Solver**: Built GNN module using PyTorch Geometric to solve complex graphs with dynamic obstacles and sparse feedback; achieved 80%+ success rate in test set.

Leadership & Achievements

- Hospitality Head, Exodia: Led 30-member team for IIT Mandi's cultural fest; managed 1000+ attendees and logistics.
- Robotics Club, IIT Mandi: Mentored juniors in robotics design, automation; contributed to project builds and contests.
- Selected for semester exchange program (TU Darmstadt) on the basis of merit in a batch of 450+ students.
- Secured Top 5 rank in Arduino Hackathon during intra-college techfest.