

Saurav Kumar

LinkedIn — GitHub — Portfolio

sksingh95700@gmail.com

+91 9798490095

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)
 - **Initial UI Development:** Architected and developed the first production-ready UI for **Inlicne**, 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: ± 3 cm).
- **AI Medical Chatbot – Multimodal Patient Assistant** GitHub
Python, Django, Gradio, Whisper, OpenCV, GROQ API, TTS/STT Jun 2025
 - **Multimodal Interaction:** Developed an AI medical chatbot that accepts both voice and image input. Used Whisper STT for transcription and OpenCV for visual diagnostics; achieved <1s median response time.
 - **LLM Integration + Output Management:** Integrated GROQ-hosted LLaMA-3/4 to provide real-time diagnosis suggestions; enabled token streaming and exportable chat summaries (PDF format).
 - **Knowledge-Augmented Retrieval:** Designed RAG architecture with LangChain and ChromaDB to ground responses in domain-specific datasets. Integration underway.
- **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-5b66.onrender.com.
 - **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.