

Shlok Mehndiratta

BS in Electrical Engineering and Computer Science, IISER Bhopal

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EDUCATION

Indian Institute of Science Education and Research Bhopal (IISER Bhopal) <i>Bachelor of Science in Electrical Engineering and Computer Science (EECS)</i> • CPI: 8.87/10 (3.55/4)	Bhopal, India Aug 2023 – Present
Central Board of Secondary Education (CBSE) <i>Grade XII: 95.8% Grade X: 96.8%</i>	Roorkee, India 2021 – 2023

RESEARCH EXPERIENCE

Vision-Based Autonomous Navigation and Swarm Coordination <i>Undergraduate Research Student Advisor: Dr. P. B. Sujit</i>	<i>MOON Lab, IISER Bhopal</i> May 2026 – Present
- Implemented spherical coordinate-based vision planning with extensions for moving target tracking and dynamic obstacle avoidance for MAVs, validating algorithms on ROS 2 simulation environment. - Concurrently assembling drone systems integrating flight controller, RC receiver, and telemetry modules; configuring and integrating OptiTrack mocap system with ROS for high-precision indoor localization during algorithm testing and validation. - Progressing toward multi-agent coordination: investigating decentralized swarm algorithms for cooperative coverage and autonomous missions.	
Learning Visual Contact Estimation from Photorealistic Synthetic Data <i>Research Intern Advisor: Dr. Spandan Roy</i>	<i>RRC, IIIT Hyderabad</i> April 2026 – Present
- Building high-fidelity synthetic data engine generating paired multi-view RGB images, segmentation masks, and 3D contact/SDF supervision using GPU-accelerated physics (NVIDIA Warp) and photorealistic rendering (BlenderProc). - Training vision-conditioned neural models (ResNet/UNet/PointNet) to predict 3D contact distributions from camera images, leveraging synthetic supervision for downstream grasp generation and real-robot policy transfer on 16-DoF LEAP Hand platforms. - Targeting paper submission on learning-based contact prediction from visual data to top-tier robotics venues; scaling dataset generation across multi-GPU clusters for large-scale synthetic scene diversity.	
Perception-Aware Altitude Optimization for Aerial-Ground Tracking <i>Undergraduate Research Student Advisor: Dr. Arijit Sen</i>	<i>IISER Bhopal</i> Sept 2025 – July 2026
- Developed closed-form altitude scheduling policy for UAV-UGV cooperative tracking by formalizing the altitude-coverage-resolution coupling; built belief-space MPC controller and event-triggered aerial planner achieving 25× compute reduction while maintaining estimation quality. - Constructed complete ROS 2/Gazebo testbed with unified logging protocol to validate theoretical predictions on sensor noise scaling, altitude optimality, and event-triggered performance across variable terrain curvature.	

PUBLICATIONS

COAST: Altitude as a Coupled Perception Variable in Shared-Camera Aerial-Ground Tracking S. Mehndiratta, D. Sood, P. Gupta, A. Banerjee, A. Sen Derived a closed-form altitude policy for shared-camera UAV-UGV tracking, where altitude trades off localization noise ($\propto z^2$) against lane coverage. Validated in ROS 2/Gazebo; event-triggered planning cut aerial computation by 25× at matched estimation quality.	<i>[ACODS 2026 Accepted (presenting Dec 2026)]</i>
Multi-Robot Area Balancing in the Presence of Discrete Local Communication S. Tantravahi, N. Jaiswal, S. Mehndiratta, J. Leitner, A. Paranjape, P. B. Sujit Developed a decentralized area-balancing algorithm for drone swarms under opportunistic local communication, alternating greedy and altruistic rules for fast convergence. Validated in 35+ Crazyflie flights (3–5 drones) and Gazebo/SITL wildfire missions.	<i>[Submitted to ICRA 2027]</i>

OPEN SOURCE CONTRIBUTIONS

ros2.control: ROS 2 Control Framework

[PRs](#) | [Issues](#)

- Improved real-time safety and reliability: migrated controller manager lock to RT-safe priority-inheritance mutex to prevent timing delays in the control loop; implemented dynamic command toggling for testing hardware communication failures.
- Enhanced debugging and testing: added comprehensive exception-handling tests ensuring plugin failures do not cascade; improved error messages to identify which hardware component failed, reducing diagnosis time.
- Modernized framework: refactored deprecated parameter APIs across the ecosystem, eliminating technical debt and preventing future API breakage.

TECHNICAL SKILLS

Programming Languages: Python, C++, MATLAB, Verilog, Assembly

Robotics & Simulation: ROS2, Gazebo, NVIDIA Isaac Sim, Model Predictive Control, Extended Kalman Filter

Computer Vision & ML: PyTorch, TensorFlow, OpenCV, SLAM, Reinforcement Learning

Data & ML Libraries: NumPy, Pandas, scikit-learn

Systems & Deployment: Git/GitHub, Linux/Bash, Docker, FastAPI, L^AT_EX

ADDITIONAL PROJECTS

AI-Powered Contract Review & Negotiation Assistant | *Infosys Springboard Virtual Internship*

[\[GitHub\]](#)

- Built end-to-end LLM-based contract analysis application with FastAPI backend, Flutter cross-platform frontend, and Docker containerization; developed full-stack AI solution for legal document processing and automated negotiation assistance.

CS50's Web Programming with Python and JavaScript | *Harvard University*

[\[Project Demos\]](#)

- Built full-stack web applications including a single-page email client, a Twitter-like social network, and an eBay-style auction platform using Django, JavaScript, and SQL.

CO-CURRICULAR ACTIVITIES

Computing and Networking Council, IISER Bhopal

Aug 2024 – April 2026

Vice Secretary (Aug 2024 – Sept 2025), Technical Head for Techno-Cult Festival 2025

- Founded EECS Club and organized 10+ workshops on ROS, ML, and embedded systems; managed infrastructure and technical events for 1,500+ participant techno-cultural festival.

Google Developer Group, IISER Bhopal

Aug 2024 – Aug 2025

Web Development Lead

- Directed campus platform development and mentored students in software engineering practices and collaborative development.

Student Placement Representative

IISER Bhopal

EECS Department

Interests: Lawn Tennis, Cricket, Guitar

RESEARCH INTERESTS

Autonomous robotics and intelligent systems. Combining classical control with learning methods for real-world deployment. Multi-modal perception, robot control, and multi-agent coordination.