

Amogh S. Joshi

Graduate Research Assistant • Center for Co-Design of Cognitive Systems (CoCoSys)

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🌐 <https://amoghj98.github.io/>

Education

PhD in Electrical Engineering

GPA: 3.82/4

B.Tech in Electronics Engineering

Graduated Top of Class GPA: 9.34/10

Purdue University

2021-present

University of Mumbai

2016-2020

Research/Teaching/Work Experience

Graduate Research Assistant, Purdue University

May 22-present

- Designed an LLM agent to determine maneuver feasibility, and a real-time neuromorphic navigation stack to execute maneuvers deemed to be feasible.
- Developed a framework for using task-specific human intuition to accelerate RL training and enhance explainability, achieving up to 78% and 76% sample efficiency and training time gains, respectively, over the baseline.
- Developed an automatic synthetic dataset generation pipeline for a **first-of-its-kind** aerial navigation dataset. Dataset contains temporally dense and richly annotated ground truth for depth, optical flow, and ego-motion at data rates between 2x and 5x the state of the art across modalities.
- Designed and deployed a real-time, online neuromorphic planning and control framework on a quadrotor. Video available here: youtu.be/9Gnjpb1k2Lo

Graduate Teaching Assistant, Purdue University

Aug 21-May 22

- Mentored a group of 120+ undergraduate students. Delivered 4 weekly lectures on Calculus

Project Research Assistant, Indian Institute of Technology, Bombay

Jan 21-Aug 21

- Designed a complete sensory avionics suite for a medium-weight class UAV with automatic docking capabilities. Published research on automatic sizing and design of a mini-aerostat system. Supervised two interns.

Undergraduate Thesis, University of Mumbai

Aug 19-May 20

- Designed a stabilisation system using active propulsion to maintain safe flight characteristics for an aerostat.

Undergraduate Researcher, Indian Institute of Technology, Bombay

May 19-Aug 19

- Designed an autonomous safety system to deflate an aerostat in case of emergency. Measured endurance of 15-16 days, 1.5x state of the art. Project won Gold Medal at IIT-Bombay TechConnect 2019

Publications

Amogh Joshi, Sourav Sanyal, Kaushik Roy: "Neuro-LIFT: A Neuromorphic, LLM-based Interactive Framework for Autonomous Drone Flight at the Edge", 2025 International Joint Conference on Neural Networks (IJCNN) DOI: <https://doi.org/10.48550/arXiv.2501.19259>

Amogh Joshi, Adarsh Kosta, Kaushik Roy, "SHIRE: Enhancing Sample Efficiency using Human Intuition in REinforcement Learning", accepted in the 2025 International Conference on Robotics and Automation (ICRA) DOI: <https://arxiv.org/abs/2409.09990>

Amogh Joshi, Adarsh Kosta, Wachirawit Ponghiran, Manish Nagaraj, Kaushik Roy, "FEDORA: Flying Event Dataset fOr Reactive behAvior", 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) DOI: <https://ieeexplore.ieee.org/document/10801807>

Amogh Joshi, Sourav Sanyal, Kaushik Roy, "Real-Time Neuromorphic Navigation: Integrating Event-Based Vision and Physics-Driven Planning on a Parrot Bebop2 Quadrotor", 2024 40th Anniversary of the IEEE Conference on Robotics and Automation (ICRA@40) DOI: <https://doi.org/10.48550/arXiv.2407.00931>

Saurabh V. Bagare, **Amogh S. Joshi**, and Rajkumar S. Pant, "A Methodology for Sizing of a Mini-Aerostat System", AIAA Aviation Forum 2021, Analytical Studies, Modeling, and Simulation of Lighter-Than-Air Systems Session, August 2021. DOI: <https://doi.org/10.2514/6.2021-2986>

Technical Skills

Areas of Expertise: Event-based Vision, Reinforcement Learning, Deep Learning, Autonomous Robotics

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

Hardware Description Languages and FPGA: VHDL, Verilog, SystemVerilog, RTL Design and Verification

Software and Tools: Pytorch, OpenCV, Stable Baselines3, Gazebo sim, Robot Operating System (ROS)