

RAHUL RUSTAGI

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EDUCATION

Georgia Institute of Technology

Master of Science (Thesis) in Electrical and Computer Engineering

Atlanta, GA

Specialisation in: Systems and Controls

Aug. 2024 – May 2026

Indian Institute of Technology, Kanpur

GPA: 9.2/10

Bachelor of Technology in Aerospace Engineering

Uttar Pradesh, India

With Minors in: Machine Learning, Computer Systems, English Literature

Aug. 2020 – May 2024

PUBLICATIONS

1. C. Prachand, R. Rustagi, R. Shankar, J. Singh, A. Abhishek, K.S. Venkatesh, "Vision-Based Autonomous Ship Deck landing of an Unmanned Aerial Vehicle using Fractal ArUco markers", 2025 AIAA SciTech Forum (Under Review)
2. A. Singh, R. Rustagi, R. M. Hegde, "Lifetime Improvement in Rechargeable Mobile IoT Networks Using Deep Reinforcement Learning," in IEEE Transactions on Circuits and Systems II: Express Briefs, doi: 10.1109/TCSII.2024.3370686
3. A. Singh, R. Rustagi, S. Redhu, R. M. Hegde, "Mobile Energy Transmitter Scheduling in Energy Harvesting IoT Networks using Deep Reinforcement Learning," 2022 IEEE 8th World Forum on Internet of Things, pp. 1-6, doi: 10.1109/WF-IoT54382.2022.10152078

RESEARCH EXPERIENCE

Project Staff Associate | Helicopter and VTOL Laboratory

May 2024 – Jul 2024

Role: Optimisation and Machine Learning - Guide: Dr. Abhishek, Indian Institute of Technology Kanpur, India

- Working on predicting optimal time for landing of Unmanned Aerial Vehicle (UAV) on oscillating platform
- Implemented Kalman Filter for estimating the attitude of the platform and verified using motion capture
- Worked with Fractal Fiducial Markers and implemented vision-guided control in PX4 autopilot firmware

Visiting Robotics Researcher | MITACS GRI

May 2023 – Jul 2024

Role: Navigation and Vision-Based Guidance - Guide: Dr. Chao Shen, Carleton University Ottawa, ON

- Integrated Robot Vision to improve the AMCL pose estimate of robot in a dynamic indoor environment
- Assembled rplidar and Orbbec RGBD Camera on ground robot to detect features and performed SLAM
- Employed Camera pose estimate from detected static AprilTag markers to rectify AMCL estimated pose

Research Assistant | WSN and IoT Laboratory

May 2021 – Dec 2021

Role: Reinforcement Learning - Guide: Dr. Rajesh Hegde, Indian Institute of Technology Kanpur, India

- Worked on predicting generation of energy holes in a low powered Internet of Things (IoT) network
- Formulated the problem as a Markov Decision Process and simulated using OpenAI-gym environment
- Devised an optimal reward function and trained benchmark Deep Reinforcement Learning algorithms
- Trained the TD3-PG algorithm to perform better in comparison to DDPG and SAC Deep RL algorithms

KEY PROJECTS

MAV Swarm Formation Challenge | Drona Aviation


🐙 github/interiit11

Skills Acquired: C++, Embedded Programming, OpenCV, Ground Station Communication

May 2024 – Jul 2024

- Presented a Swarm Pattern Formation with 4 Pluto 1.2 Micro Aerial Vehicles using a visual feedback
- Implemented multi-threading to run multiple instances of Position Controller to enable Swarm Control
- Employed deadlocking between threads of controller ensuring synchronous coordination between UAVs
- Reduced latency by 50% by implementing video capture and detection from sequential to parallel tasks

Multi-Payload Delivery Challenge using UAV | Flipkart GRID 4.0

 [github/shastra23](#)


Skills Acquired: ROS, QGroundControl, PX4, OpenCV, Arduino IDE

Nov 2023 – Jan 2023

- Operated an UAV to follow an Autonomous pipeline for pickup-drop service of payloads placed in a field
- Implemented the pipeline using msm in Boost library and conducted Grid-Search of payloads using QGc
- Handled detection of payload using OpenCV and implemented a pose estimation algorithm in C++
- Setup an electromagnet as actuator and programmed Arduino UNO for autonomous pickup of payloads

POSITION OF RESPONSIBILITIES

Team Lead at Aerial Robotics, IIT Kanpur

 [github/aerial](#)

Faculty Advisor: Dr. Twinkle Tripathy, Indian Institute of Technology, Kanpur

May 2022 – Jul 2023

- Working on predicting optimal time for landing of Unmanned Aerial Vehicle (UAV) on oscillating platform
- Implemented Kalman Filter for estimating the attitude of the platform and verified using motion capture
- Worked with Fractal Fiducial Markers and implemented vision-guided control in PX4 autopilot firmware

TECHNICAL SKILLS

Robotics: ROS, Gazebo, OpenCV, RViZ, QGroundControl, PX4, MAVROS, MAVLink

Programming: C/C++, Python, MATLAB, Java

Frameworks: Arduino IDE, LabVIEW, MicroCap, TensorFlow, PyTorch

Developer Tools & Utilities: Git, Bash, Docker, Visual Studio, PyCharm, Qt5, L^AT_EX

AWARDS, GRANTS AND SCHOLARSHIPS

- Won Bronze Medal in Drona Aviation Challenge at Inter IIT Tech Meet 11.0 conducted by IIT Kanpur in 2023
- Won Silver Medal in Silicon Labs Challenge at Inter IIT Tech Meet 10.0 conducted by IIT Kharagpur in 2022
- Awarded Academic Excellence Award by IIT Kanpur for exceptional performance in 2020, 21, 22 academic year
- Received 100% Scholarship in 2020 for Honors in Math & Comp. Science at Chennai Mathematical Institute, India
- Received MITACS GRI 2023 research grant which is awarded to top 1% of students that apply globally
- Received the INSPIRE Scholarship in 2020 awarded to top 1% scorers in Higher Secondary Examination

VOLUNTEER WORK

Student Guide and Academic Mentor

May 2024 – Jul 2024

Undergraduate Counseling Service, Indian Institute of Technology, Kanpur

UP, India

- Conducted and helped in the Orientation Programme for the undergraduate fresher batch of 2021
- Helped a group of six students adjust to campus environment providing any assistance they may require
- Assisted with and Organised multiple group activities for social gathering and interaction

COURSEWORK

Machine Learning: Introduction to Machine Learning, Probabilistic Machine Learning, Introduction to Reinforcement Learning

Controls: Aircraft Control Systems, Modern Controls, Optimal Space Flight Control

Systems: Embedded and Cyber Physical Systems, Software Development and Operations, Data Structures and Algorithms, Computer Networks