

ADITYA RAUNIYAR

Active Perception • Robot Planning • Multi-Agent Systems

<https://adityarauniyar.com>

Education

Carnegie Mellon University, School of Computer Science, Pittsburgh

Aug 2022 – Aug 2024

Master of Science in Robotics (MSR)

GPA: 4.0*/4.0

Coursework: Visual Learning, Robot Learning, Multi-Robot Coordination & Planning, Computer Vision.

SRM Institute of Science and Technology, Chennai

Jan 2020

B.Tech - Mechanical Engineering

GPA: 90.95%

Coursework: Virtual Reality, Path Planning, Robotics Engineering, Mechatronics

Technical Skills

Concepts: Algorithm Design, Software Design, Multi-Agent Systems, Machine Learning, Computer Vision, Robot Planning

Languages/Database: C++, Python (Numpy, PyTorch), CUDA, WanDB, Docker, Ansible, ROS, ROS2, DDS, Linux.

Software & Tools: Isaac Sim, Rviz, Gazebo, Blender, Unreal Engine, Simulink, Solidworks.

Research Experience

AART Lab, CMU

Aug 2023 – Present(5m)

Graduate Researcher under [Prof. Katia Sycara](#)

CMU, Pittsburgh

- Developed **simulation environment** with UAVs, Ships, and Debris, towards a collaborative AI solution.
- Developed **Active Vision** using uncertainty estimation for UAVs to navigate in unknown, outdoor environments with prior understanding of scene.

Air Lab, CMU

Aug 2022 – Present(17m)

Graduate Researcher under [Prof. Sebastian Scherer](#)

CMU, Pittsburgh

- Part of a larger collaborative project with PIs: [Prof. Scherer](#), [Prof. Kris Kitani](#), [Prof. Isher](#), [Prof. Hyun Soo Park](#)
- Developed conflict resolution strategies that achieves **46% reduction of inter-robot collisions**, and single agent view search that is **72x computationally superior**
- Developed multi-drone tracking and view planning for reconstructing multiple moving targets, achieving upto **25% better occlusion-aware perception of robots** than state-of-the-art methods that **leverages GPUs vs CPUs**
- System Engineered 3 Drones geometrically tracking 3 moving targets in-the-wild.**
- Field Test Coordination:** Organized and executed weekly experiments involving multiple collaborators, showcasing effective teamwork and dedication to translating ideas into real-world applications.
- Research funded by **ONR, DARPA, NSF Grant**. Presentations to NSF Foundational Research in Robotics (FRR).

IIT Madras

Dec 2018

Research Assistant under [Prof. Krishnan Balasubramanian](#)

Chennai, India

- Generated a fault map of toxic pipelines and provide analytics for required metrics (cracks and bends) using a non-destructive testing robotic system.

Bhabha Atomic Research Centre.

May 2018 - Nov 2018(7m)

Research Assistant under [Prof. Debanik Roy](#)

Chennai, India

- Developed a novel test setup of **multi-link Flexible Robotic Systems (FRS)** for bedridden patient assistance.
- Presented the accepted paper at the 2018 IEEE ICCIC, which received the track's **best paper award**

Honors & Awards

Best Project Award: Active Vision for Next Best View Planning in 16824 VLR Course at CMU.

Best Project Award: Collaborative MeWBots from batch of 2019 within the Department, SRM IST

Best Paper Award : Track No. 3 at IEEE ICCIC 2018 for the publication mentioned above

(UG) Full-Ride Scholarship : Recipient of USD40,000 full-ride scholarship to pursue undergraduate degree.

COMPEX Scholarship Test : Rank 1 out of 12,000 applicants for merit-based scholarship towards B.tech.

Industry Experience

Vimana (Venture funded startup) HQ: Berkeley, California

April 2020 – July 2022(29m)

Software Engineer (Teams: Edge Computing, Cloud Computing)

Remote

- **98% improved CPU usage** for OS apps through thread optimization and efficient nested hash implementation.
- Developed library that made **36% reduction of code repeatability and 75% better traffic management**.
- Featured **informative talks on edge computing**, enhancing cross-functional team performance.
- Skills: Operating Systems, Computer Networks, Cloud Computing, DS&Algo, Software design, Test Driven Dev (TDD)

Publications

Active vision for view gathering in large scenes.

March 2024 (In Preparation)

- Authors: **Rauniyar***, **Aditya** and Alama*, Omar and Sycara, Katia and Scherer, Sebastian
- European Conference on Computer Vision (ECCV) 2024

Coordinated Capture with multi-drone operations

Dec 2023 (In Preparation)

- Authors: **Rauniyar**, **Aditya** and Suresh, Krishna and Hou, Yuechuan and Corah, Micah and Scherer, Sebastian
- IEEE Robotics and Automation Letters (RA-L)

Greedy Perspectives: Multi-Drone View Planning for Collaborative Coverage. | [Link](#)

2024 (Submitted)

- Authors: Suresh, Krishna and **Rauniyar**, **Aditya** and Corah, Micah and Scherer, Sebastian
- Under Review at Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)
- Short version presented at IROS 2023 Workshop on [IPPC](#)

Enhancing Multi-Drone Coordination for Filming Group Behaviours in Dynamic Environments

Oct 2023

- Authors: **Rauniyar**, **Aditya** and Li, Jiaoyang and Scherer, Sebastian
- Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) Workshop on Multi-Agent Learning

MeWBots: Decentralized Collaborative Manipulation in a Clustered Space. | [Publication link](#)

March 2021

- Authors: **Aditya Rauniyar**, Hem Chandra Upreti, Aman Mishra, Dr. S. Prabhu.
- Springer: Journal of Intelligent & Robotic Systems volume 102, Article number: 3 (2021)

Design Model for the Test Set-Up of a Novel Flexible Robotic System. | [Publication link](#)

Aug 2019

- Authors: **Aditya Rauniyar**, Dr. Debanik Roy, Pankaj Pandit, Vinod Atpadkar.
- 2018 IEEE International Conference on Computational Intelligence and Computing research (ICCIC)

Projects

Informative Multi-Drone View Planning for Collaborative Coverage | C++, CUDA

June 2023 – present

- Developed methods for submodular maximization to optimize camera views across teams of aerial robots for large-scale filming of dynamic groups of people in complex environments.
- Addressing inter-robot collision and environment view occlusions, and developed a dynamic-multi-target view planner.

Active Vision for Next Best View Planning | Python, Torch

June 2023 – present

- Developing uncertainty driven view planning approach that uses prior experiences of navigating outdoor scenes
- Developed a novel training approach called, “cutscene augmentation” that reduces dataset size by 30% and increase pred accuracy by 20%

Dynamic Multi-Agent Multi-target Task Assignment and Planning | Python, [Git](#)

Jan 2023 – May 2023

- Conflict-Based Multi-Agent Path Finding (MAPF) algorithm for collision-free paths in multi-camera filming scenarios.
- Extension for actor-specific requirements. Demonstrated effectiveness through experiments in simulated environments.

Unified Graph Algorithms | C++, [Git](#)

June 2021 – July 2021

- Implemented and rigorously tested graph-related algorithms, including Kruskal, Prim, Floyd Warshall, BFS, DFS, negative cycle detection, Dijkstra, A*, and more.
- Ensured comprehensive problem statement documentation for each algorithm, specifying input parameters, constraints, and output types, while actively encouraging bug reporting for continuous refinement.

Collaborative MeWBots in obstacle-clustered Environment | C

July 2018 – Jan 2020

- Led a 3-member team in developing Collaborative MeWBots for obstacle-clustered environments, overseeing full-stack engineering from design to testing.
- Implemented coordination algorithm enabling multi-robot collaboration in transporting objects.

Online Courses

Data Structures and Algorithms Specialization: University of California San Diego (Coursera)

Robotics Specialization: University of Pennsylvania (Coursera)

Front End Development: The Hong Kong University of Science and Technology (Coursera)

Mentorships

Krishna Suresh: Robotics Institute of Summer Scholar(RISS) 2023 Intern. Worked together towards **ICRA** publication over summer 2023.

Hannah Noh: Undergraduate Student conducting independent research study in Spring 2024.

Angie Bu: Undergraduate student preparing towards part 107 pilot license.

Services

Reviewer: IEEE International Conference on Robotics and Automation (ICRA) 2023 - Present

Flight trainer Actively training new members towards their first drone piloting at Air Lab.

Workshop Host: 2nd International Conference on Advances in Mechanical Engineering at SRM IST

Relief Volunteer: Earthquake relief volunteering in Nepal

Entrepreneurship Experience

Pixel AI (Stage: Ideation)

Aug 2023 – Present

Founder

Swartz Center for Entrepreneurship, CMU

- * Revolutionizing construction industry with robotics and AI towards seamless integration of various subdomains.
- * Conducted Market Survey to find value proposition under common platform for Contractors/Architects/Construction Manager to realtime building status with digital twin representation.
- * Selected for Project Olympus Customer Discovery kick-start program

Leadership and Competitions

World Robot Olympiad(WRO)

2018 and 2019

S.T.A.R. Robotics at SRM IST

Chennai, India

- * **Co-founded** the team S.T.A.R Robotics to take part in WRO 2018. Total team size of 14 members
- * **Led** the Design, Simulation and Testing of the fully autonomous Two-link Articulated Arm Mobile Delta Robot in '18
- * Secured **Bronze Medal** Nationally(India) in WRO'18.

Asia-Pacific Robot Contest (ABU Robocon)

2017 and 2018

SRM Team Robocon at SRM IST

Chennai, India

- * **Led** the Design, Control, and Testing of a Frisbee launching mobile robot with controlled landing of Frisbee in 2017
- * **Top 15 finish out of 150+ teams** from all over the country in ABU Robocon 2017.
- * **Led** 4 member sub team towards Mathworks Robocon Simulation Competition in 2018.

Licences

FAA Part 107 Certified Pilot

Jan 2023

Federal Aviation Administration

CPR/AED

Jul 2023 - Jul 2025

American Heart Association

Credential ID 236028626830

Extracurricular Activities

Mountain Treks: Trekked Himalaya Annapurna Base Camp in May 2023. Duration: 7d. Altitude: 4300m

Soccer: Graduate-Student Assembly CMU Soccer league champions 2023, Team's top scorer, Position: Striker.

Cycling: Intermediate on Mountain and Road Biking, Participant of BikePGH 40miles.

Cricket Represented Home Country(Nepal) Internationally in U19 leagues. Played w/ India(L) and Kuwait(W)

Other: Poker, table tennis, 8 ball pool, bouldering.