

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: *Learning for 3D Vision, Visual Learning & Recognition, Robot Learning, Multi-Robot Coordination & Planning*

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

Advanced Agent – Robotics Technology Lab, CMU

Aug 2023 – Present (9m)

Graduate Researcher under *Prof. Katia Sycara*

CMU, Pittsburgh

- Developing **vision-language view planning framework using GPT-4-Vision** for robot's scene understanding.
- Improving pre-trained models for **view synthesis** in large outdoor scenes using an innovative augmentation approach.

Air Lab, CMU

Aug 2022 – Present (21m)

Graduate Researcher under *Prof. Sebastian Scherer*

CMU, Pittsburgh

- Designed view conflict resolution algo that achieves **46% reduction of inter-robot collisions**, and single agent view search that is **72x computationally superior** than the value iteration MDP solver.
- Developed multi-drone multi-target tracking for target 4D reconstruction, achieving upto **25% better occlusion-aware perception for robots** that leverages **GPUs against CPUs** than state-of-the-art formation planning.
- **System Engineered 3 Drones** to geometrically track 3 moving persons in-the-wild using RTK GPS connection.
- **Field Robotics:** Led weekly experiments with 6 collaborators, showcasing effective teamwork and problem-solving.

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.