Pranay Gupta

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Education

Carnegie Mellon University — Pittsburgh, PA
Ph.D. in Robotics, GPA: 4.05/4 — *Aug. 2024 – Present*
MS by Research in Robotics, GPA: 4.05/4 — *Aug. 2022 – Aug. 2024*

International Institute of Information Technology — Hyderabad, India
Bachelor and Master of Science in Computer Science, GPA ; 8.03/10 — *Aug. 2016 – Jul 2021*

Research Interests

Policy Adaptation, Robot Learning, Human Robot Interaction, Assistive/Autonomous Driving

Academic Research Experience

Ph.D. Student — Aug 2024 – Present
The Robotics Institute, CMU, Advised by Prof. Henny Admoni — *Pittsburgh, PA*

- Developed runtime observation intervention approach for policy adaptation using functional correspondences.
- Achieved 48% improvement in OOD environments over Diffusion Policy across two real-world manipulation tasks using the Franka Research 3 platform. [**CoRL 2025**, paper, project-page, *Pytorch, Mujoco, Polymetis*]

Graduate Research Assistant — Oct 2022 – Aug 2024
The Robotics Institute, CMU, Advised by Profs. Henny Admoni and David Held — *Pittsburgh, PA*

- Devised a novel approach for driver's Situational Awareness Estimation (SA) using their eye-gaze and the scene context. [**CoRL 2024.**, paper, project-page, code, *Pytorch, CARLA*]
- Curated a novel dataset and designed a counterfactual reasoning based approach to identify important objects in driving scenarios. [**IEEE RA-L, ICRA 2025**. paper, project-page, code, *Pytorch, CARLA*]

Undergraduate Research Assistant — June 2018 – June 2021
Center for Visual Information Technology(CVIT), IIIT-H — *Hyderabad, Telengana*

- Curated the largest into-the-wild and out-of-context skeleton-action recognition dataset; Benchmarked it on SOTA skeleton-action recognition approaches [**IJCV 2021**, paper, project-page, code, *Pytorch, Openpose*]
- Devised a VAE backed approach for learning syntactically aware embeddings for zero shot skeleton action recognition, achieving SOTA on NTU-60 and 120 datasets. [**IEEE ICIP 2021**, paper, project-page, code, *Pytorch*]

Industry Research Experience

Research Intern — May 2025 – Aug 2025
Toyota Research Institute — *Cambridge, MA*

- Devised a novel LLM backed, interactive querying protocol for extracting Layered Situational Awareness from free-form natural language scene descriptions provided by human drivers [**IEEE IV 2026**, *Pytorch, HuggingFace, Qwen LLMs, Human Subjects Study,*]

Predoctoral Apprentice — May 2021 – July 2022
TCS research — *Delhi, India*

- Implemented 3D CNNs to approximate implicit functions for 3D Single View Reconstruction (SVR).
- Employed an energy based out-of-distribution (OOD) detection classifier to increase robustness for SVR. [*Pytorch, Pytorch3D, Open3D*]

Applied Scientist Intern — Jun. 2020 – Aug.2020
Amazon — *Bengaluru, Karnataka*

- Trained LLMs within a siamese network to estimate semantic similarity between query and product description. Transfer learning for adapting LLMs trained English to European languages. [*Pytorch, HuggingFace, AWS*]

Conference/Journal Publications

Adapting by Analogy: OOD Generalization of Visuomotor Policies via Functional Correspondence
***Pranay Gupta**, Henny Admoni, Andrea Bajcsy*
Conference on Robot Learning (CoRL) 2025

Modeling Drivers' Situational Awareness from Eye Gaze for Driving Assistance
*Abhijat Biswas, **Pranay Gupta**, David Held, Henny Admoni*
Conference on Robot Learning (CoRL) 2024

Object Importance Estimation Using Countefactual Reasoning for Intelligent Driving
***Pranay Gupta**, Abhijat Biswas, Henny Admoni, David Held*
IEEE Robotics and Automation Letters (RA-L) 2024 and ICRA 2025

NewsKVQA: Knowledge-Aware News Video Question Answering
***Pranay Gupta**, Manish Gupta*
Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD) 2022

Syntactically guided generative embeddings for zero shot skeleton action recognition
***Pranay Gupta**, Divyanshu Sharma, S. Ravi Kiran*
IEEE International Conference of Image Processing (ICIP) 2021

Quo Vadis, Skeleton Action Recognition?
***Pranay Gupta**, Anirudh Thatipelli, Aditya Aggarwal, Shubh Maheshwari, Neel Trivedi, Sourav Das, S. Ravi Kiran*
International Journal of Computer Vision (IJCV) 2021

Worshop Papers

An Interactive Protocol to Measure a Driver's Situational Awareness
Pranay Gupta, Abhijat Biswas*, David Held, Henny Admoni*
International Workshop on Virtual, Augmented, and Mixed-Reality for Human-Robot Interactions (VAM-HRI) 2024

Leveraging VLMs for zero-shot, personalization of household multi-object rearrangement tasks
*Benjamin A Newman, **Pranay Gupta**, Yonatan Bisk, Kris Kitani, Henny Admoni, Chris Paxton*
Human-Large Language Model Interaction Workshop HRI'24

Miscellaneous Achievements

Reviewer for IEEE RA-L 2025, IEEE ICRA 2026, ACM HRI 2025, CoRL 2025

Qualcomm Innovation Fellowship(QIF) India 2022 and 2021 Winner Awarded twice among 13 of 96 teams from India's top 15 institutes; fellowship worth INR 1 million.

Dean's Merit List of Academic Excellence 2019-20. Awarded to top 20% students across the batch.

National Talent Search Examination Scholar. Nationwide scholarship awarded to top 1500 students.

Group Leadership: Led the project as a third-year undergraduate that resulted in a publication in the International Journal of Computer Vision (IJCV).

Individual Ownership: Executed end-to-end research projects from ideation to publication in international conferences (PAKDD, CoRL), both as an undergraduate and PhD researcher

Open Source Contributions

Google Summer of Code 2018: Successfully updated purr-data's core and the external libraries from single precision float to double precision. [commits]
Publication Code: Object Importance Estimation, Driver SA Estimation, Zero-Shot Skeleton Action Recognition

Technical Skills

Languages: Python, Matlab, C/C++, HTML/CSS
Developer Tools: Git, Docker, Vim, VS Code, AWS
Libraries: Pytorch, Mujoco, OpenAI-Gym, HuggingFace, Pytorch-3D, CARLA, PyBullet, Open3D, Opencv, Scikit-Learn, Pandas, NumPy, Matplotlib