

# Pranjal Aggarwal

 Pranjal2041 |  Website

## EDUCATION

---

2024–Present Ph.D. in Language Technologies, School of Computer Science, Carnegie Mellon University  
2019–2024 B.Tech. and M.Tech. in Computer Science, Indian Institute of Technology Delhi (**GPA: 9.4, Department Rank: 4**)

## PUBLICATIONS

---

- [1] **Pranjal Aggarwal\***, Aman Madaan\*, Ankit Anand, Srividya Pranavi Potharaju, Swaroop Mishra, Pei Zhou, Aditya Gupta, Dheeraj Rajagopal, Karthik Kappaganthu, Yiming Yang, Shyam Upadhyay, Mausam, and Manaal Faruqui. “AutoMix: Automatically Mixing Language Models”. In: *To appear in **Neural Information Processing Systems, 2024***. 2024. [Link](#).
- [2] **Pranjal Aggarwal**, Vishvak Murahari, Tanmay Rajpurohit, Ashwin Kalyan, Karthik Narasimhan, and Ameet Deshpande. “GEO: Generative Engine Optimization”. In: *Proceedings of the 30th ACM SIGKDD Conference on **Knowledge Discovery and Data Mining***. KDD ’24. Barcelona, Spain: Association for Computing Machinery, 2024, pp. 5–16. [Link](#).
- [3] **Pranjal Aggarwal**, Aman Madaan, Yiming Yang, and Mausam. “Let’s Sample Step by Step: Adaptive-Consistency for Efficient Reasoning and Coding with LLMs”. In: *Proceedings of the 2023 Conference on **Empirical Methods in Natural Language Processing (Oral)***. Singapore: Association for Computational Linguistics, Dec. 2023, pp. 12375–12396. [Link](#).
- [4] **Pranjal Aggarwal**, Ameet Deshpande, and Karthik Narasimhan. “SemSup-XC: semantic supervision for zero and few-shot extreme classification”. In: *Proceedings of the 40th **International Conference on Machine Learning***. ICML’23. Honolulu, Hawaii, USA, 2023. [Link](#).
- [5] **Pranjal Aggarwal\***, Krithika Rangarajan\*, Dhruv Kumar Gupta, Rohan Raju Dhanakshirur, Akhil Baby, Chandan Pal, Arunkumar Gupta, Smriti Hari, Subhashis Banerjee, and Chetan Arora. “Deep learning for detection of iso-dense, obscure masses in mammographically dense breasts.” In: ***European radiology*** (2023). [Link](#).
- [6] **Pranjal Aggarwal\***, Shreyas Chaudhari\*, Khanh Nguyen, Vishvak Murahari, Ashwin Kalyan, Karthik Narasimhan, and Ameet Deshpande. “Demystifying Reinforcement Learning with Human Feedback”. In: *Under Review*. 2024. [Link](#).

\* *Equal Contribution*

## RESEARCH INTERESTS

---

Code Generation and Formal Verification, Inference time search for Reasoning, Multimodal Agents.

## WORK EXPERIENCE

---

**Ph.D. Student**, *Carnegie Mellon University*, Advisor: Prof. Sean Welleck Aug’24–Present

- Developing methods for generating formally verified code using iterative refinement techniques using inference-time search and reinforcement learning algorithms guided by dense feedback.
- Developing multimodal code agents capable of interacting with unified action spaces, including images and keyboard actions over long horizon tasks.

**Undergraduate Researcher**, *Data Analytics & Intelligence Lab*, Advisor: Prof. Mausam Dec'22–Jun'24

- Improved efficiency and performance in reasoning and code generation tasks for large language models.
- Developed cost-quality optimization methods using few-shot self verification and POMDP based routing enabling state-of-the-art control on costs-performance tradeoff.

**NLP Research Intern**, *Princeton University*, Advisor: Prof. Karthik Narasimhan Jun'22–Aug'22

- Developed a state-of-the-art method for zero-shot extreme classification (with 1M+ unseen labels).
- Published a survey and research paper on reinforcement learning from human feedback in LLMs.
- Proposed black-box optimization techniques for content creators in the era of language models augmented with search engines; introduced evaluation metrics and benchmarks to foster future research.

**Undergraduate Researcher**, *CV Lab, IIT Delhi*, Advisor: Prof. Chetan Arora Jul'21–Mar'22

- Developed an object-localization method for malignant cancer detection using mammogram images.

## AWARDS

---

**Winner, Model Attribution Challenge at SaTML 2023** [Link](#)

- Developed the best method for attributing blackbox fine-tuned language models to their corresponding pre-trained models; Oral presentation @ SaTML'23.

**First Place, Tower Research Capital Data Challenge** [Link](#)

- Secured 1st rank in machine learning for market data challenge by Tower Research Capital at IIT Delhi.

**Google and Microsoft Research Travel Grants**

- Awarded research travel grants from Microsoft and Google Research for academic conferences.

**Winner, HackMIT Sponsor Track** [Link](#)

- Won MIT's HackMIT 2020 in the vehicle crash detection challenge by Cambridge Mobile Telematics.

## ACADEMIC HONORS

---

- All India Rank 143 in IIT JEE-Advanced 2019 among 2 million candidates nationwide.
- Selected among top 50 students nationwide for the Orientation-Cum-Selection Camp (OCSC) for the International Olympiad in Astronomy and Astrophysics.
- Received the IIT Delhi Semester Merit Award (top 7%) in 4 out of 8 semesters.
- Ranked 303rd in KVPY'19, a prestigious science examination conducted by the Indian Institute of Science, Bangalore.

## ACADEMIC SERVICE

---

Reviewer: EMNLP 2023, ACL 2024, KDD 2024, NeurIPS 2024, EMNLP 2024

**Outstanding Teaching Assistant Award**, Natural Language Processing (Graduate Level), Spring 2023–2024

Teaching Assistant, Principles of Artificial Intelligence (Graduate Level), Fall 2023–2024

Academic Mentor, Electrodynamics and Quantum Mechanics, Fall 2020–2021

Volunteer at ACL 2023, ICML 2023, EMNLP 2023