Vishisht Rao

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EDUCATION

Carnegie Mellon University, *MS in Machine Learning* Pittsburgh, PA, 08/2024 – 12/2025

Selected Coursework: Convex Optimization (PhD); Probability and Statistics (PhD); Probabilistic Graphical Models (PhD); Deep Reinforcement Learning and Control (PhD)

PES University, *BTech in Computer Science and Engineering* Bangalore, India, 08/2019 – 06/2023

Recipient of the MRD Scholarship, awarded to the top 20% of students, in 5 out of 6 possible semesters

PUBLICATIONS

[1] **Vishisht Rao**, Justin Payan, Andrew McCallum, Nihar B. Shah, "ML Researchers Support Openness in Peer Review But Are Concerned About Resubmission Bias". Preprint.
Link: https://arxiv.org/abs/2511.23439
Code: https://github.com/justinpayan/OpenReviewAnalysis

[2] Sarina Xi, **Vishisht Rao**, Justin Payan, Nihar B. Shah, "FLAWS: A Benchmark for Error Identification and Localization in Scientific Papers". Preprint.
Link: https://arxiv.org/abs/2511.21843
Code: https://github.com/xasayi/FLAWS

[3] **Vishisht Rao**, Aounon Kumar, Himabindu Lakkaraju, Nihar B. Shah, "Detecting LLM-Generated Peer Reviews". PLOS ONE. Podium presentation at the *Tenth International Congress of Peer Review and Scientific Publication*.
Link: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0331871
Code: https://github.com/Vishisht-rao/detecting-llm-written-reviews

[4] Mayank Ratan Bhardwaj, **Vishisht Rao**, Bazil Ahmed, Kartik Sagar, Y. Narahari, "Deep Learning Based Auction Design for Sale of Agricultural Produce through Farmer Collectives to Maximize Nash Social Welfare". Preprint.
Link: https://vishisht-rao.github.io/files/DL_ForwardAuction.pdf

[5] V. Udaya Sankar, **Vishisht Rao**, Y. Narahari, "Deep Learning Meets Mechanism Design: Key Results and Some Novel Applications". Preprint.
Link: https://arxiv.org/abs/2401.05683

[6] Prajwal Gupta, **Vishisht Rao**, Rithvik Ganesh, R. L. Sameeksha, V. R. Badri Prasad, "SAliCLIP: Generating Speech-Conditioned Images by Aligning Speech With CLIP Latents" 2023 8th International Conference on Image, Vision and Computing (ICIVC), Dalian, China, 2023, pp. 231-238
Link: https://ieeexplore.ieee.org/abstract/document/10270664
Code: https://github.com/Vishisht-rao/SAliCLIP

RESEARCH EXPERIENCE

Carnegie Mellon University (CMU), *Research Assistant* Pittsburgh, PA, 09/2024 – Present

- **Detecting LLM-Generated Peer Reviews**
  - Built a three-component framework for detecting LLM-generated reviews – *watermarking* strategy that stochastically selects specific phrases to serve as detectable signals in LLM-generated reviews – *indirect prompt injection* techniques to embed instructions into manuscript PDFs – *statistical detection method* that identifies embedded watermarks across multiple reviews with formal FWER control and higher power than standard corrections; flagged LLM reviews with high 100% TPR at zero false flags under strict FWER bound of 0.01.
  - Watermark persisted across 100 generations across several frontier models.
  - Sparked key discussion in *The Workshop on Practical Improvements to Peer Review, AAMAS 2025*, presented as a podium talk at *The 10th International Congress on Peer Review and Scientific Publication*, presented as a poster at the *AI-SDM Workshop on Human-AI Complementarity for Decision Making (Carnegie Mellon University)*, and published in *PLOS ONE*.
- **Benchmarking LLMs for Error Detection in Scientific Papers**
  - Developing a benchmark dataset consisting of scientific papers with subtle errors introduced to evaluate the ability of LLMs to identify such errors
  - Designed a multi-stage pipeline to identify key claims made in scientific papers and introduce a subtle modification in the paper to invalidate these claims using LLMs
  - Showed through pilot tests that errors inserted have $< 40\%$ detection across SOTA LLMs
- **Effect of Open vs Closed Reviewing Systems on Quality of Peer Reviews**
  - Designed a human-subject study and conducted a survey with over 2,300 responses from ICLR 2025 participants to to inform conference policy on when open reviewing is actually beneficial.
  - Built an LLM-based evaluator to score real review texts from the two settings on metrics such as substantiation, correctness, and completeness.

Indian Institute of Science (IISc), *Research Intern, Research Engineer* Bangalore, India, 12/2022 – 07/2024

- **Deep Learning Based Auction Mechanisms**
  - Designed data-driven auctions using neural networks for the procurement of supply materials, and the sale of produce, in the agricultural domain
  - Trained allocation and payment networks for volume-discount and combinatorial settings, optimizing a composite objective to minimize the violation of Nash social welfare, individual rationality, incentive compatibility, envy-freeness, and practical business constraints
  - Worked closely with two agricultural districts in Karnataka, India to implement relevant state-of-the-art solutions, which won the *Elets Technology Excellence Award 2024* in the Public Sector Initiatives for Social Good category
- **Deep Learning Meets Mechanism Design - A Survey**
  - Surveyed and synthesized DL-based approaches to auction/mechanism design; mapped literature to core properties (IC/IR, revenue, welfare, fairness, business constraints)
  - Proposed a clear taxonomy and design checklist for practitioners; contrasted characterization-based vs. characterization-free methods and their regret/complexity profiles
  - Showcased practical impact through three application case studies (vehicular energy management, mobile resource allocation, agricultural procurement) and distilled open problems

ACADEMIC PROJECTS

- **Generating Speech-Conditioned Images – Undergraduate Capstone Project** 01/2022 – 12/2022
  - Learned a shared embedding space by pulling paired speech–image samples together and pushing negatives apart; aligned speech encoders to CLIP image features
  - Enabled direct speech-conditioned image generation (no text intermediary) and efficient cross-modal retrieval
  - Reported state-of-the-art retrieval metrics and proposed a novel cross-modal classification trick with strong accuracy

TEACHING EXPERIENCE

TA – Advanced Introduction to Machine Learning (PhD) [10-715], *CMU* Aug. 2025 – Dec. 2025

- Designed homeworks on SVMs, optimization, Kernel methods, neural networks; conducted a recitation on tail bounds
- Graded homeworks, midterms, final exams, and held office hours

TA – Game Theory Course [E1 254], *IISc* Jan. 2024 – May 2024

- Conducted problem solving sessions on strategic form games, Nash equilibria, and two-player zero-sum games
- Organized and scheduled project presentations of over 100 students, assisted professors in reviewing all projects and presentations along with other TAs
- Held office hours, graded midterm papers, invigilated exams, and tabulated results of exams, assignments, projects

WORK EXPERIENCE

Bosch Global Software Technologies, *Summer Intern* Bangalore, India, 06/2022 – 07/2022

- Built applications that provided proof of concepts for aggregation and visualization techniques for location-based data using FastAPI, React and S2Cell, which contributed to the Data Engineering team that plays an integral role in developing autonomous driving solutions

LEADERSHIP & PROFESSIONAL SERVICE

- **Reviewer**: Tenth International Congress on Peer Review and Scientific Publication
- **Volunteer Technologist – Project StepOne** Sept. 2022 – Aug. 2024
  - Developed a helpline platform to address mental health-related issues that was adopted by 21 state governments.
  - Designed Finite State Machines to automatically connect individuals to healthcare professionals based on their needs.
- **Local Organizing Committee Member – GAMEARTS (Game Theory, Mechanism Design, and Artificial Intelligence)** July 2024
  - Led the organization of the symposium involving over 450 attendees from multiple countries, held at IISc.
  - Planned logistics for talks, guest travel, accommodation, catering, funding, and felicitation ceremonies.
- **Student Ambassador – 16th International Conference on Educational Data Mining** July 2023
  - Played a pivotal role in the organization and coordination of events for over 219 participants from 20 different countries.
  - Organized logistics for distinguished guests; coordinated with the technical support team for audio visuals, poster displays, and demo setups; planned and coordinated tasks for all Student Ambassadors.
- **Admissions Committee**
  - Served on the admissions committee for the Master of Science in Machine Learning program at CMU (Fall 2025 intake)
  - Reviewed more than 200 applications followed by multiple calibration rounds
- **Interviewer**: Interviewed 10 candidates for Teaching Assistant positions for Spring 2026, in the Machine Learning Department at CMU