Atrey Desai

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Research Interests

I am an undergraduate student in computer science and linguistics at the University of Maryland, College Park, advised by Professor Rachel Rudinger and Professor Jordan Boyd-Graber. My research interests center around developing **novel evaluation methods** that probe deeper linguistic understanding, leveraging insights from theoretical linguistics (especially syntax and semantics) to design more **robust** and **trustworthy** models, and enhancing the **explainability** of LLMs in reasoning tasks. I am grateful to be supported by the UMD Presidential and NMSC Merit scholarships.

Education

University of Maryland, College Park — College Park, Maryland
B.S. in Computer Science, Honors Program — *Exp. Graduation: May 2027*

- **Selected Coursework**: Machine Learning, Natural Language Processing, Data Science, Algorithms, Computer Systems, Discrete Math, Linear Algebra
- **Graduate Coursework**: Natural Language Processing*, Commonsense Reasoning*

University of Maryland, College Park — College Park, Maryland
B.A. in Linguistics, Minor in Korean Studies — *Exp. Graduation: May 2027*

- **Selected Coursework**: Syntax, Phonetics, Psycholinguistics

Publications

Atrey Desai, Nishant Balepur, Rachel Rudinger (2025). *Language Models Generate Multiple-Choice Questions with Artifacts.* Mid-Atlantic Student Colloquium on Speech, Language and Learning (MASC-SLL). *(non-archival)*

Chace Hayhurst, Hyojae Park, **Atrey Desai**, ..., and Michael Littman (2022). *Reinforcement Learning As End-User Trigger-Action Programming.* Interactive Machine Learning Workshop at AAAI, Multi-disciplinary Conference on Reinforcement Learning and Decision Making (RLDM).

Atrey Desai, et al. (In progress). *A Survey on Computational Exploration of Animal Linguistic Features.*

Research Experience

University of Maryland, College Park — May 2024 — Present
Undergrad Researcher | CLIP Lab (advised by Prof. Rachel Rudinger, Prof. Jordan Boyd-Graber) — *College Park, MD*

- Systematically evaluated LLM-generated Multiple-Choice Questions (MCQs) for unintended artifacts to assess if questions are solvable without full context, demonstrating high choices-only accuracy (often >90%) via partial-input testing.
- Developing an adversarial benchmark to evaluate Vision-Language Models (VLMs) in detecting out-of-context (OOC) video-based misinformation on social media based on multimodal clues and user interactions.

The University of Texas at Arlington — Feb. 2024 — Present
Visiting Researcher | ACL2 Lab & National Science Foundation (advised by Prof. Kenny Zhou) — *Arlington, TX*

- Developed AniVoice-cat, a dataset of 26,000+ annotated cat vocalizations from 250+ hours of video, identifying 57 unique cat phones and expanding resources for lexical semantics and AI research in animal behavior.
- Improved vocalization transcription accuracy to 96% by implementing PANNs and HuBERT models, achieving 65% precision in cat vocalization detection and 93.89% top-5 accuracy in action recognition.

University of Maryland, College Park — Dec. 2023 — Aug. 2024
Researcher | FIRE Sustainability Analytics Lab (advised by Prof. Thanicha Ruangmas) — *College Park, MD*

- Streamlined environmental impact assessment of U.S. emissions regulations by developing a Python-based data processing pipeline, enabling more efficient policy analysis.
- Drafted framework to inform evidence-based policymaking on climate restoration strategies.

Brown University — Dec. 2020 — June 2023
Researcher | Reinforcement Learning at Brown Group (advised by Prof. Michael Littman) — *Providence, RI*

- Developed a custom environment and implemented reinforcement learning algorithms to allow non-experts to programmatically solve tasks by defining reward functions and specifying agent behavior.
- Presented research findings at AAAI-22 IMLW and RLDM-22, demonstrating how human-readable interfaces enable fine-grained control during inference and improving AI-human interaction in robotics.

Personal Projects

- **Yelp-Help**: Developed an NLP-based classifier achieving 98.7% accuracy in vectorizing Yelp reviews, enabling precise emotional response analysis and improving customer insight extraction.
- **Archimal**: Created a high-speed CNN model achieving 95% accuracy in animal image classification, streamlining content organization and retrieval for zoological databases.
- **Trek**: Conducted statistical analysis using web crawlers and public APIs, revealing a significant positive age-performance correlation in British first-division football, providing actionable insights for player recruitment.

Selected Grants

SPIRE Research Grant ($3,000) 2025
UMD President's Scholarship ($50,000) 2023
NMSC National Merit Scholarship ($4,000) 2023
Catherine Yang Scholarship ($1,000) 2023

Selected Honors

Omicron Delta Kappa Top 10 Freshman 2024
CMSC & ARHU Dean's List 2023—2025

Students Mentored

UMD Office of Undergraduate Research Spring 2025
Juan Cortés, Kemisola Benson, Vivian Akpala

Technica Big/Little Mentorship Program Fall 2024—Present
Savya Miriyala, Tanya Grover, Jessica Ononye, Nakshatra Hiray

Professional Service

Computer Science Ambassador *(Department-wide)* 2024—Present
Hosted official department guests, met with prospective applicants, and planned community outreach events

CMNS Recruitment Ambassador *(College-wide)* 2024—Present
Ambassador for computer science; presented in admissions open houses and organized student meetings

NSF REU Seminar Panelist Nov. 2024
Organized by UMD Office of Undergraduate Research; presented findings from UT ACL2 Lab and promoted creating and attending NSF-funded opportunities to 160+ students and professors

Technica Hackathon Oct. 2024
Volunteer and mentor; world's largest hackathon for underrepresented genders in tech

FIRE Student Leadership Council 2024
Councilmember; Represented 200+ peers, ran events & workshops, and work on program reforms

MSET Robotics & Programming Workshops 2020—2022
Organizer, curriculum designer, and volunteer; ran numerous events teaching robotics, computer modeling, and programming languages to young girls and underprivileged youth

Additional Information

Clubs: Stylus Literary Magazine (Former Associate Editor), Photography Club, Linguistics Club
Languages: Python, Java, R, MATLAB, JavaScript, HTML/CSS
Packages: PyTorch, NLTK, pandas, NumPy, Matplotlib
Developer Tools: Git, Docker, GCP, Google Vertex AI, VS Code, Eclipse
Natural Languages: English (native), Gujarati (native), Spanish (intermediate), Korean (beginner)