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. My research interests center around developing **novel evaluation methods** that probe deeper linguistic understanding, leveraging insights from theoretical linguistics (especially semantics and pragmatics) 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 2026*

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

University of Maryland, College Park — College Park, Maryland
B.A. in Linguistics, Minor in Korean Studies — *Exp. Graduation: May 2026*

- **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
Undergraduate Researcher | CLIP Lab (advised by Prof. Rachel Rudinger) — *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 Honors and Grants

Omicron Delta Kappa Top 10 Freshman 2024
CMSC & ARHU Dean's List Fall 2023, Spring 2024
UMD President's Scholar (Top 1%) 2023—2027
NMSC National Merit Scholarship 2023—2027
Catherine Yang Scholarship 2023
FIRST Robotics World Championship (Top 30) 2023

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)* 2024—Present
Hosted official department guests, met with prospective applicants, and planned community outreach events

NSF REU Internal 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 Jan. 2024—Nov. 2024
Councilmember; Represented 200+ peers, ran events & workshops, and work on program reforms

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

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)