ISHITA KAKKAR

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EDUCATION

University of Massachusetts Amherst Sep 2021 - May 2025
Bachelor of Science in Computer Science (Honors College) and Mathematics, GPA: 3.7

OBJECTIVE

I am applying to Ph.D. programs in Computer Science and Natural Language Processing for Fall 2025. My current research interests lie in creating transparent, interpretable, trustworthy natural language processing (NLP) and machine learning (ML) systems with a focus on leveraging language technologies for social good, specifically in applications such as safe human-LLM interactions, LLM emotional intelligence, Public Interest Technology and bias detection in language models.

RESEARCH AND PROFESSIONAL EXPERIENCE

MIT-IBM Watson AI Lab Aug 2024 - Present
Research Intern

- Conducting study on determining strengths and weaknesses of different-sized LLMs given the topic of the prompt to enable LLM query routing.
- Analyzing LLM response comparisons with human feedback using topic modeling techniques like BERTopic and k-means clustering to identify winning trends.
- Identifying performance strengths of LLMs across specific prompts, contributing to insights for LLM Routing.

Boston University Public Interest Technology - New England Fellowship May 2024 - Jun 2024
ML Research Intern

- Conducted study on benchmarking state-of-the-art automatic speech recognition (ASR) models against stutter speech.
- Evaluated ASR models on 50+ hours of Chinese speech recordings from individuals who stutter.
- Quantified fluency bias in ASR models by analyzing semantic distances between more than 12,000+ lines of Chinese ground truth and model-generated text using BERT, Sent2Vec, and GloVe embeddings.
- Found that models are less fluent in handling blocks and repetitions as compared to interjections, highlighting a critical area for improvement in ASR systems.

University of Massachusetts Amherst - BioNLP Lab Feb 2024 - Present
NLP Research Assistant

- Conducted study on quantifying rationale quality in LLM Chain of Thought responses by analyzing SVAMP, CQA, ESNLI, ANLI datasets, identifying patterns and insights that led to a 30% improvement in common reasoning tasks using high-quality rationales generated by engineered prompts.
- Developed quality scoring framework based on GEval Metrics and engineered prompts to analyze the impact of high vs low-quality rationales on task performance by performing statistical analysis on 500,000+ rationale scores.

Northeastern University Sep 2023 - Aug 2024
NLP Research Assistant

- Conducted study on emotional bias in LLMs using Reddit dataset of 5000+ posts by converting words to vectors.
- Performed statistical analysis on 100,000+ word vectors and intensity scores to identify bias toward positive/negative emotions.
- Achieved 90% accuracy in pinpointing bias by deploying strategies such as element-wise analysis, cumulative sign vector analysis, cosine similarity, Jaccard similarity, Pearson Coefficient to classify bias into different dimensions.

University of California San Diego Jun 2023 - Aug 2024
NLP Research Intern

- Conducted study on creating classifiers to identify mental burnout on social media.
- Fine-tuned machine learning, BERT, and GPT-4 models for advanced mental health-related text classification, achieved $> 85\%$ accuracy and reduced false positives by 40% using AWS SageMaker, Scikit-learn, TensorFlow.
- Performed data augmentation, clustering analysis, topic modeling (BERTopic, LDA) on a dataset of 300,000+ Reddit posts.
- Contributed a dataset of 2,330 manually labeled Reddit posts to identify contexts and meanings of the "burnout" keyword.

PUBLICATIONS

[1] Nazanin Sabri, Anh C. Pham, **Ishita Kakkar**, Mai ElSherief. "Inferring Mental Burnout Discourse Across Reddit Communities" *NLP for Positive Impact Workshop at EMNLP* 2024.

[2] Isha Joshi, Anh C. Pham, **Ishita Kakkar**, Melissa M. Karnaze, Sindhu Venkata Kothe, Mai ElSherief. "Emotional Bias in Large Language Models" *In submission to ACL Rolling Review (ARR)* 2024.

TALKS AND PRESENTATIONS

[1] *Making LMs Better Performers: A Systematic Analysis of the Relationship between LLM-Generated Rationale Quality and Task Performance.* Massachusetts Undergraduate Research Conference. Apr 2024. Poster Presentation.

[2] *Navigating the World of Deepfakes and GANs.* UMass Voives of Data Science Conference. Mar 2024. Short Talk.

[3] *Examining Mental Burnout Discourse on Reddit Online Communities.* UC San Diego Summer Research Conference. Aug 2023. Research Talk.

[4] *Automation of Premise Selection to Enable More Software Verification.* National Early Research Scholars Program (ERSP) Conference. Sept 2023. Poster Presentation.

TECHNICAL SKILLS

Languages: Python (PyTorch, PySpark, Pandas, SciPy, Matplotlib, TensorFlow), Java, JavaScript, C
Databases: PostgreSQL, MySQL, REST APIs, Apache Spark, MongoDB
Statistics/ML: Natural Language Processing, Neural Networks, Regression Analysis, Time-Series Analysis, Hypothesis Testing
Tools: AWS, Tableau, PowerBI, Git, Figma

SERVICE

Manning Undergraduate Student Council	*Research Chair*	Sep 2024 - Present
Public Interest Technology - University Network	*Student Leader*	Jun 2024 - Present
UMass Public Interest Technology Club	*Secretary*	Feb 2024 - Present
UMass CICS Undergraduate Course Assistant Program	*Head UCA*	Feb 2024 - Present
BUILD UMass	*Software Developer*	Sep 2023 - Present
UMass Campus Design & Copy Student Business	*Co-Manager*	Oct 2022 - Jan 2023
UMass CICS Undergraduate Course Assistant Program	*UCA*	Sep 2022 - Feb 2024
Microsoft Technology Education and Learning Support	*Teacher*	Jul 2022 - Jul 2023

AWARDS AND HONORS

Northeastern University - Intelligence, Data, Ethics And Society (IDEAS) Fellow	Jun 2024
Massachusetts Institute of Technology - Break Through Tech AI/ML Fellow	May 2024
Public Interest Technology New England - Technology Impact Fellow	May 2024
Amazon Web Services - AI/ML Fellow	Dec 2023
UMass Amherst - Early Research Scholars Program (ERSP) Fellow	Sep 2022
Dean's List Honor	Sep 2021 - Present
Chancellor's Award	Sep 2021