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Amherst, MA
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TUHINA TRIPATHI

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EDUCATION

University of Massachusetts Amherst **Amherst, MA**
Doctor of Philosophy, Computer Science *SEP 2023*

- Coursework: Machine Learning, Human-centric machine learning, Advanced Natural Language Processing
- Advised by **Prof. Scott Niekum**

University of Colorado Boulder **Boulder, CO**
Master of Science in Computer Science *AUG 2021 - MAY 2023*

- Coursework: Advanced Robotics, Robotic Manipulation, Decision Making under Uncertainty, Theoretical Foundations of Autonomous Systems, Datacenter Scale Computing
- Advised by **Prof. Bradley Hayes**

Delhi Technological University **Delhi, India**
Bachelor of Technology in Information Technology *AUG 2015 - MAY 2019*

PUBLICATIONS

- **Investigating the Impact of Feedback Protocols on Reinforcement Learning from AI Feedback (2025) | Under submission**
Tuhina Tripathi, Manya Wadhwa, Greg Durrett, Scott Niekum
- **Breaking the Tie: Evaluating Human Preferences in Reinforcement Learning (2023) | Masters Thesis**
Tuhina Tripathi, Bradley Hayes

EXPERIENCE

Research Assistant **AUG 2021 - JAN 2022**
Emotive Computing Lab, University of Colorado *Boulder, CO*

- Engineered a scalable Python ML wrapper library integrating multiple backends to streamline basic initial data processing for diverse signal data in eye tracking, speech processing, and physiological sensing.

Software Development Engineer **JUL 2019 - JUN 2021**
Citicorp Services India Pvt. Ltd. *Pune, India*

- **Swap Data Reporting Engine:** Developed an end-to-end enrichment solution for data patching of trades using Springboot and Angular7. The tool reduced inconsistencies on the Production database by 65%
- **Compliance Data Engine:** Implemented 'Advanced Search' functionality on Elasticsearch that reduced average query response time by 80%. Also designed and implemented a robust CI/CD production pipeline and responsive templates for CitiCODE dashboard

Research Intern **AUG 2018 - OCT 2018**
Indian Institute of Technology Delhi *Delhi, India*

- Developed a Generative Adversarial Network (GAN) based latent fingerprint enhancement algorithm to improve automated fingerprint matching, addressing challenges like noisy backgrounds and poor ridge clarity.
- NFIQ scores of enhanced images were three times lower than state-of-the-art approaches (around 1.88%).

Research and Development Intern **JUN 2018 - JUL 2018**
Nucleus Software Exports Ltd. *Noida, India*

- Created a Code Generator that converts GUI screenshots into front-end HTML code, saving developers an average of 8 hours per week. Deployed as a production tool, was widely used by multiple internal teams
- Developed a multi-lingual chatbot supporting Hindi and Punjabi languages using the RASA framework, capable of maintaining context in conversations spanning over 8 messages

PAST RESEARCH

Turning the Tide: Navigating prompt recovery in large language models **UMass Amherst, USA**

- Fine-tuned a large language model (Meta Llama-2-7b) to recover rewrite prompts from corresponding rewritten texts using a curated dataset of diverse prompts generated using open-weight LLMs (Gemma by Google and Llama-2 by Meta)
- The fine-tuned model demonstrated strong performance in the text-rewrite task, achieving 73% accuracy in strict-accuracy case and 87% loose-accuracy

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Inverse Reinforcement Learning from suboptimal data with bounded risk

CU Boulder, USA

Research project with Prof. Zachary Sunberg

Spring 2022

- Designed and implemented a novel maximum entropy inverse reinforcement learning algorithm to learn from suboptimal trajectory data while ensuring a lower bound on risk
- Calculated confidence bounds by analyzing data on a sub-trajectory level, strategically removing high-risk segments to ensure safe agent behavior
- Developed and tested the algorithm on a 9x9 grid world navigation task and 2-D driving simulation, achieving a lower generalization error compared to standard IRL

DYNAMIC OBSTACLE AVOIDANCE IN SHARED HUMAN-ROBOT WORKSPACE

Research project with Prof. Nikolaus Correll

Spring 2022

- Developed a human-robot collaborative algorithm to reason over the uncertainty in human intention estimation in real-time using a Partially Observable Markov Decision Process (POMDP)
- Implemented the algorithm for a tabletop collaborative picking task with higher goal prediction accuracy while using a smaller dataset as compared to state-of-the-art methods

UNDERGRADUATE PROJECTS

BIO-METRIC IDENTIFICATION AND FINGERPRINT PERCEPTIVITY ENHANCEMENT

Undergraduate Major Project

2019

- Performed fingerprint enhancement using short-term Fourier Transform and Contextual filtering, to help intensify the ridges and minutiae [Dataset: 12k images from Optical and Capacitive sensors]. Enhanced images fed into a CNN for feature extraction. Achieved an accuracy of 98.32% with a significantly less False Acceptance Rate(FAR).

AUTOMATED HATE SPEECH DETECTOR

Undergraduate Minor Project

2018

- Implemented a solution to categorize tweets into hate speech, offensive language, and normal text using a dataset of 25k labeled tweets. Applied extensive preprocessing with TF-IDF scores and POS tags, and utilized Regression with L2 Regularization achieving a precision of 0.91 and F1 score of 0.90.

TEACHING

Object Oriented Programming (CS160)

Spring'25

Teaching Assistant

Introduction to Robotics (CSCI 3302/ECEN 3303)

Fall'22

Teaching Assistant

Starting Computing (CSCI 1300)

Spring'22, Summer'22

Teaching Assistant

SKILLS

Languages Python, C++, C, Julia, SQL, Java, Javascript

Software & Tools: ROS, Pytorch, Tensorflow, Webots, Linux, Angular, Spring, Elasticsearch

ACTIVITIES

PhD Chair of the CSWomen club at UMass Amherst

2024-2025

Undergraduate Research Volunteer (URV) mentor at UMass Amherst

2023 - 2025

Graduate Peer Mentor at CU Boulder

Fall 2022

CitiCorp **Bronze award** for Enrichment Tool deployment on Production

2021

Best Innovation Award at Nucleus Software for 'Code Generator'

2018

Among the Top 5 teams in SIH' 17 conducted by Govt. of India

2017