MAITREY GRAMOPADHYE

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RESEARCH INTERESTS

Human Robot Interaction, Long Horizon Reasoning in Robotics, Robotic Perception, Deep Learning

Research Objective - I am interested in improving robot reasoning, to enable human robot collaboration for complex long-horizon tasks.

EDUCATION

University of North Carolina, Chapel Hill *(Aug 2023 - present)*
Ph.D. candidate in Computer Science. Advisor: Dr. Daniel Szafir

University of North Carolina, Chapel Hill *(Aug 2021 - Aug 2023)*
Master of Science in Computer Science

Indian Institute of Technology, Bombay, India *(July 2016 - July 2020)*
Bachelor of Technology in Computer Science, with Honors

RESEARCH AND PUBLICATIONS

- **MARCER: Multimodal Augmented Reality for Composing and Executing Robot Tasks**.
  Maitrey Gramopadhye[*], Bryce Ikeda[*], LillyAnn Nekervis and Daniel Szafir. *ACM/IEEE International Conference on Human Robot Interaction (HRI) 2025*

  We design and evaluate a novel interactive and multimodal end-user robot programming system. MARCER combines Trigger-Action Programming, Large Language Models and Augmented Reality to allow users to author and visualize reactive robot behavior.

- **The Cyber-Physical Control Room: A Mixed Reality Interface for Mobile Robot Teleoperation and Human-Robot Teaming**. Michael E. Walker, **Maitrey Gramopadhye**, Bryce Ikeda, Jack Burns and Daniel Szafir. *ACM/IEEE International Conference on Human Robot Interaction (HRI) 2024*

  We present the design and evaluation of an immersive **Cyber-Physical Control Room interface** for remote mobile robots. In a human subjects study, our interface improved robot operator effectiveness and various aspects of human-robot teaming, including social engagement.

- **Human Robot Collaboration with Few-Shot LLM Robot Models**. **Maitrey Gramopadhye** and Daniel Szafir. *Human-Interactive Robot Learning (HIRL) | HRI, 2024*

  We design a system that enables people to interact with an LLM driven robot. We conduct a human subjects study to gain insights into the participants' mental model.

- **Generating Executable Action Plans with Environmentally-Aware Language Models**. **Maitrey Gramopadhye** and Daniel Szafir. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2023*

  We propose an approach to utilise **large language models** and convert high level tasks to environmentally-aware action plans that intelligent agents can directly execute. Our approach involves using the agent's environment to provide **situational awareness**.

- **CuRL: Coupled Representation Learning of Cards and Merchants to Detect Transaction Frauds**. **Maitrey Gramopadhye**[*], Shreyansh Singh[*], Kushagra Agarwal, Nitish Srivasatava, Alok Singh, Siddhartha Asthana and Ankur Arora. *International Conference on Artificial Neural Networks (ICANN) 2021*

  We propose to generate contextual embeddings for credit cards and merchants by capturing the **cross-interactions** in a bipartite graph of the payment entities. The proposed approach was faster and outperformed many SOTA representation learning algorithms.

INDUSTRY EXPERIENCE

HONDA RESEARCH INSTITUTE, USA
Research Intern   *(May 2025 - Aug 2025)*
- Worked in the Intelligent Robotics Research team
- Built a system to infer and visualize a series of robot motion constraints, to assist a robot operator in completing operations from an instruction manual, specified using natural language and images
- The modular system used Large Vision Models and LLM to infer the constraints and visualized them to the robot operator using Augmented Reality

HONDA RESEARCH INSTITUTE, USA
Research Intern   *(May 2024 - Aug 2024)*
- Worked in the Human Intention Estimation and Robot Assistance Generation team
- Implemented a VLM enabled method to estimate the goal of a human operating a robot, using the actions completed so far, and predict the future actions required to autonomously complete the goal
- Grounded the VLM in sensible state transitions required for completing the goal, by inferring the state of the system and predicting future states resulting from the planned actions

AI GARAGE, MASTERCARD
Associate Analyst   *(Aug 2020 - Aug 2021)*
- Research paper **CuRL: Coupled Representation Learning of cards and merchants to detect transaction frauds** got accepted in **ICANN 2021**
- Built models to predict whether transactions would **clear** as well as the details of clearing, i.e. **time taken to clear**, **is clearing amount same as the authorised amount** etc. with **99.5%** precision

SAMSUNG RESEARCH INSTITUTE, BANGALORE
Research Intern   *(May 2019 - July 2019)*
- Worked in the **Advanced Technology Lab** at Samsung Research Institute, Bangalore
- Built real-time monocular **3D object detection** model in Pytorch for mobile phones
- Implemented methods to estimate 3D bounding box around objects in 2D images
- Received a job offer for outstanding performance during the internship

SELECTED STUDENT PROJECTS

IIT-B MARS ROVER TEAM
Student Technical Team, IIT Bombay   *(May 2017 - July 2020)*
- The IIT Bombay Mars Rover Team builds rovers capable of traversing and conducting operations and experiments in Mars like terrain, for competing in the University Rover Challenge, Mars Society
- As head of Software Subsystem, supervised the progress on software required for URC 2020
- Worked on **Autonomous Object detection** task by implementing a hybrid method, using conventional CV approach followed by deep learning, to get real-time detection from a video stream
- Worked on **Autonomous Obstacle Avoidance** task of the rover, using data from **GPS** and **LiDAR**

TEACHING AND MENTORING EXPERIENCE

GRADUATE TEACHING ASSISTANT
Department of Computer Science, UNC Chapel Hill   *(Aug 2021 - May 2022)*
- TA for COMP 523 - Software Engineering Lab in Spring 2022, taught by Prof. David Stotts
- TA for COMP 475 - 2D Computer Graphics in Fall 2021, taught by Prof. Mike Reed
- Duties included regular meetings with students for tracking their progress, clarifying doubts with the course content, helping debug code in C++, python etc.

INSTITUTE STUDENT MENTOR
Institute Student Mentorship Program, IIT Bombay   *(May 2019 - July 2020)*
- Responsible for guiding a group of 12 undergraduate freshmen for the academic year
- Providing counsel and mentoring them about any academic or personal problem