Maithili Patel

PhD · Robotics · Georgia Institute of Technology

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Research Interests

I am a PhD student, conducting research in artificial intelligence towards human-centered robot autonomy; specifically enabling robots to assist humans in a proactive and personalized manner in open environments over long-term interactions.

Education

Georgia Institute of Technology · *PhD, Robotics (Interactive Comp.)* · GPA 4/4 *2021 - 2026*

Advised by Prof. Sonia Chernova

University of Michigan · *MSE, Mechanical Engineering (Robotics)* · GPA 3.98/4 *2017 - 2019*

Advised by Prof. Chad Jenkins

Indian Institute of Technology, Bombay · *B.Tech, Mechanical Engineering* · GPA 8.99/10 *2013 - 2017*

Graduated with Honors, holding a Minor in Computer Science and Engineering

Publications

Journal

- A Survey of Semantic Reasoning Frameworks for Robotic Systems,
  W. Liu*, A. Daruna*, **M. Patel****, K. Ramachandruni**, S. Chernova
  Robotics and Autonomous Systems (RAS), 2022

Conference

- ADAPT: Actively Discovering and Adapting to Preferences for any Task,
  M. Patel, X. Puig, R. Desai, R. Mottaghi, S. Chernova, J. Truong, A. Rai
  arXiV 2025, under blind review
- A Model-Agnostic Approach for Semantically Driven Disambiguation in Human-Robot Interaction,
  F. Dogan, **M. Patel**, W. Liu, I. Leite, S. Chernova
  under review at IEEE-ROMAN 2025
- Robot Behavior Personalization from Sparse User Feedback,
  M. Patel, S. Chernova
  Robotics and Automation Letters (IEEE-RAL) 2025
- Predicting Routine Object Usage for Proactive Robot Assistance,
  M. Patel, A. Prakash, S. Chernova
  Conference on Robot Learning (CoRL), 2023
- Proactive Robot Assistance via Spatio Temporal Object Tracking,
  M. Patel, S. Chernova
  Conference on Robot Learning (CoRL), 2022

Workshop

- **Longitudinal Proactive Robot Assistance**,
  M. Patel
  HRI Pioneers, 2023 workshop
- **Understanding In-home Routines through Spatio-temporal Object Tracking for Proactive Assistance**,
  M. Patel, S. Chernova
  ICRA, 2022 workshop - Prediction and Anticipation Reasoning in Human Robot Interaction

Academic Achievements and Service

- Area Chair for late breaking reports at the ACM/IEEE International Conference on Human Robot Interaction (HRI), 2025 *2024-25*
- Participant in Doctoral Consortium at the Summit on Responsible Computing, AI, and Society, Atlanta *October 2024*
- Invited speaker at the Environment Dynamics Matters workshop at IROS, 2024, Abu Dhabi. *October 2024*
- Reviewer for RSS, CoRL, HRI, RAL, ICRA, IJHCI, ICSR, UR, HRI-Pioneers, and RSS-Pioneers *2022-Present*
- Fellowship awardee from the Georgia Robotics Fellowship program. *April 2024*
- Student Volunteer Coordinator for Conference on Robot Learning, 2023 *November 2023*
- HRI Pioneer at the ACM/IEEE International Conference on Human Robot Interaction (HRI), 2023. *March 2023*
- Co-organizer for the Semantic Scene Understanding for Human Robot Interaction workshop at the ACM/IEEE International Conference on Human Robot Interaction (HRI), 2023. *March 2023*
- Participant in Google CS Research Mentorship Program to receive mentorship from a Googler and network with other participants to further my career in computing *2022-2023*
- Participant in RPL Summer School, 2022, Stockholm, Sweden, fully funded and organized by the Division of Robotics, Perception and Learning at KTH Royal University, Sweden *June 2022*

Research Experience

Meta · *Research Scientist Intern, FAIR* *May 2024 - Aug 2024*

Socially Intelligent Robots under Embodied AI at Fundamental AI Research (FAIR) Labs.

- Formulated and developed a method to address personalized adaptation of robot behavior from sparse dialog.

Allen Institute for AI (AI2) · *Research Intern, Mosaic* *May 2023 - Aug 2023*

Mosaic at AI2, led by Prof. Yejin Choi, conducts research on Commonsense Reasoning in AI systems.

- Formulated the problem of goal inference from visual observations of partially complete tasks.
- Developing a method involving commonsense reasoning with language models and visual grounding models for video understanding.

Graduate Researcher · *The Laboratory for Progress, University of Michigan*
Advisor: Prof. Chad Jenkins

Planning over affordance wayfields *Jan 2019 - Apr 2019*

- Explored null-space subsumption architecture to create planners over potential-based affordance representations achieve constrained manipulation tasks. Demonstrated pick and place on a coffee mug without spilling its contents, using OpenRAVE to simulate and visualize.

Potential Field guided RRTs for motion planning *Jan 2019 - Apr 2019*

- Created a hybrid motion planner based on RRT and potential field based gradient descent and achieved greater obstacle-clearance and faster convergence compared to a vanilla RRT.

Manipulation over Mobile Robot Platform *Jan 2018 - Apr 2018*

- Implemented capability for a Fetch robot to open doors using MoveIt package on ROS platform, and integrated it into a mobile manipulation pipeline based on a behavior tree structure.

Industry Experience

Toyota Research Institute · *Software Engineer, Automated Mapping Platform* *Jan 2021 - July 2021*

At TRI, the research arm of Toyota, I worked on a mapping project with the Autonomous Driving team.

- Made improvements to the algorithms used to probabilistically infer object changes in a SLAM-based map over time.
- Developed a validation toolkit for evaluating metric accuracy of feature-based maps against a reference, and evaluating precision-recall over detected changes between an old and new map.
- Helped the Women and Allies ERG host Women's History Month to spread awareness and support women's progress.

Veoneer · *Algorithm Engineer* *June 2019 - Jan 2021*

Veoneer, formerly Zenuity, develops AD and ADAS software. I worked on Motion Planning and Localization teams based in US.

- Tested mapping and localization by simulating worst-case scenarios, and improved lane curvature calculation.
- Implemented code to identify roadside barriers in HD-maps and extracting a polygon representation of free space.
- Initiated and ran a Journal Club for the team to gain and share domain knowledge through literature discussions.

Zenuity · *Intern, Decision & Control* *May 2018 - Aug 2018*

- Improved path-tracking performance of the lateral dynamics controller in simulation and on vehicle.
- Identified challenges of autonomous parking in an indoor parking structure and created prototypes of decision trees for high-level behaviour planning and kinodynamic A* based motion planning.

Teaching And Mentorship

Robot Autonomy and Interactive Learning (RAIL) Lab · *Mentor* *Fall 2022 - Present*

- Helped mentor a team of 2 graduate students towards building a semantic mapping software stack on a Hello Robot Stretch manipulator.
- Helped mentor a team of 4 graduate students towards building a mobile manipulation software stack on a Hello Robot Stretch manipulator.
- Mentored two graduate students through independent research in semantic robotics towards in-home assistance.

Helen Scholars Program (NCWIT) · *Mentor* *Fall 2021-Spring 2022*

- Mentoring an undergraduate student towards professional and personal development as a part of a pilot scholarship program by the National Center for Women & Information Technology (NCWIT)

Graduate Student Instructor · *University of Michigan, Ann Arbor*

*Recieved honorable mention for **2020 Richard and Eleanor Towner Prize** for Outstanding GSIs*

- **Human Robot Interaction** with Prof. Sonia Chernova *Fall 2024*
  Graduate course on human robot interaction, based on seminar-style paper discussions and final project
- **Introduction to Autonomous Robotics** with Prof. Seth Hutchinson and Prof. Sonia Chernova *Spring 2024*
  Introductory graduate course on autonomous robotics including perception, localization, and planning.
- **Mobile Robotics** with Prof. Maani Jadidi *Spring 2019*
  Graduate-level course focusing on probabilistic methods in robotics like Bayesian methods and Graphical formulations, for perception and SLAM
- **Introduction to Autonomous Robotics** with Prof. Chad Jenkins *Fall 2018*
  Graduate-level course on Autonomous Robotics focusing on planning, covering path planning, manipulation and controls

Teaching Assistant · *Indian Institute of Technology, Bombay*

- Biology : Qualitative and quantitative models in life systems and applications of engineering in biology *Fall 2014*