

Huy Quyen Ngo

PHD CANDIDATE · ROBOTICS

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Education

Carnegie Mellon University

PHD IN ROBOTICS

Pittsburgh, PA

2021 - 2026 (expected)

University of Michigan

MS IN MECHANICAL ENGINEERING

- Vingroup Full-ride Master's Degree Scholarship

Ann Arbor, MI

2019 - 2021

Nagoya University

BS IN ELECTRICAL AND ELECTRONIC ENGINEERING AND INFORMATION ENGINEERING

- JASSO Scholarship

Nagoya, Aichi, Japan

2015 - 2019

Research Experience

Carnegie Mellon University - The Robotics Institute

ADVISOR: DR. AARON STEINFELD

Pittsburgh, PA

Aug. 2021 - Present

- PhD Dissertation: "Multi-modal Multi-stage Robot-to-Human Communications in Robot Failures"
- Design and implement integrated visual, auditory, and physiological modalities to facilitate effective in-vehicle interaction during startling and unexpected events.
- Research deep learning-based visual perception models for real-time detection of human emotional states, including surprise, confusion, and frustration.
- Develop simulation environments using Unity to evaluate Advanced Driver Assistance Systems (ADAS) and in-vehicle infotainment consoles.
- Developed system-level software for control and motion planning of a full-scale 7-DOF Fetch Robot, enabling automation and teleoperation for diverse manipulation and interaction experiments.
- Implemented multi-modal communication interfaces—including speech, gesture, and visual cues—to facilitate robotic explanation and promote explainable AI during failure scenarios.
- Designed comprehensive user studies and perform statistical analysis to explore the influence of robot behaviors on humans.
- Developed and implemented real-time obstacle-aware intent-expressive (legible) motion planning algorithm based on potential vector field planners in dynamic environments for robot-to-human handover task.

Professional Experience

Research Scientist Intern - Honda Research Institute

ADVISOR: DR. RANA SOLTANI ZARRIN AND DR. YUHAN HU

San Jose, CA

May 2024 - Aug. 2024

- Built a general multi-modal perception model for human state understanding during robot-initiated touch, which can be adapted to most physical human-robot interaction scenarios, using only computer vision and user study data.
- Developed an optimization-based behavior adaptation system for verbal and nonverbal robot behaviors for human state improvement, capturing human preference with learning and tree-based approaches.

Applied Research Scientist Intern - Aptiv LLC

ADVISORS: DR. KAI ZHANG

Troy, MI

May 2021 - Aug. 2021

- Implemented data-driven machine learning algorithms for map validation techniques and change detection for autonomous driving systems, which proved to be effective in real-world scenarios.
- Designed and tested map validation systems using on-board radar to enable the detection of real-time map alteration in driving logs, as compared to established reference maps.
- Devised a comprehensive evaluation framework for map validation systems, taking into account accuracy, robustness, scalability, and other pertinent metrics for the company's autonomous vehicle platforms.

Publications

PUBLISHED

Ngo, H. Q., & Steinfeld, A. (2024, August). Joint Potential-Vector Fields for Obstacle-Aware Legible Motion Planning. In 2024 33rd IEEE International Conference on Robot and Human Interactive Communication (ROMAN) (pp. 1856-1863). IEEE.

Ngo, H. Q., Carter, E. J., & Steinfeld, A. (2024, November). Human Perception of Robot Failure and Explanation During a Pick-and-Place Task. In Proceedings of the AAAI Symposium Series (Vol. 4, No. 1, pp. 373-379).

Ngo, H. Q. (2024). Human Perception of Robot Failure and Explanation (Master's Thesis, Carnegie Mellon University Pittsburgh, PA).

IN REVIEW

Ngo, H. Q., & Soltani Zarrin, R. (2025). Multi-Modal Perception and Behavior Adaptation Models for Human State Understanding and Interaction Improvement in Robotic Touch. Submitted to 2025 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). IEEE.

IN PREP

Ngo, H. Q., Jayaraman, S.K., Martelaro, N., & Steinfeld, A. (2025). Multi-Modal Modeling and Detection of Human Startling Reactions to In-Vehicle Unexpected Events. Submitting to 2025 IEEE International Conference on Intelligent Robots and Systems (IROS). IEEE.

Presentations

** presenting author*

CONTRIBUTED PRESENTATIONS

Ngo, H. Q.*, Carter, E. J., & Steinfeld, A. 2024. Human Perception of Robot Failure and Explanation During a Pick-and-Place Task. Oral presentation: AAAI Fall Symposium Series, Washington, DC.

Ngo, H. Q.*, & Steinfeld, A. 2024. Joint Potential-Vector Fields for Obstacle-Aware Legible Motion Planning. Oral Presentation: The 33rd IEEE International Conference on Robot and Human Interactive Communication (ROMAN), Pasadena, CA.

Teaching Experience

Fall 2024 **Math Fundamentals for Robotics**, Teaching Assistant

Other Professional Development

PEER REVIEW

Reviewer for AAAI Fall Symposium Series (2024)

CONFERENCE CHAIR

Chair of "Motion Planning and Navigation in Human-Centered Environments IV" session in IEEE RO-MAN 2024 Conference

PROFESSIONAL MEMBERSHIP

IEEE Student Member