# HUY QUYEN NGO

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## SUMMARY

Seeking research-oriented positions in Robotics, Machine Learning and Autonomous Systems

## EDUCATION

**Doctor of Philosophy**, Robotics — *Aug 2022 - May 2026*
Carnegie Mellon University — GPA: 4.0/4.0
**Master of Science in Engineering**, Mechanical Engineering — *Sep 2019 - Apr 2021*
University of Michigan - Ann Arbor — GPA: 3.865/4.0
**Bachelor of Engineering**, Electrical & Electronic & Information Engineering — *Oct 2015 - Sep 2019*
Nagoya University — GPA: 3.95/4.3

## SKILLS

**Programming Languages**: C, C++, Python, MATLAB
**Technical Skills**: ROS, Linux, Machine Learning, Computer Vision, Deep Reinforcement Learning, Embedded Systems (Raspberry Pi, Arduino), Simulation (Gazebo, PyBullet), Robot Design
**Relevant Coursework**: Computer Vision, Machine Learning, Hand Design and Control for Dextrous Manipulation, Visual Navigation for Autonomous Aerial Vehicles, Advanced Mechatronic Design, Engineering Haptic Interfaces

## EXPERIENCE

**PhD Candidate**, Carnegie Mellon University — *Sep 2022 - Present*
- Conduct research and literature review on 3D scene generaion, spatial completion and NLP for creative AI
- Build 3D space generation and interactive simulation system of buildings and dynamic environments based on point clouds collected by mobile robots with computer vision and machine learning modules
- Develop algorithms and methods for semantic segmentation and scene understanding for VR/AR supported interactive environments, with applications for gaming, virtual experience and robotic research
- Develop techniques for 3D scene generation and mesh creation from text through natural language processing
- Build and maintain mobile robots with 3D perception and vision infrastructure for 3D space exploration and mapping

**Research Assistant**, Carnegie Mellon University — *Aug 2021 - Aug 2022*
- Research title: Human-Robot Interaction with Multimodal Haptic Guidance Robots
- Researched and performed literature study on multimodal and bidirectional haptic interface designs for human-robot interaction and collaboration via nonverbal mechanisms of kinesthesia, skin-stretch, hand squeeze and vibrotactile
- Designed, optimized and programmed an Arduino controlled robotic arm with customized humanoid hand and haptic components incorporated into an exsiting guidance robot for haptic research and human participant testing
- Developed guidance systems based on psychophysical interactions and nonverbal perception of visually-impaired people

**Applied Research Scientist Intern**, Aptiv LLC — *May 2021 - Aug 2021*
- Research title: Radar-based Map Validation for Autonomous Vehicles
- Researched and performed literature review on data-driven machine learning algorithms for map validation and change detection in autonomous driving systems in real-world settings
- Designed and experimented map validation systems based on open-source code repositories that fuses on-board radar data and detects real-time map changes in driving logs compared to reference maps
- Developed an evaluation framework for map validation systems based on accuracy, robustness, scalability and metrics
- First author of a manuscript on Map Validation for Autonomous Driving Systems

**Student Researcher**, UMich & Ford Center for Autonomous Vehicles — *Aug 2020 - Apr 2021*
- Research title: Optimal Sensor Placement in Occlusion-rich Environments for Autonomous Vehicles
- Researched and performed literature review on planning optimization algorithms to improve vision coverage and mitigate accident rate for autonomous vehicles in highly-occluded traffic intersections
- Devised and developed new sensor placement algorithms in point cloud representations using Next-Best-View frontier-prone planning principles

## PROJECTS

**6-DOF Robotic Manipulator Project (Robotic Systems Lab course)**
- *Perception*: Use traditional computer vision to distinguish block colors for pick-and-place task with arm manipulation
- *Acting:* Used Forward Kinematics & Inverse Kinematics and PID controllers to control robot end-effector to grasp and manipulate color-coded blocks

## Manuscript

H. Q. Ngo and K. Zhang, "Map Validation for Autonomous Driving System - A Review". https://tinyurl.com/3vb749hd