Hai Nguyen

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Experienced engineer and highly-cited researcher in **end-to-end data-driven decision making** under **partial observability** and **uncertainties**, using **memory-based model-free reinforcement learning** with the focus on **robotic manipulation applications**.

Education

Ph.D. in Computer Science, Northeastern University (3.95/4.0), USA **Sep. 2019 - Nov. 2024 (Expected)**
M.Sc. in Unmanned Aircraft Systems Design, University of Southampton (w/ Distinction), UK **2016-2017**
B.Sc. in Control & Automation Engineering, Hanoi University of Science and Technology, Vietnam **2007-2012**

Work Experience

Ph.D. Student, LLPR Lab & Helping Hands Lab, Northeastern University **Sep. 2019 - Present**
Reinforcement Learning (RL) in Robotics under Partial Observability *Advisors: Christopher Amato, Robert Platt*

- Leveraged privileged information, mixed observability, and symmetry for efficient memory-based RL under partial observability
- Learned RL agents in simulation and performed sim-to-real or learned directly on hardware with scripted demonstrations

Applied Science Intern, Amazon Robotics, North Reading, MA, USA **May 2024 - Aug. 2024**
Multi-step Manipulation using On-Robot RL *Manager, Mentor: Manikantan Nambi, Huitan Mao*

- Used symmetry-aware RL (pixel-based DQN) to learn multi-step manipulation (e.g., pick-pick, push-pick, drag-pick) in simulation (PyBullet) to pick objects that are difficult to grasp (e.g., objects at corners, dense clutter) using top-down picks
- Performed direct learning on a UR5e robot (from scratch, no demonstrations) to achieve >90% success rate within 2 hours

Research Intern, OMRON SINIC X Corporation, Tokyo, Japan **May 2023 - Sep. 2023**
On-Robot RL under Partial Observability *Mentors: Masashi Hamaya, Tadashi Kozuno*

- Combined actor-critic RL (SAC) + behavior cloning (50 episodes of demonstrations to repopulate the replay buffer) to learn Peg-In-Hole task directly on a soft UR5e robot arm using force and torque (F/T) feedback within 2 hours on hardware
- Developed a soft UR5e robot with F/T feedback in MuJoCo to test learning Peg-In-Hole in simulation based on RoboSuite

Research Assistant, ARA & ARL Lab, University of Nevada, Reno **Sep. 2018 - Jun. 2019**
Deep and Deep Reinforcement Learning Research *Advisors: Kostas Alexis, Hung La*

- Developed mobile robot agent to open doors autonomously from RGB images in MuJoCo, learned using RL (DDPG + HER)
- Developed an object detector using thermal images for team CERBERUS to deploy on edge devices (Intel Neural Sticks) mounted on drones operating underground (later won the DARPA Subterranean Challenge 2021 with $2M prize)

Flight Software Developer, Viettel Aerospace Institute, Vietnam **2012-2016 & 2017-2018**
Embedded Autopilot Software for Autonomous Drones

- Developed control & path planning embedded algorithms in an FPGA-based autopilot for autonomous fixed-wing drones
- Implemented control algorithms allowing a quad-plane to perform autonomous fixed↔rotary-wing transition mid-flight

Selected First-Authored Publications (G-Full List > 700 Citations)

"Leveraging Mutual Information for Asymmetric Learning under Partial Observability", *Hai Nguyen*, Long Dinh, Christopher Amato, Robert Platt, *Conf. on Robot Learning (**CoRL**), 2024*

"Symmetry-aware Reinforcement Learning for Robotic Assembly under Partial Observability with a Soft Wrist", *Hai Nguyen*, Tadashi Kozuno, C. Hernandez, M. Hamaya, *Intl. Conf. on Robotics and Automation (**ICRA**), 2024*, Code, Video

"Equivariant Reinforcement Learning under Partial Observability", *Hai Nguyen*, Andrea Baisero, David Klee, Dian Wang, Robert Platt, Christopher Amato, *Conf. on Robot Learning (**CoRL**), 2023*, Code, Video

"On-Robot Bayesian Reinforcement Learning for POMDPs", *Hai Nguyen*, Sammie Katt, Yuchen Xiao, Christopher Amato, *IEEE/RSJ International Conf. on Intelligent Robots and Systems (**IROS**), 2023*, Video

"Leveraging Fully Observable Policies for Learning under Partial Observability", *Hai Nguyen*, Andrea Baisero, Dian Wang, Christopher Amato, Robert Platt, *Conf. on Robot Learning (**CoRL**), 2022*, Code, Video

"Belief-Grounded Networks for Accelerated Robot Learning under Partial Observability", *Hai Nguyen*, Brett Daley, Xinchao Song, Christopher Amato, Robert Platt, *Conf. on Robot Learning (**CoRL**), 2020*, Code, Video

Engineering Skills

Programming Languages: MATLAB, C/C++, Python | **Frameworks**: PyTorch, ROS, MuJoCo/PyBullet/Gazebo, Linux

Awards

IMechE UAS Autonomous Drone Challenge, Team Valkyrie, Runner-up Award (Final) & Navigation Authority Award **2017**
Chevening Scholarship, British Foreign and Commonwealth Office (**2%** acceptance rate) **2016**