Hai Nguyen

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Experienced engineer and researcher in **end-to-end data-driven decision making** under **partial observability** and **uncertainties**, using **memory-based 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, 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
- Learned RL agents in simulation and performed sim-to-real or learned directly on hardware with 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) and directly on a UR5e robot (from scratch, no demonstrations) 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 RL (Soft Actor-Critic) + behavior cloning (50 episodes of demonstrations to repopulate the replay buffer) to learn Peg-In-Hole directly on a soft UR5e robot arm using force and torque feedback within 2 hours

Research Assistant, ARA & ARL Lab, University of Nevada, Reno **Sep. 2018 - Jun. 2019**
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
- Developed an object detector using thermal images for team CERBERUS to deploy on drones 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 Drones

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

Selected Publications (G-Full List)

"Leveraging Mutual Information for Asymmetric Learning under Partial Observability", *Conf. on Robot Learning (**CoRL**), 2024*

"Symmetry-aware Reinforcement Learning for Robotic Assembly under Partial Observability with a Soft Wrist", *International Conf. on Robotics and Automation (**ICRA**), 2024*, Code

"Equivariant Reinforcement Learning under Partial Observability", **CoRL**, 2023, Code

"On-Robot Bayesian Reinforcement Learning for POMDPs", *IEEE/RSJ International Conf. on Intelligent Robots and Systems (**IROS**), 2023*

"Leveraging Fully Observable Policies for Learning under Partial Observability", ***CoRL***, 2022, Code

"Belief-Grounded Networks for Accelerated Robot Learning under Partial Observability", ***CoRL***, 2020, Code

Engineering Skills

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

Awards

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