Hai Huu Nguyen

🏠 https://hainhbkhn.wixsite.com/hainguyen[1]

RESEARCH INTERESTS	Computer Vision, Deep Learning, Robotics and Reinforcement Learning.

EDUCATION

University of Southampton, United Kingdom.   [Sept. 2016 - Sept. 2017]

- M.Sc., Unmanned Aircraft Systems Design, GPA: 75/100 (**Distiction**).
- Thesis: *Aerial Docking between Multi-Rotor Remotely Piloted Aircraft Systems* [poster, pdf, video].
- Supervisor: Dr. Stephen Prior.

Hanoi University of Science and Technology, Vietnam. [Aug. 2007 - June 2012]

- B.Sc., Automation and Control, GPA: 3.18/4.0 (Good).
- Thesis: *Control Structure with Direct Decoupling for Permanent Magnet Linear Synchronous Motors including End Effects.*
- Supervisor: Dr.-Ing. Phuoc Nguyen Doan.

SKILLS

- *Programming Languages:* C/C++, C#, Python, LaTex, Arduino.
- *Technical Software:* MATLAB, Simulink, OpenCV, ROS, TensorFlow, Keras, Git (⭘hhn1n15).
- *OS:* Windows, Linux (Ubuntu).

HONORS AND AWARDS

- **Chevening Scholar 2016:** The UK government's global scholarship for a one year Master's degree in the UK, awarded for 20 Vietnamese finalists in 2016. About **2%** acceptance rate annually.
- **IMechE UAS Challenge 2017 - Runner-up:** Member of Southampton - Valkyrie, 22 international teams participated.
- **IMechE UAS Challenge 2017 - Navigation Accuracy Award:** For the most accurate waypoint-following path while flying missions. Drones presented at the *Defence and Security Equipment International (DSEI) Exhibition* - London, Sept. 2017.

EXPERIENCE

Research Assistant   [August. 2018 -]
Advanced Robotics and Automation Lab, University of Nevada, Reno, USA

- Using convolutional neural networks for crack detections on concrete bridges to automate road inspection tasks which are normally performed by human experts.
- Applying convolutional neural networks and reinforcement learning for a mobile manipulator to detect and open autonomously door handles. Using Deep Deterministic Policy Gradient - DDPG and Hindsight Experience Replay - HER. Improving learning performance of DDPG+HER by using an external CNN to

---

[1]Store pictures and videos of past projects.

rank training experiences to achieve automatic hindsight goal creation[2], allowing only the highest-scored experiences for training the control policy. Significant boost in learning speed verified by four simulated tasks in Gym+Mujoco.

- Using Yolo-v3 network and transfer learning for object detections from thermal images. Potentially can be used to compete in DARPA Subterranean Challenge in 2019.

MSc student   [Sept. 2016 - Sept. 2017]
University of Southampton, UK

- Developing control algorithms for autonomous aerial docking between two drones using ROS and augmented reality tags (ArUco). The mother drone with the tags attached is a quadcopter controlled by a Pixhawk autopilot while the child drone is the commercial Parrot AR.Drone 2.0 quadcopter. Image processing is performed on a desktop computer and then movement commands are computed and sent back wirelessly to the child drone to control it to follow the tags (the mother drone) and to dock on the mother drone.

- Developing the feature of target detection and geo-location reporting (a mission within the IMechE UAS competition) using OpenCV and ROS. An single on-board computer (Odroid XU4) run ROS scripts in Linux OS to process images captured from a camera and send movement commands and target coordinates to the Pixhawk autopilot [video].

Flight Software Engineer   [Aug. 2012 - Aug. 2016 & Nov. 2017 - Aug. 2018]
Viettel Aerospace Institute, Hanoi, Vietnam

- Implementing and testing control algorithm for a quad-plane to take off vertically as a multirotor, transfer to fixed-wing flight and land autonomously on a predefined GPS coordinate (landing pad) as a multirotor.

- Developing an extended Kalman filter to estimate a fixed-wing Unmanned Aerial Vehicle (UAV)'s attitude using data fusion from 3-axis gyroscope, accelerometer, magnetometer and GPS on an FPGA platform. The filter bases on kinematic quaternion differential equations to obtain Euler angles and has a state vector of four quaternions and three gyro biases.

- Developing SITL and HITL simulation to verify control and navigation algorithms using FlightGear and XPlane simulators. The program is interfaced with the simulators using C# and connected to the autopilot hardware via serial ports.

- Developing and testing control and path planning algorithms for an FPGA-based autopilot to control fixed-wing UAVs. Software is developed using μC/OS-II kernel and observer design pattern.

PUBLICATIONS

- A. Sehgal, H. M. La, S. J. Louis, **H. Nguyen**, "Deep Reinforcement Learning using Genetic Algorithm for Parameter Optimization", in 2019 Third IEEE International Conference on Robotic Computing (IRC).

- **H. Nguyen** and H. M. La, "Review of deep reinforcement learning methods for robot manipulation", in 2019 Third IEEE International Conference on Robotic Computing (IRC).

- **H. Nguyen**, Hung Manh La, and Matthew Deans. "Deep Learning with Experience Ranking Convolutional Neural Network for Robot Manipulator." arXiv preprint arXiv:1809.05819 (2018), Submitted for ICRA 2019 [pdf, video].

---

[2]OpenAI request for research: HER edition [link]