DIEP GIANG THUY KHUONG

22-4 Dongil-ro 38-gil, Gwangjin-gu, Seoul, South Korea
010-6791-2607 thuykhuong911@gmail.com linkedin.com/in/khuonggiangthuydiep/ github.com/KhuongDiep911

Summary

Diep Giang Thuy Khuong is passionate about AI development and application. He is currently pursuing a Master's degree at Sejong University and working as a Graduate Research Assistant in the Human-Computer Interaction lab. His research focuses on development and evaluation of a Deep Reinforcement Learning-Based Obstacle Avoidance System for Drones.

During his undergraduate education, Diep Giang Thuy Khuong realized he had a passion for AI and Machine Learning, and wanted to use it to tackle real-world problems. This passion motivated his decision to pursue postgraduate education, leading him to enroll in the Master's program after completing his Bachelor of Engineering in Aerospace Engineering in 2021. He graduated from the university with a very-good degree and at the top 3% of students in the Faculty of Transportation (Top 4 out of 150 students).

His life motto is: "You only fail when you stop trying".

Work Experience

Human-computer Interaction (HCI) Lab, Sejong University **March 2022 – Present**
Graduate research assistant *Seoul, South Korea*

- **Research topic**: Development and Evaluation of a Deep Reinforcement Learning-Based Obstacle Avoidance System for Drones
- Studied the procedure of transitioning autonomous flight models, initially trained within the Airsim simulator, to real-time testing scenarios through the deployment of ROS in conjunction with a Bebop drone platform;
- Implemented a depth estimation model capable of transforming RGB images into precise depth observations;
- Constructed realistic and complicated training environment in Unreal Engine for drone training;
- Utilized multiple algorithms, including D3QN and SAC in reinforcement learning to train the drone. Additionally, implemented temporal shift network architecture aimed at enhancing overall performance and efficiency;
- Designed appropriate reward functions and action spaces to meet the specific requirements of the project.
- **Achievement** (still updating):
- Project: Finished the "Future intelligent drone research" project funded by National Research Foundation of Korea. The drone successfully navigated through five walls in the Airsim simulation environment with a 90% success rate. In real-world testing, the Bebop drone achieved an 80% success rate in navigating physical obstacles;
- Korean conference: A paper titled "Novel Reward Function for Autonomous Drone Navigating in Indoor Environment" on the Annual Conference of KIPS 2023 received the Best Paper Award;
- Graduation thesis: Proposed a novel reward function tailored to enable three-dimensional navigation for drone obstacle avoidance. This approach allowed the drone not only to move forward but also to change its heading direction and operating height dynamically during navigation;
- Journal: Expecting to publish a paper in an international journal after finish the thesis defense.
- **Tools and libraries**: Pytorch, Tensorflow, keras, stable-baselines, Airsim, Unreal Engine, ROS, Bebop drone

Emage Development Co., Ltd **April 2021 - February 2022**
Mechanical Design Engineer *Ho Chi Minh City, Vietnam*

- Created animations to illustrate the robotic movements employed in solving industrial challenges using SolidWorks software;
- Designed essential tools to enhance the functionality and efficiency of the robot's tasks;
- Produced rendered animation videos that depict the problem-solving process of the robot, intended for presentation to clients.

NOBA Robotics Co., Ltd **August 2020 - April 2021**
R&D Intern *Ho Chi Minh City, Vietnam*

- Engaged in research within my professor's startup, focusing on drone system components such as motors, batteries, propellers, and avionics, aimed at gaining practical experience and building a comprehensive database for my upcoming graduation thesis;

- Studied the design algorithm developed using Matlab software, adapting it to align with the specific mission profile of the delivery drone. This involved determining optimal weight parameters and specifications for the propulsion system;
- Utilized the calculated weights obtained from the algorithm to create a detailed 3D model using SolidWorks software;
- Conducted structural analysis of the drone's framework, employing the Tsai-Wu criterion to assess its strength and integrity, contributing to a comprehensive understanding of the drone's performance capabilities.

• **Achievement**:

- A graduation thesis researching on designing of delivery drone;
- A research paper titled "Electric Propulsion System Sizing Algorithm and Structural Design for Delivery Drone" published in the journal "Applied Mechanics and Materials".

Education

Sejong University — **March. 2022 – Present**
Master of Science in Computer Science and Engineering (GPA: 4.25/4.5) — *Seoul, South Korea*

VNU, Ho Chi Minh City University of Technology — **August 2017 - October 2021**
Bachelor of Engineering in Aerospace Engineering (GPA: 8.15/10.0) — *HCMC, Vietnam*

Thai-German Graduate School of Engineering (TGGS) — **July 2019 - August 2019**
Exchange student — *Bangkok, Thailand*

Publications

- Khuong G. T. Diep, Yong-Guk Kim et al. "Novel Reward Function for Autonomous Drone Navigating in Indoor Environment". Annual Conference of KIPS 2023, Vol. 30, No. 2, ISSN 2671-7298. http://kips.or.kr/societyAwards.
- Khuong Giang Thuy Diep, and Ngoc Anh Vu. "Electric Propulsion System Sizing Algorithm and Structural Design for Delivery Drone." Applied Mechanics and Materials, vol. 907, Trans Tech Publications, Ltd., 22 June 2022, pp. 89–100. Crossref, doi:10.4028/p-k58195.

Scholarships and Awards

Best Paper Awards issued by Annual Conference of KIPS 2023	November, 2023
Kumho Asiana-Vietnam Scholarship and Cultural Foundation	September, 2019 – October, 2021
Incentive Scholarship for the top 3 students in the department	4 times (2017 – 2020)
Consolation prize at Model Aircraft Contest – Aeroday 2019	Ranking 4/11 (September, 2019)

Coursework Projects

Implementing CoGAN on MNIST dataset	*Python, Pytorch*	(***report link***)
Deep reinforcement learning for Atari game	*Python, Pytorch, gym*	(***report link***)
Comparison of Swin Transformer and PVT on Image classification	*Python, Pytorch, timm library*	
Facial expression recognition	*Python, Pytorch*	(***report link***)
Human keypoints labeling and detection	*Python, Pytorch, Detectron2*	
Comparison between MLP and CNN on MNIST dataset	*Python, Pytorch*	(***report link***)

Linguistic Competences

English	IELTS 6.0
Vietnamese	Native language

Relevant Certificates

- Python Data Structures (Coursera)
- Neural Network and Deep Learning (Coursera)
- Introduction to Tensorflow in AI (Coursera)
- Advanced RL: Policy gradient methods (Udemy)
- ROS for beginners: Basic, Motion and OpenCV (Udemy)
- ROS for beginners II: Localization, Navigation and SLAM (Udemy)

Technical Skills

Programming Languages	Python, C (basic), C++ (basic), MATLAB
Frameworks and library	Pytorch, Tensorflow, keras, stable-baselines, gym, detectron2 (basic), timm (basic)
Developer Tools	VS Code, Google Colab
Technologies/Platform	Linux, ROS, Airsim, Unreal Engine, GitHub, Anaconda

Leadership / Extracurricular

Vietnamese Students' Association in Korea (VSAK) **April 2023 – Present**

Collaborator *Viet Nam Embassy in Republic of Koreas*

- Organizer of the 9th Annual Conference of Vietnamese Young Scientists (ACVYS 2023).
- Organizer of the VSAK Sport Woori Bank Union Cup 2023.
- Organizer of the 16th Vietnamese Student day in Korea.

Vietnamese Students' Association at Sejong University **November 2022 – Present**

Commissioner *Sejong University*

- Organizer of the year-end event, "GALA DINNER - TET XA 2023" aimed to create a festive atmosphere reminiscent of Lunar New Year for Vietnamese students at Sejong University who are residing far from home. (*link to the article*)
- Organizer of the event to welcome new students entering the Fall semester 2022