LONG HOANG PHAM

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June 17, 2022

RESEARCH INTERESTS

My current research focuses on applying computer vision, image processing, and machine learning to extract information from traffic surveillance systems.

EMPLOYMENT RECORDS

09/2021 – Now **Postdoctoral Scholar**, Automation Lab, Sungkyunkwan University.
- » Advisor: Prof. Jae Wook Jeon.

08/2017 – 08/2021 **Teaching Assistant**, Automation Lab, Sungkyunkwan University.
- » Advisor: Prof. Jae Wook Jeon.

08/2015 – 08/2017 **Olympiad Coach**, School of Computer Science & Engineering, HCMIU.
- » Train Olympiad team in Informatics for HCMIU.
- » Achievements: 1 bronze medal in Vietnam Student Olympiad in Informatics (2016).

08/2015 – 08/2017 **Research Assistant**, School of Computer Science & Engineering, HCMIU.
- » Advisor: Dr. Synh Viet-Uyen Ha.
- » Research interests: computer vision, image processing, traffic surveillance system, vehicle classification.

07/2014 – 08/2015 **Teaching Assistant**, Department of Industrial and Systems Engineering, HCMIU.
- » Organize training and tutorial sessions on embedded programming (Arduino and C/C++) for courses' projects.

EDUCATION

08/2017 – 08/2021 **Ph.D. in Computer Engineering,**
Sungkyunkwan University, Suwon, Republic of Korea.
- » **Dissertation: "A Smartphone-based Laser Measuring System for Gap and Flush Assessment in Car Body."**
- » Area of specialty: computer vision, image processing, laser measurement, instrumentation and measurement, mobile development.
- » Advisor: Prof. Jae Wook Jeon.

11/2014 – 06/2017 **M.Eng. in Information Technology Management,**
Vietnam National University - Ho Chi Minh City – International University (HCMIU), Vietnam.
- » **Thesis: "A Robust Multiclass Vehicle Detection and Classification Algorithm for Traffic Surveillance System."**
- » Area of specialty: computer vision, machine learning, traffic surveillance system.
- » Advisor: Dr. Synh Viet-Uyen Ha.
- » Overall GPA: **3.80/4.0**, Excellent (rank 1st).

08/2009 – 05/2014 **B.Sc. of Computer Science,**
Vietnam National University - Ho Chi Minh City – International University (HCMIU), Vietnam.
- » **Thesis: "Extended Segmentation Algorithm in Traffic Monitoring System."**
- » Area of specialty: computer vision, machine learning, traffic surveillance system.

» Advisor: Dr. Synh Viet-Uyen Ha.
» Overall GPA: **3.85/4.0**, Very good (rank 2nd).

08/2006 – 05/2009 **Nguyen Thi Minh Khai High School,** Ho Chi Minh City, Vietnam.
» Literature 6.5 • Math 9.5 • Physics 9.5 • English 9.0 • Biology 10 • Geography 8.5.

HONORS & AWARDS

Research Related

2022 » Second place in the 6th AI City Challenge Track 4 (Multi-Class Product Counting & Recognition for Automated Retail Checkout), 2022 IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)

» Third place in the 5th UG2+ Challenge Track 1 - Object Detection in the Hazy Condition, 2022 IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)

2021 » Fourth place in the 5th AI City Challenge Track 1 (Multi-Class Multi-Movement Vehicle Counting Using IoT Devices), 2021 IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW).

» First place in Driving Image AI Learning Dataset Contest, Instance Segmentation.
» Second place in Driving Image AI Learning Dataset Contest, Object Detection.
» The contest was organized by the Ministry of Science and ICT; the Ministry of Trade, Industry and Energy; the National Information Society Agency; and the Korea Automotive Technology Institute.

2020 » First places in the Automated Driving Recognition Technology Competition, 4th Pangyo Autonomous Mobility Show, Korea, 2020 in two fields:
   o Forward recognition environment.
   o Omni-directional 3D (Lidar) recognition environment.

2019 » Second places in the Automated Driving Recognition Technology Competition, 3rd Pangyo Autonomous Mobility Show, Korea, 2019 in two fields:
   o Forward recognition environment.
   o Omni-directional 3D (Lidar) recognition environment.

2017 Excellent Scientific Publications Graduate Program award, intake 2015 – 2017.

2014 Ho Chi Minh City ICT Award 2014 for excellent performance in academic, scientific research.

2013 Award from Chairman of Ho Chi Minh City People Committee for excellent performance academic, scientific research.

Programming Contests

2013 Bronze medal in Vietnam Student Olympiad in Informatics.

   Honorable mention in ACM/ICPC Asia Regional Contest 2013 - Danang site.

2012 Consolation prize in Vietnam Student Olympiad in Informatics.

   Honorable mention in ACM/ICPC Asia Regional Contest 2012 - Hanoi site.

Academic Related

2017 Dean's List, outstanding student (rank 1), the gold medal of master intake 2015 – 2017.

2014 Dean's List, outstanding student (rank 2), silver medal of bachelor intake 2009 – 2014.

2013 International University Rector's Award 2013 for academic excellence at the 10th anniversary.

2012 – 2014   Student of 5 merits (moral courage, academic accomplishment, physical fitness, skills acquisition, integrated competence) titles of:
- Ho Chi Minh City level (2013, 2014),
- Vietnam National University level (2012, 2013, 2014), and
- International University level (2012, 2013, 2014).

Scholarships & Fellowships

2017 – Present   Full Scholarship for Ph.D. study in Electrical and Computer Engineering, Sungkyunkwan University, Republic of Korea.

2015   Toshiba Scholarship 2015 for master and doctoral student.

2014 – 2016   Full Scholarship for Master program in Information Technology Management, Vietnam National University - Ho Chi Minh City – International University, Vietnam.

2013   Pony Chung Scholarship 2013 for achievements in scientific research.

2012   CSC Vietnam Scholarship 2012 for excellent academic performance.

2009 – 2013   8 End-of-Semester Scholarships for Bachelor program in Computer Science and Engineering, Vietnam National University - Ho Chi Minh City – International University, Vietnam.

2009   HCMIU's Scholarship for excellent performance in the university entrance exam.

RESEARCH EXPERIENCES

Applied Research & Development Projects

2018 – 2021   **DEVELOPMENT OF A SMARTPHONE-BASED LASER MEASUREMENT SYSTEM FOR ASSESSMENT OF GAP, FLUSH, AND CURVATURE IN CAR BODY**
- **Description:** A project to develop a portable laser measurement device using smartphone as both images capturing device and logical processing unit.
- **Location:** Suwon, South Korea.
- **Client:** Hyundai Advanced Manufacturing CAE Team.
- **Role:** Participant.
- **Position:** Lead Developer.

2015 – 2017   **PILOTING PROJECT ON THE INTELLIGENT TRAFFIC SYSTEM OF HO CHI MINH CITY.**
- **Description:** A piloting project belonged to the "Application of Science and Technology in Reducing Traffic Congestion" program. The project is consisted of three modules: traffic surveillance system, traffic simulation, and traffic light control system. Our group is responsible for developing the traffic surveillance system to detect, track, classify, and count moving vehicles using surveillance cameras. The counting information is then provided to other modules for further processing.
- **Location:** Ho Chi Minh City, Vietnam.
- **Client:** Ho Chi Minh City People's Committee.
- **Role:** Participant.
- **Position:** Software Architect, Lead Developer.

Academic Research Projects

2020 – 2022   **REAL-TIME SCENE UNDERSTANDING TECHNOLOGY IN COMPLEX TRAFFIC CONDITIONS AND IN BAD WEATHER.**
- **Description:** Developing a state-of-the-art semantic segmentation in the presence of complex traffic conditions and bad weather.
- **Location:** Suwon, South Korea.
- **Client:** The National Research Foundation of Korea (NRF) grant funded by the Korean government (MSIT) (2020R1A2C3011286).
- **Role:** Participant.

» **Position:** Researcher.

2017 – 2018 **DEVELOPMENT OF OVERLAPPING VEHICLE DETECTION AND CLASSIFICATION ALGORITHMS FOR CAMERA TRAFFIC SURVEILLANCE SYSTEM.**
» **Description:** A project belonged to the Science and Technology Incubator Program 2017.
» **Location:** Ho Chi Minh City, Vietnam.
» **Client:** Ho Chi Minh City Department of Science and Technology in cooperation with Ho Chi Minh City Youth Union and The Youth Scientific and Technological Promotion Center.
» **Role:** Scientific Secretary.
» **Position:** Supervisor.

2016 – 2017 **ADVANCED OCCLUSION DETECTION ALGORITHM IN VIDEO PROCESSING APPLICATIONS.**
» **Description:** A Vietnam National University class C project.
» **Location:** Ho Chi Minh City, Vietnam.
» **Client:** Vietnam National University - Ho Chi Minh City.
» **Role:** Participant.
» **Position:** Developer.

2015 – 2016 **EXTEND OCCLUSION VEHICLE DETECTION ALGORITHM IN CROWDED SCENE FOR TRAFFIC SURVEILLANCE SYSTEM.**
» **Description:** A student research project (SV2015-IT-03).
» **Location:** Ho Chi Minh City, Vietnam.
» **Client:** Vietnam National University - Ho Chi Minh City – International University.
» **Role:** Participant.
» **Position:** Developer, Supervisor.

2014 – 2015 **RESEARCHING VIDEO TECHNOLOGIES IN TRAFFIC MONITORING SYSTEM.**
» **Description:** A HCMIU research project.
» **Location:** Ho Chi Minh City, Vietnam.
» **Client:** Vietnam National University - Ho Chi Minh City – International University.
» **Role:** Participant.
» **Position:** Developer.

2013 – 2014 **EXTENDED SEGMENTATION ALGORITHMS IN TRAFFIC MONITORING SYSTEM.**
» **Description:** A student research project.
» **Location:** Ho Chi Minh City, Vietnam.
» **Client:** Vietnam National University - Ho Chi Minh City – International University.
» **Role:** Principal Investigator.
» **Position:** Software Architect, Lead Developer.

PATENTS & REGISTRATIONS

Patents

2022 Jae Wook Jeon, **Pham Hoang Long**, HyungMin Jeon, Tran Nguyen Ngoc Duong (2022), *"Traffic Flow Prediction by Counting the Number of Vehicles Moving in a Specific Direction (특정 방향으로 이동하는 차량 수 카운팅을 이용한 교통 흐름 예측)"*, (KR Patent R-2021-1147-KR-1)

2020 Jae Wook Jeon, **Long Hoang Pham**, Jinyoung Byun (2020), *"스마트폰 카메라를 이용한 간격 및 단차 측정 애플리케이션"*, (KR Patent)

Copyrights

2021 Jae Wook Jeon, **Long Hoang Pham**, Duong Nguyen-Ngoc Tran, and HyungMin Jeon (2021), *"Turn-counts Traffic Flow Estimation (특정방향으로 이동하는 차량 수 카운팅을 이용한 교통 흐름 예측)"* (KR C-2021-036820) Korea Copyright Commision (한국저작권위원회)

PUBLICATIONS

Articles

2022   Duong Nguyen-Ngoc Tran, **Long Hoang Pham**, Huy-Hung Nguyen, Tai Huu-Phuong Tran, Hyung-Joon Jeon, Jae Wook Jeon, "*Universal Detection-based Driving Assistance Using a Mono Camera with Jetson Devices,*" IEEE Access, 2022, doi: 10.1109/ACCESS.2022.3179999.

2021   **Long Hoang Pham**, Duong Nguyen-Ngoc Tran, Jin Young Byun, Chul Hong Rhie, and Jae Wook Jeon, *"A Smartphone-based Laser Measuring System for Gap and Flush Assessment in Car Body",* IEEE Transactions on Industrial Electronics, 68(07): 6297–6307, 2021, doi: 10.1109/tie.2020.2992971

2016   Synh Viet-Uyen Ha, Nhan Thanh Pham, **Long Hoang Pham**, and Ha Manh Tran, *"Robust Reflection Detection and Removal in Rainy Conditions using LAB and HSV Color Spaces,"* REV Journal on Electronics and Communications, 6(1):13–19, August 2016.

2014   Synh Viet-Uyen Ha, **Long Hoang Pham**, Ha Manh Tran, and Phong Ho-Thanh, *"Improved Vehicles Detection and Classification Algorithm for Traffic Surveillance System,"* Journal of Information Assurance and Security, 2/49(5):268–277, December 2014.

CONFERENCES & PRESENTATIONS

Conferences

2022   **Long Hoang Pham**, Duong Nguyen-Ngoc Tran, Huy-Hung Nguyen, Tai Huu-Phuong Tran, Hyung-Joon Jeon Hyung-Min Jeon, and Jae Wook Jeon, *"DeepACO: A Robust Deep Learning-based Automatic Checkout System,"* The 6th AI City Challenge (AICity), 2022 IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW), USA, 2022.

Duong Nguyen-Ngoc Tran, **Long Hoang Pham**, Hyung-Joon Jeon, Huy-Hung Nguyen, Hyung-Min Jeon, Tai Huu-Phuong Tran, Jae Wook Jeon, *"A Robust Traffic-Aware City-Scale Multi-Camera Vehicle Tracking Of Vehicles,"* The 6th AI City Challenge (AICity), 2022 IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW), USA, 2022.

2021   Guanlin Chen, Wenguan Wang, Zhijian He, Lujia Wang, Yixuan Yuan, Dingwen Zhang, Jinglin Zhang, Pengfei Zhu, Luc Van Gool, Junwei Han, Steven Hoi, Qinghua Hu, Ming Liu, Andrea Sciarrone, Chao Sun, Chiara Garibotto, Duong Nguyen-Ngoc Tran, Fabio Lavagetto, Halar Haleem, Hakkı Motorcu, Hasan F. Ates, Huy-Hung Nguyen, Hyung-Joon Jeon, Igor Bisio, Jae Wook Jeon, Jiahao Li, **Long Hoang Pham**, Moongu Jeon, Qianyu Feng, Shengwen Li, Tai Huu-Phuong Tran, Xiao Pan, Young-min Song, Yuehan Yao, Yunhao Du, Zhenyu Xu, Zhipeng Luo, *"VisDrone-MOT2021: The Vision Meets Drone Multiple Object Tracking Challenge Results,"* 2021 IEEE/CVF International Conference on Computer Vision, 2021

Duong Nguyen-Ngoc Tran**, Long Hoang Pham**, Huy-Hung Nguyen, Tai Huu-Phuong Tran, Hyung-Joon Jeon and Jae Wook Jeon, *"A Region-and-Trajectory Movement Matching for Multiple Turn-counts at Road Intersection on Edge Device,"* The 5th AI City Challenge (AICity), 2021 IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW), USA, 2021.

Duong Nguyen-Ngoc Tran, **Long Hoang Pham**, and Jae Wook Jeon, *"Benchmark of Segmentation Model on Edge Device,"* The 16th International Conference on Future Information Technology (FutureTech 2021), South Korea, 2021.

Long Hoang Pham, Duong Nguyen-Ngoc Tran, Chul Hong Rhie, and Jae Wook Jeon, *"Developing a Smartphone-based Hand-Held Radius Measurement Using Laser Triangulation System,"* The 16th International Conference on Future Information Technology (FutureTech 2021), South Korea, 2021.

Long Hoang Pham, Duong Nguyen-Ngoc Tran, Chul Hong Rhie, and Jae Wook Jeon, *"An Improved Sub-Pixel Laser Center Extraction Using Peak Position and Contour Detection Methods,"* The 16th International Conference on Future Information Technology (FutureTech 2021), South Korea, 2021.

Long Hoang Pham, Duong Nguyen-Ngoc Tran, Chul Hong Rhie, and Jae Wook Jeon, *"A Mobile Vision-based System for Gap and Flush Measuring between Planar Surfaces using ArUco Markers,"* The 20th International Conference on Electronics, Information, and Communication (ICEIC 2021), South Korea, 2021.

Long Hoang Pham, Duong Nguyen-Ngoc Tran, Chul Hong Rhie, and Jae Wook Jeon, *"Analysis of the Smartphone Camera Exposure Effect on Laser Extraction,"* The 20th International Conference on Electronics, Information, and Communication (ICEIC 2021), South Korea, 2021 [**Best paper award**].

2020   Duong Nguyen-Ngoc Tran, Huy-Hung Nguyen, **Long Hoang Pham**, Jae Wook Jeon, "Object Detection with Deep Learning on Drive PX2," 2020 IEEE International Conference on Consumer Electronics - Asia (ICCE-Asia), South Korea, 2020.

Long Hoang Pham, Duong Nguyen-Ngoc Tran, Jae W. Jeon, *"Low-Light Image Enhancement for Autonomous Driving Systems using DriveRetinex-Net,"* 2020 IEEE International Conference on Consumer Electronics - Asia (ICCE-Asia), South Korea, 2020.

Long Hoang Pham, Hung Ngoc Phan, Nhat Minh Chung, Tuan-Anh Vu and Synh Viet-Uyen Ha, *"A Robust Multiclass Vehicle Detection and Classification Algorithm for Traffic Surveillance System,"* The 2020 IEEE-RIVF International Conference on Computing and Communications Technologies (IEEE-RIVF 2020), Ho Chi Minh City, Vietnam, April 2020.

Hung Ngoc Phan, **Long Hoang Pham**, Nhat Minh Chung and Synh Viet-Uyen Ha, *"Improved Shadow Removal Algorithm for Vehicle Classification in Traffic Surveillance System,"* The 2020 IEEE-RIVF International Conference on Computing and Communications Technologies (IEEE-RIVF 2020), Ho Chi Minh City, Vietnam, April 2020.

2019   Hung Ngoc Phan**, Long Hoang Pham**, Tin Trung Thai, Nhat Minh Chung, and Synh Viet-Uyen Ha, "*A Real-time Vehicle Detection for Traffic Surveillance System Using a Neural Decision Tree*," 25th Asia-Pacific Conference on Communications (APCC), Ho Chi Minh City, Vietnam, November 2019.

2018   **Long Hoang Pham**, Hung Ngoc Phan, Duong Hai Le, and Synh Viet-Uyen Ha, *"A Hybrid Shadow Removal Algorithm for Vehicle Classification in Traffic Surveillance System,"* Intelligent Engineering Informatics. Advances in Intelligent Systems and Computing, vol 695. Springer, Singapore, 2018.

2017   Hung Ngoc Phan, **Long Hoang Pham**, Duong Nguyen-Ngoc Tran, and Synh Viet-Uyen Ha, *"Occlusion Vehicle Detection Algorithm in Crowded Scene for Traffic Surveillance System,"* 2017 IEEE International Conference on System Science and Engineering (ICSSE 2017), Ho Chi Minh City, Vietnam, July 21-23, 2017. [**Best paper award**]

Tuan-Anh Vu, **Long Hoang Pham**, Tu Kha Huynh, and Synh Viet-Uyen Ha, *"Nighttime Vehicle Detection and Classification via Headlights Trajectories Matching,"* 2017 IEEE International Conference on System Science and Engineering (ICSSE 2017), Ho Chi Minh City, Vietnam, July 21-23, 2017.

Duong Nguyen-Ngoc Tran, **Long Hoang Pham**, Ha Manh Tran, and Synh Viet-Uyen Ha, *"Scene Recognition in Traffic Surveillance System using Neural Network and Probabilistic Model,"* 2017 IEEE International Conference on System Science and Engineering (ICSSE 2017), Ho Chi Minh City, Vietnam, July 21-23, 2017.

Hung Ngoc Phan, **Long Hoang Pham**, Duong Nguyen-Ngoc Tran, and Synh Viet-Uyen Ha, *"Occlusion Vehicle Segmentation Algorithm in Crowded Scene for Traffic Surveillance System,"* 4th International Conference on Information System Design Intelligent Applications (INDIA 2017), Springer, Da Nang, Vietnam, June 15-17, 2017. [**Best paper award**]

Tuan-Anh Vu, **Long Hoang Pham**, Tu Kha Huynh, and Synh Viet-Uyen Ha, *"Vehicle Classification in Nighttime using Headlights Trajectories Matching,"* 4th International Conference on Information System Design Intelligent Applications (INDIA 2017), Springer, Da Nang, Vietnam, June 15-17, 2017.

Duong Nguyen-Ngoc Tran, **Long Hoang Pham**, Ha Manh Tran, and Synh Viet-Uyen Ha, *"Probabilistic Model and Neural Network for Scene Classification in Traffic Surveillance System,"* 4th International Conference on Information System Design Intelligent Applications (INDIA 2017), Springer, Da Nang, Vietnam, June 15-17, 2017.

2015   Synh Viet-Uyen Ha, **Long Hoang Pham**, Hung Ngoc Phan, and Phong Ho-Thanh, *"A Robust Algorithm for Vehicle Detection and Classification in Intelligent Traffic System"*, 16th Asia Pacific Industrial Engineering & Management Systems Conference (APIEMS 2015), 1832–1838, Ho Chi Minh City, Vietnam, December 08-11, 2015.

2013   **Long Hoang Pham**, Tin Trung Duong, Ha Manh Tran, and Synh Viet-Uyen Ha, *"Vision-based Approach for Urban Vehicle Detection & Classification,"* The 3rd World Congress on Information and Communication Technologies (WICT 2013), IEEE, 305–310, Hanoi, Vietnam, December 15-18, 2013. **[Paper selected for special issue]**

Poster & Presentations

2016   Synh Viet-Uyen Ha, **Long Hoang Pham**, and Duong Nguyen-Ngoc Tran, "Intelligent Traffic Surveillance System," Poster presentation and demonstration at The Workshop on Solutions to Reduce Traffic Jams and Traffic Accidents in Ho Chi Minh City, Vietnam, March 29, 2016.

Synh Viet-Uyen Ha, **Long Hoang Pham**, and Duong Nguyen-Ngoc Tran, "Intelligent Traffic Surveillance System," Poster presentation and demonstration at Smart City Summit, Binh Duong, Vietnam, March 28, 2016.

2015   Synh Viet-Uyen Ha, **Long Hoang Pham**, Huy-Hung Nguyen, and Tin Trung Duong, *"Vehicle Detection and Classification Software in Traffic Surveillance System,"* Poster presentation at The Exhibition Introducing the Achievements of Science and Technology on the Occasion of 20 Years Establishment of Vietnam National University, Ho Chi Minh City, Vietnam, January 27, 2015.

SERVICES

2014 – 2017   Member of the organizing committee of "IU Top Coder" programming contest,
School of Computer Science and Engineering,
Vietnam National University - Ho Chi Minh City – International University, Vietnam.

SKILLS & SUPPORTING TOOLS

Language:		*Listening*	*Speaking*	*Reading*	*Writing*
	» Vietnamese	*Native*	*Native*	*Native*	*Native*
	» English	*Fluent*	*Fluent*	*Fluent*	*Fluent*
	» Korean	*Basic*	*Basic*	*Basic*	*Basic*

Coding:
» C/C++ (proficient, 12+ years): Qt, STL, GSL, Boost.
» iOS (proficient, 4+ years): Swift, Objective-C.
» Python (proficient, +3 years).
» Web (intermediate): HTML5, CSS3, JavaScript, PHP.

Computer Vision:
» OpenCV
» NVIDIA CUDA

Machine Learning:
» TensorFlow, PyTorch, TensorRT, CoreML, R.

Database:
» MySQL
» Microsoft SQL

Misc.:
» Strong background in algorithms, software architecture, and design.
» Good teamwork, communication, time management and planning skills.

REFERENCES

Prof. Jae Wook Jeon, Ph.D.
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Sungkyunkwan University.
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Vietnam National University - Ho Chi Minh City – International University.
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CERTIFICATION

I certify that (1) to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience; and (2) that I am available for the assignment for which I am proposed.

Institution   **Date: June 17, 2022**

Pham Hoang Long