

THUONG NGOC-CONG TRAN

- Suwon, South Korea
- 1992-12-25
- Male
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EDUCATION

Sungkyunkwan University, Suwon-si, South Korea. GPA: 4.3/4.5 *Sep. 2015 – Aug. 2020*
PhD. in Electrical and Computer Engineering
Major in Robotics, Signal Processing, and Automation
Member of Automation Lab

Back Khoa University, Ho Chi Minh city, Vietnam. GPA: 8.6/10 *Sep. 2010 – Jan. 2015*
Bachelor of Engineer in Mechatronics (Honor Program)
Major in Robotics and Automation

TECHNICAL SKILLS

Fields of Interest	Mobile Robot and ADAS Perception, Object Detection and Prediction, Freespace Detection, and SLAM.
Academic Fields	Deep Learning, Machine Learning, Computer Vision, and Signal Processing.
Programming Skills	C++, Python, Bash, Matlab.
Libraries & Tools	PyTorch, Keras, OpenCV, Git, PCL, and ROS.

LANGUAGES

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- **English** – Professional working proficiency
 - **Vietnamese** - Native

EXPERIENCES

Robotics Software Engineer *Oct. 2021 – Present*
@[STPC.AI](#), South Korea

Team collaboration and brainstorming sessions for the last-mile delivery robot's software architecture, while staying up-to-date with the latest research and technology.

<Projects>:

- **Delivery robot perception modules** *April. 2022 - Present*
 - Designed, optimized, and deployed real-time multiple-task deep learning model for 3D object detection and segmentation for last-mile delivery robots.
 - Implemented deep learning models for lidar 3D object detection: Pixor, MobilePixor, CenterPoint, SpConv, TransFusion.
 - Lidar and multiple-cameras fusion for 3D object detection applying to outdoor AGVs.
 - Developed and improved 3D multi-object tracking and object motion prediction.
 - Designed the flow for pedestrian traffic light detection and recognition for last-mile delivery robots.
 - Implemented and deployed the flow for real-time image semantic segmentation (DDRNET) for freespace detection.

- Designed data collection processes for lidar 3D object detection and segmentation with different processes – plain labeling, semi-auto labeling, and labeling with point cloud registration to reduce labeling time.
- Data collection for 2D image semantic segmentation with visual prompting from Segment Anything (SAM).
- Deployed various deep learning models to edge devices (Nano Jetson, Xavier).
- **Motion planning structure for last-mile delivery robots** *Oct. 2021 - Mar. 2022*
- Implemented hybrid A* algorithm for motion planning, optimized and smoothed paths, and designed the architecture for robot following tasks.

Robotics Software Engineer

Nov. 2020 – Oct. 2021

@[VinAI Research](#), Vietnam

Lead the ADAS calibration team for VinFast

- Developed multi-sensor calibration for ADAS: camera-radar, camera-lidar, and lidar-radar supporting for perception team.
- Designed the processes for camera intrinsic and extrinsic calibration on the production line.
- Implemented the proof of concept for a 360-degree surrounding view using fisheye cameras for automobiles (image stitching, ISP tuning for multiple cameras, creating multiple virtual views – it was commercialized for Vinfast all electric vehicles).
- Developed camera extrinsic self-calibration module for ADAS using road lane features.

Robotics Software Engineer (part-time, remote)

Jul. 2020 – Nov. 2020

@[Movel AI](#), Singapore

- Developed and implemented modules for object detection and freespace detection specifically designed for indoor mobile robots.

Signal Processing and Robot Perception Researcher

Sep. 2015 – Nov. 2020

@[Automation Lab](#), Sungkyunkwan University, South Korea

Conducted research and developed signal processing algorithms for magnetic encoders and robot perception using 2D and 3D sensors.

<Projects>:

- **6-DOFs robot perception** *Sep. 2018 – Nov. 2020*
- Optimized robot grasping detection using generative CNN network and point cloud, implemented object localization based on sim-to-real domain randomization with transfer learning.
- **Signal Processing for Absolute Magnetic Encoders** *Sep. 2015 – Aug. 2018*
- Utilized mathematical modeling to analyze magnetic encoder signals, designed IIR and FIR filters for signal processing, performed MATLAB algorithm simulations, and implemented real-time signal processing on microcontrollers (ARM) to develop industrial-grade absolute magnetic encoders.

REFERENCE

Prof. Jae Wook Jeon (jwjeon@yurim.skku.ac.kr)

Automation Lab, School of Information and Communication Engineering,
Sungkyunkwan University, Suwon, South Korea.

PUBLICATIONS

- **T. N. Tran**, H. X. Nguyen, J. W. Park and J. W. Jeon, "A Stable Adaptive Gradient Descent Harmonic-Disturbance Rejection for Improving Phase-Tracking Accuracy," *in IEEE Access*, vol. 8, pp. 31409-31419, 2020.
- **T. N. Tran**, H. X. Nguyen, J. W. Park and J. W. Jeon, "Improving the Accuracy of an Absolute Magnetic Encoder by Using Harmonic Rejection and a Dual-Phase-Locked Loop," *in IEEE Transactions on Industrial Electronics*, vol. 66, no. 7, pp. 5476-5486, July 2019.
- H. Q. Cao, H. X. Nguyen, **T. N. Tran**, H. N. Tran and J. W. Jeon, "A Robot Calibration Method Using a Neural Network Based on a Butterfly and Flower Pollination Algorithm," *in IEEE Transactions on Industrial Electronics*, vol. 69, no. 4, pp. 3865-3875, April 2022.
- H. X. Nguyen, H. Q. Cao, T. T. Nguyen, **T. N. Tran**, H. N. Tran and J. W. Jeon, "Improving Robot Precision Positioning Using a Neural Network Based on Levenberg Marquardt-APSO Algorithm," *in IEEE Access*, vol. 9, pp. 75415-75425, 2021.
- H. Q. Cao, H. X. Nguyen, **T. N. Tran**, H. N. Tran and J. W. Jeon, "A Robot Calibration Method Using a Neural Network Based on a Butterfly and Flower Pollination Algorithm," *in IEEE Transactions on Industrial Electronics*, vol. 69, no. 4, pp. 3865-3875, April 2022.
- H. X. Nguyen, **T. N. Tran**, J. W. Park, N. V. P. Tran and J. W. Jeon, "Improving the Accuracy of Battery-Free Multi-Turn Absolute Magnetic Encoders by Using a Self-Referencing Lookup-Table Algorithm," *in IEEE Transactions on Instrumentation and Measurement*, vol. 69, no. 8, pp. 5468-5477, Aug. 2020.
- H. X. Nguyen, **T. N. Tran**, J. W. Park and J. W. Jeon, "An Adaptive Linear-Neuron-Based Third-Order PLL to Improve the Accuracy of Absolute Magnetic Encoders," *in IEEE Transactions on Industrial Electronics*, vol. 66, no. 6, pp. 4639-4649, June 2019.
- T. H. Nguyen, H. X. Nguyen, **T. N. Tran**, J. W. Park, K. M. Le and J. W. Jeon, "An Effective Method to Improve the Accuracy of a Vernier-type Absolute Magnetic Encoder," *in IEEE Transactions on Industrial Electronics*, vol. 68, no. 8, pp. 7330-7340, Aug. 2021.
- **T. N. Tran**, H. X. Nguyen, J. W. Park and J. W. Jeon, "Improvement of the accuracy of absolute magnetic encoders based on automatic calibration and the fuzzy phase-locked-loop," *IECON 2017 - 43rd Annual Conference of the IEEE Industrial Electronics Society*, Beijing, 2017, pp. 3310-3315.
- H. X. Nguyen, **T. N. Tran**, J. W. Park and J. W. Jeon, "Auto-calibration and noise reduction for the sinusoidal signals of magnetic encoders," *IECON 2017 - 43rd Annual Conference of the IEEE Industrial Electronics Society*, Beijing, 2017, pp. 3286-3291.
- J. W. Park, H. X. Nguyen, **T. N. Tran** and J. W. Jeon, "Improve efficiency multi-turn magnetic encoder that uses gear system," *2017 17th International Conference on Control, Automation and Systems (ICCAS)*, Jeju, 2017, pp. 318-324.

PATENTS

- Jae Wook Jeon, Ha Xuan Nguyen, Jun Young Moon, Jae Wan Park, **Thuong Ngoc-Cong Tran**, Nhan Phan Van Tran, "Apparatus for compensating output signal of magnetic encoder," KR101834526B1, 2018-04-19.
- Jae Wook Jeon, Jae Wan Park, **Thuong Ngoc-Cong Tran**, Ha Xuan Nguyen, "Device and method for multi-rotation detection," KR101881559B1, 2018-08-24.
- Jae Wook Jeon, Jae Wan Park, Ha Xuan Nguyen, **Thuong Ngoc-Cong Tran**, "Multi-turn Absolute Encoder, Method for Detecting Rotation Angle and Readable Recording Medium for Detecting Rotation Angle," KOR1020170035081, 2018-10.