Thanh Nguyen Canh

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Research Interests

Simultaneous Localization and Mapping (SLAM), Semantic SLAM, Active SLAM, Lifelong SLAM, Probabilistic Learning, Continual Learning, Robot Perception, Environment Representation, Motion Planning, Humanoid Robotics, Human-Robot Interaction, Multisensor Fusion and Control, UAVs.

Education

Japan Advanced Institute of Science and Technology — October 2027 - expected
Ph. D. in Information Science, Ishikawa, Japan — *Current GPA: 3.0/3.0*

Japan Advanced Institute of Science and Technology — September 2024
M.S. in Information Science, Ishikawa, Japan — *GPA: 2.98/3.0, Thesis Score: 100/100*

VNU-University of Engineering and Technology — September 2022
B.S.Eng in Robotics Engineering, Hanoi, Vietnam — *GPA: 3.77/4.0 (Top 1%), Thesis Score: 9.7/10*

Experience

Visiting Researcher | *University of Genoa, Italy* — 2/2026 – 8/2026
Advisor: Prof. Antonio Sgorbissa, RICE Lab, DIBRIS
Working on the SOLARIS, HORIZON-CL5-2023-D3-02-13 project, creating drone teams for optimal monitoring of the panels in order to detect defects and faults.

Teaching Assistant | *School of Information Science, JAIST* — 2024 – present
Working on slides, lectures, tutorial preparation

Research Assistant | *Japan Advanced Institute of Science and Technology* — 2023 - present
Advisor: Prof. Nak Young Chong, School of Information Science
Working on Active semantic simultaneous localization and mapping for UAVs (ROS/ROS2, C++, Python, PyTorch, UAVs)

Teaching Assistant | *VNU-University of Engineering and Technology* — 2022 – Present
Working on slides, lectures, tutorial preparation

Research Assistant | *Department of Robotics Engineering, VNU-University of Engineering and Technology* — 2019 – 2023
Advisor: Prof. Xiem HoangVan, Department of Robotics Engineering
Working on simultaneous localization and mapping, obstacle avoidance, navigation, calibration, etc. for robotics (ROS, C++, Python, PyTorch, TensorFlow, mobile robot, dual-arm)

Projects

Delibot - Humanoid Robotics | *C++/Python, ROS, MoveIt/Gazebo, Dual-arm service robot, ground robot* — 2020 – 2024

- Optimal design and fabrication of frame structure for dual-arm service robot. *Papers: [J3], [C12], [P9]*
- 3D localization using 2D estimates for Robot Vision system *Papers: [J1], [C13]*
- Obstacle avoidance using multi-sensor fusion. *Papers: [C8], [C11]*

Semantic Active SLAM | *Python/C++, ROS, UAVs* — 2022 – Present

- Real-time Semantic-Aware Simultaneous Localization and Mapping system for Unmanned Aerial Vehicles. *Papers: [C3], [C4], [C10], [C11], [J5]*
- Improve localization quality based on data association method. *Papers: [P5, P3]*
- Robust Visual SLAM in Dynamic Environment. *Paper: [J4], [C15], [C10]]*
- Autonomous Exploration and Active SLAM. *Paper: [P1]*
- Gaussian Splatting for SLAM. *Paper: [P7]*

Humanoid Robot Interaction and Social Navigation

| *Python/C++, ROS/ROS2, Mobile Robotic/Huamannoid Robot* 2024 – Present

- Multi-Robot Collaboration and Humanoid Perception based on Deep Learning. *Paper: [P2], [C12*
- Humanoid Robot Interaction based on Vision Language Model/Large Language Model. *Papers: [P3], [P4], [C9]*
- Improve navigation performance in crowded environments and Semantic-aware path planning. *Papers: [C8], [C7]*

Publications

Preprints

[P9] M. DoDuc, B. NguyenVan, **T. N. Canh***, H. Nguyen, N. Y. Chong, X. HoangVan, M.T. Thai *"Advancing Colonoscopy Through Monocular SLAM: A Survey of Methods, Performance, and Clinical Potential*, [website][code]

[P8] P. N. Xuan*, **T. N. Canh***, H. Nguyen, N. Y. Chong, X. HoangVan, *"A Survey on Collaborative SLAM with 3D Gaussian Splatting*, (IFAC World Congress 2026) (submitted) [website][code]

[P7] **T. N. Canh,** N. Y. Chong, *"Bayesian Probabilistic Data Association via Gaussian Mixture Models for Semantic SLAM"* [website][code]

[P6] **T. N. Canh,** T. T. Tran, H. Zhang, Z. GaoN. Y. Chong, X. HoangVan, *"Object-Centric Video Understanding for Robotic Manipulation Commands"* [website][code]

[P5] T. T. Tran, **T. N. Canh,** N. Y. Chong, X. HoangVan, *"Hybrid TD3: Robust and Stable Joint-Space Control via Weighted Clipped Q-Learning"* [website][code]

[P4] T. T. Tran, **T. N. Canh,** N. Y. Chong, X. HoangVan, *"Hierarchical Task Robot Imitation Learning based on Large Language Model Foundation and Reinforcement Learning"* [website][code]

[P3] **T. N. Canh*,** T. T. Tran*, H. Zhang, X. HoangVan, N. Y. Chong, *"Learning to Manipulate by Watching Humans: A Decoupled Vision-Language-Driven Imitation Framework"* [website][code]

[P2] **T. N. Canh,** T. T. Viet, P. V. Dinh, X. HoangVan, N. Y. Chong, *"Online DAG Scheduling for LLM-Driven Multi-Robot Collaboration"* [website][code]

[P1] **T. N. Canh,** H. Zhang, X. HoangVan, N. Y. Chong, *"A Multi-Resolution Active Semantic SLAM for Autonomous UAV Exploration"* [website][code]

Journals

[J7] X. HoangVan, L. H. Luong, **T. N. Canh**, *"E2DSR: Edge-Enhanced Representation for Deep Super- Resolution in Machine Vision Applications*, (REV Journal on Electronics and Communications 2025) [website][code]

[J6] **T. N. Canh**, A. P. Tuan X. HoangVan, *"Design of Deep Reinforcement Learning Approach for Traffic Signal Control at Three-way Crossroads"*, Public Transport, 2024 (accepted) [website][code]

[J5] **T. N. Canh,** X, HoangVan, N. Y. Chong, *"Semantic Visual Simultaneous Localization and Mapping: A Survey on State of the Art, Challenges and Future Directions"*, Robotics and Automation System, 2025 (revision) [website][code]

[J4] H. Zhang, C. Li, **T. N. Canh,**, N. Y. Chong, *"SR-SLAM: Scene Reliability-Based RGB-D SLAM in Diverse Environments"*, Robotics and Automation System(RAS), 2025 [website][code]

[J3] **T. N. Canh,** S. T. Duc, H. N.The, T. H. Dao, X. HoangVan, *"Optimal Design and Fabrication of Frame Structure for Dual-Arm Service Robots: An Effective Approach for Human-Robot Interaction"*, Engineering Science and Technology, an International Journal (JESTECH), 2024 [website] [code]

[J2] **T. N. Canh,** D. M. Bui, X. HoangVan, *"ESRPCB: an Edge guided Super - Resolution model and Ensemble learning for tiny Printed Circuit Board Defect detection"*, Engineering Applications of Artificial Intelligence, 2025 (Accepted) [website][code]

[J1] **T. N. Canh**, D. T. Ngoc, X. HoangVan, *"M-Calib: A Monocular 3D Object Localization using 2D Estimates for Industrial Robot Vision System"*, Journal of Automation, Mobile Robotics and Intelligent Systems, 2025 [website][code]

Conferences

[C15] H. Zhang, **T. N. Canh**, C. Li, R. Yang, Y. Ji, N. Y. Chong, *"IL-SLAM: Intelligent Line-assisted SLAM Based on Feature Awareness for Dynamic Environments*, (IRC 2025) [website][code]

[C14] T. T. Viet, P. D. Van, H. U. Gia, S. T. Duc, **T. N. Canh,** X. HoangVan, *"Development of a Humanoid Robot Prototype and Gesture and Voice-Based Interaction Approach"*, International Conference on Advances in Information and Communication Technology (RIVF 2025) [website][code]

[C13] **T. N. Canh**, Q. M. Trinh, T-V Dang, P. X. Tan, X. HoangVan, *"Refined 3D Object Localization with Monocular Camera using Depth Estimation and Geometric Refinement"*, International Conference on Interactive Collaborative Robotics (ICR 2025) [website][code]

[C12 **T. N. Canh**, T. T. Viet, S. T. Duc, H. N. The, T. H. Dao, V-H. Nguyen, X. HoangVan, *"Efficient Human-Robot Interaction via Deep Perception and flexible Motion Planning"*, International Conference on Interactive Collaborative Robotics (ICR 2025) [website][code]

[C11] **T. N. Canh,** B. N. Quoc, H. Zhang, B. R. Veeraiah, X. HoangVan, N. Y. Chong, *"IRAF-SLAM: An Illumination-Robust and Adaptive Feature-Culling Front-End for Visual SLAM in Challenging Environments"*, European Conference on Mobile Robots, 2025 [website] [code]

[C10] H. Zhang, **T. N. Canh**, C. Li, N. Y. Chong, *"Adaptive Prior Scene-Object SLAM for Dynamic Environments"*, The 2025 IEEE International Conference on Real-time Computing and Robotics (RCAR), 2025 [website][code]

[C9] **T. N. Canh**, K. HoangVan, X. HoangVan, *"Context-aware LLM-based Human-Robot Interaction"*, International Conference on Intelligent Systems & Networks (ICISN), 2025 [website][code]

[C8] **T. N. Canh**, H.-H. Ngo, X. HoangVan, N. Y. Chong, *"Toward Integrating Semantic-aware Path Planning and Reliable Localization for UAV Operations"*, The 24th International Conference on Control, Automation and Systems (ICCAS), 2024 [website] [code]

[C7] **T. N. Canh**, X. HoangVan, N. Y. Chong, *"Enhancing Social Robot Navigation with Integrated Motion Prediction and Trajectory Planning in Dynamic Human Environments"*, The 24th International Conference on Control, Automation and Systems (ICCAS), 2024 [website][code]

[C6] **T. N. Canh**, M. DoNgoc, T. N. Quang and H. B. Thanh, X. HoangVan, *"Underwater Image Enhancement for Depth Estimation via Various Image Processing Techniques"*, 2024 International Conference on System Science and Engineering (ICSSE), 2024 [website][code]

[C5] M. D. Duc, **T. N. Canh**, M. DoNgoc, X. HoangVan, *"Fusion LiDAR-Inertial-Encoder data for High-Accuracy SLAM"*, 2024 International Conference on Mechatronic, Automobile, and Environment Engineering (ICMAEE), 2024 [website][code]

[C4] **T. N. Canh**, V. Nguyen, X. HoangVan, A. Elibol, N. Y. Chong, *"S3M: Semantic Segmentation Sparse Mapping for UAVs with RGB-D Camera"*, IEEE/SICE International Symposium on System Integration (SII), 2024 [website][code]

[C3] **T. N. Canh**, A. Elibol, N. Y. Chong, X. HoangVan, *"Object-Oriented Semantic Mapping for Reliable UAVs Navigation"*, IEEE International Conference on Control, Automation and Information Sciences (ICCAIS), 2023 [website] [code]

[C2] **T. N. Canh**, X. HoangVan, *"Machine Learning-Based Malicious Vehicle Detection for Security Threats and Attacks in Vehicle Ad-hoc Network (VANET) Communications"*, IEEE International Conference on Research, Innovation and Vision for the Future, 2023 [website][code]

[C1] **T. N. Canh**, T. S. Nguyen, C. H. Quach, X. HoangVan, M. D. Phung, *"Multisensor Data Fusion for Reliable Obstacle Avoidance"*, IEEE International Conference on Control, Automation and Information Sciences (ICCAIS), 2022 [website][code]

Technical Skills

Programming: C++/Python/Matlab, HTML/CSS, LaTeX
Operating Systems: Linux, ROS/ROS2
Libraries and Toolbox: Pytorch, Pybullet, Gazebo/Habitat/iGibson/Unity/Rviz
Robot Platform: Dual-arm Humanoid services robot, Turtlebot3, PX4 Quadrotors

Honors and Awards

JST SPRING Scholarship, Japan Science and Techology 2025-2027
JAIST Doctoral Research Fellowship (DRF), Special Type (Oct 2024 – Mar 2025)
KDDI Scholarship, KDDI Foundation 2024-2025
RIVF Best paper award, IEEE International Conference on Research, Innovation and Vision for the Future 2023
VinIF Scholarship for Master Programmer, Vingroup Innovation Foundation 2022-2024
Instruction students to win Second place, Students Research Competition
VNU-University of Engineering and Technology 2023
Best Student Thesis Award, VNU-University of Engineering and Technology 2022
Vallet Scholarship, Vallet Foundation 2021-2022
REV-ECIT Best paper award, Radio and Electronics Association of Vietnam 2022
First place, Students Research Competition, VNU-University of Engineering and Technology 2021

Teaching Experience

Teaching Assistant, System Optimization, Japan Advanced Institute of Engineering and Technology
Teaching Assistant, Discrete Signal Processing, Japan Advanced Institute of Engineering and Technology
Teaching Assistant, Fundamentals of Programming, Japan Advanced Institute of Engineering and Technology
Teaching Assistant, Robotics, Japan Advanced Institute of Engineering and Technology
Teaching Assistant, Discrete Signal Processing, Japan Advanced Institute of Engineering and Technology
Teaching Assistant, Fundamentals of Programming, Japan Advanced Institute of Engineering and Technology
Teaching Assistant, Programming robot with ROS, VNU-University of Engineering and Technology
Teaching Assistant, Introduction to Human Machine Interface, VNU-University of Engineering and Technology
Teaching Assistant, Robotic Control, VNU-University of Engineering and Technology
Teaching Assistant, Mechanical Drawing, VNU-University of Engineering and Technology
Teaching Assistant, Electronics Engineering Practice, VNU-University of Engineering and Technology
Teaching Assistant, PLC and Its Application in Agriculture, VNU-University of Engineering and Technology

Professional Membership & Activities

AWIST 2025 Committee, The 13th ASEAN Workshop on Information Science and Technology 2024-present

Reviewer:

- **IEEE**: IEEE Robotics and Automation Letters, IEEE Transactions on Robotics, IEEE Transactions on Automation Science and Engineering.
- **Elsevier**: Knowledge-Based Systems, Engineering Applications of Artificial Intelligence, ISA transactions, Expert systems with applications, Engineering Science and Technology, an International Journal, Computers & electrical engineering.
- **Springer**: Multimedia Tools and Applications
- **Other**: ICCAIS2023, ICCAIS 2024, ICCAS 2024, ICCAS 2025, IEEE SIMPAR2025, All Life, Journal of Automation, Mobile Robotics and Intelligent Systems

IEEE, Graduate Student Member 2024-present
IEEE Robotics and Automation Society, Graduate Student Member 2024-present
IEEE Young Professionals, Graduate Student Member 2024-present

References

- Prof. Dr. Nak Young Chong, Ph.D. (Ph.D. Supervisor)
  Professor, School of Information Science, Japan Advanced Institute of Science and Technology, Japan.
  Director of the JAIST Robotics Laboratory
  Co-founder and CEO of CURA Robotics and AI
  Email: nakyoung@jaist.ac.jp; Phone: (+81)761(51)1248
- A/Prof. Dr. Xiem HoangVan, Ph.D (Undergraduate Supervisor)
  Professor, University of Engineering and Technology, Vietnam National University, Vietnam.
  Head of Robotics Engineering Department
  Email: xiemhoang@vnu.edu.vn; Phone: (+84)378608113