

Thuan Phuoc Nguyen - Doctoral candidate

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📍 Espo, Finland

EXPERIENCE

Doctoral Researcher • Aalto University

Oct 2023 - present

Hypermaps: Closing the complexity gap in robotic mapping

- Research on a multilayered mapping framework that enables robots to handle complex tasks by efficiently representing different aspects of the environment.

Research Assistant - Project Researcher • University of Turku

Feb 2022 - Aug 2023

Participation in ENRICH Robotic Hackathon 2023:

- Design and develop UAV software, utilizing [the UFOMap project](#) for mapping, the OMPL library for path planning and frontier-based method for autonomous exploration.

Project Aeropolis:

- Design and develop a lightweight landing pad using a single-lens panoramic camera module and an embedded computing platform.
- Explore the potential of active learning to minimize the labeling effort while maintaining good object detection results.

Project AutoSOS:

- Utilize the Gazebo simulator to emulate UAV-aided search and rescue scenarios.
- Evaluate object detection performance at various altitudes and experiment with different autonomous flight strategies.

Teaching Assistant • Tampere University

Aug 2022 - Oct 2022

- Course name: DATA.ML.100 Introduction to Pattern Recognition and Machine Learning
- Explain and clarify fundamental concepts and mathematics of machine learning algorithms to students.
- Assist students in code debugging and testing.

EDUCATION

Tampere University

Tampere, Finland

MSc.Tech, Robotics and Artificial Intelligence, Information Technology

August 2021 - June 2023

- **GPA:** 5.0/5.0 (Expected)

- **Thesis:** Vision-based safe autonomous UAV landing with panoramic sensors.

- Design and develop a human detection model for an on-ground safe landing system utilizing a panoramic camera module.
- Localize surrounding people by amalgamating object detection and distance estimation results.
- When there are people near the landing zone, the UAV either retreats to a higher position or select an optimal landing position base on the surrounding.

- [Link to full document](#) and [demonstration video](#).

Ho Chi Minh City University of Technology
B.Eng. Mechatronic Engineering

Ho Chi Minh City, Vietnam
August 2015 - November 2020

- **GPA:** 8.91/10.0 (Rank: 1st)
- **Thesis:** A study on the design and control of the operation of overhead medical transportation system.

PROJECTS

Data driven model learning for robot simulation and control

Aug 2022 - Jan 2023

github.com/phuoc101/GP_RL

- Control manipulator of an Avant machine using Gaussian process modeling and reinforcement learning.
- [Link to the video presentation](#), which explains the methodology in detail and showcases results in the Gazebo simulator and on the actual machine

Frontier Exploration for Turtlebot3

Sep 2021 - Jan 2022

github.com/phuoc101/robot_proj_2021

- Implement frontier exploration algorithm to perform simultaneous mapping and localization (SLAM) with Turtlebot3 in the Gazebo simulator. [Link to video demonstration](#)

PUBLICATIONS

- [1] P. Nguyen, F. Verdoja, and V. Kyrki. “Event-Grounding Graph: Unified Spatio-Temporal Scene Graph from Robotic Observations.” arXiv: [2510.18697 \[cs\]](https://arxiv.org/abs/2510.18697). (Jan. 19, 2026), pre-published.
- [2] P. Nguyen, F. Verdoja, and V. Kyrki, “REACT: Real-time Efficient Attribute Clustering and Transfer for Updatable 3D Scene Graph,” in *2025 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Oct. 2025, pp. 2209–2216. doi: [10.1109/IROS60139.2025.11247273](https://doi.org/10.1109/IROS60139.2025.11247273).
- [3] P. N. Thuan, J. P. Queralta, and T. Westerlund, “Simulation Analysis of Exploration Strategies and UAV Planning for Search and Rescue,” in *New Developments and Environmental Applications of Drones*, Cham: Springer Nature Switzerland, 2024, pp. 75–84, ISBN: 978-3-031-44607-8. doi: [10.1007/978-3-031-44607-8_5](https://doi.org/10.1007/978-3-031-44607-8_5).
- [4] P. T. Nguyen, T. Westerlund, and J. Peña Queralta, “Vision-based safe autonomous UAV docking with panoramic sensors,” *Frontiers in Robotics and AI*, vol. 10, 2023, ISSN: 2296-9144. doi: [10.3389/frobt.2023.1223157](https://doi.org/10.3389/frobt.2023.1223157).
- [5] T. N. K. Hung, N. Q. K. Le, N. H. Le, et al., “An AI-based Prediction Model for Drug-drug Interactions in Osteoporosis and Paget’s Diseases from SMILES,” *Molecular Informatics*, vol. 41, no. 6, p. 2100264, 2022, ISSN: 1868-1751. doi: [10.1002/minf.202100264](https://doi.org/10.1002/minf.202100264).
- [6] N. K. H. Truong, T. P. Nguyen, Q. H. Kha, et al., “Prediction of anterior cruciate ligament injury from MRI using deep learning,” in *International Forum on Medical Imaging in Asia 2021*, vol. 11792, SPIE, Apr. 20, 2021, pp. 79–84. doi: [10.1117/12.2590855](https://doi.org/10.1117/12.2590855).

RELEVANT RESEARCH SKILLS

Specialization: Machine Learning, Computer Vision, Robotic Perception, Autonomous Mobile Robots

Programming languages: Python, C/C++, MATLAB, shell scripting

Machine Learning: Pytorch, Tensorflow, Scikit-Learn, OpenCV, Pandas, NumPy

Robotics: ROS, PX4, Gazebo, RViz, Foxglove

Miscellaneous: Linux, git, (Neo)vim, tmux, L^AT_EX

REFERENCES

Prof. Ville Kyrki - Aalto University - ville.kyrki@aalto.fi

Dr. Francesco Verdoja - Aalto University - francesco.verdoja@aalto.fi

Dr. Jorge Peña Queraltá - Zurich University of Applied Sciences, Binabik.ai, Skya.ai - jorge@binabik.ai