Bui Bach Thuan

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Education

Doctor of Engineering | *Information Science and Engineering* | *GPA 5.0/5.0* — Oct. 2022 – Now
Ritsumeikan University — Osaka, Japan

Master of Engineering | *Information Science and Engineering* | *GPA 4.67/5.0* — Oct. 2020 – Sep 2022
Ritsumeikan University — Shiga, Japan

Bachelor of Engineering | *Telecommunications Engineering* — Sep. 2015 – Sep 2019
Hanoi University of Science and Engineering — Hanoi, Vietnam

Research Background

Proficient in Computer Vision, Machine Learning, Visual Localization, Visual SLAM, and Evolutionary Algorithms. I gained approximately one year of industry experience developing AI algorithms for face detection and recognition before joining AIS Lab to pursue research on camera re-localization and mapping with machine learning (ML) techniques. During the first two years of my PhD, I developed multiple ML-based localization algorithms that accelerated camera-based localization by up to 700 times faster than traditional methods. Additionally, I authored the pioneering paper that applied ML (Transformer-based) to represent 3D maps with points and lines. My research has been published/presented in leading robotics venues, including IROS, ICRA, RA-L, and ISPRS (IF 11).

Work Experience

Founding Researcher - Remote — August 2024 – Now
Coolant Climate, Inc — Osaka, Japan

- Developing advanced Structure-from-Motion techniques for aerial forestry imagery
- Improving large-scale image matching algorithms for enhanced 3D reconstruction accuracy
- Modeling 3D forest structures using Gaussian Splatting for scalable reconstruction

Research Assistant — June 2021 – Now
Advanced Intelligent System Laboratory — Shiga, Japan

- Developed a back-end API for data collection on cars
- Analyzed collected data and proposed a recommendation system based on driver behavior

AI Algorithm Engineer — November 2019 – April 2020
VTI Corporation — Hanoi, Vietnam

- Member of AI algorithms team, working on face recognition using deep learning

Laboratory Assistant — Oct. 2017 – Oct. 2019
Communications Research and Development Laboratory — Hanoi, Vietnam

- Led a group of undergrad. students for researching evolutionary algorithms on antenna design

Selected Publications

1. Bach-Thuan Bui, Huy-Hoang Bui, Yasuyuki Fujii, Dinh-Tuan Tran, and Joo-Ho Lee **Improved 3D Point-Line Mapping Regression for Camera Relocalization**. arXiv preprint arXiv:2502.20814, 2025. [Paper | Code]

2. Huy-Hoang Bui, Bach-Thuan Bui, Dinh-Tuan Tran, and Joo-Ho Lee
Leveraging Neural Radiance Field in Descriptor Synthesis for Keypoints Scene Coordinate Regression. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2024. [Paper | Code]
3. Bach-Thuan Bui, Huy-Hoang Bui, Dinh-Tuan Tran, and Joo-Ho Lee
Representing 3D sparse map points and lines for camera relocalization. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2024. [Paper | Website | Code | LinkedIn]
4. Bach-Thuan Bui, Dinh-Tuan Tran, and Joo-Ho Lee
D2S: Representing local descriptors and global scene coordinates for camera relocalization. IEEE Robotics and Automation Letters (RA-L), 2024. [Paper | Website | Code]
5. Bach-Thuan Bui, Dinh-Tuan Tran, and Joo-Ho Lee
Fast and Lightweight Scene Regressor for Camera Relocalization. 16th IEEE/SICE International Symposium on System Integration (SII), 2023. [Paper | Code]
6. Bach-Thuan Bui, Dinh-Tuan Tran, and Joo-Ho Lee
FeatLoc: Absolute pose regressor for indoor 2D sparse features with simplistic view synthesizing. ISPRS Journal of Photogrammetry and Remote Sensing, 2022 (IF 11.7). [Paper | Code]

Open Source Project

1. PL2Map (210⋆): https://github.com/ais-lab/pl2map
2. D2S (94⋆): https://github.com/ais-lab/d2s
3. FeatLoc (7⋆): https://github.com/ais-lab/featloc

Honors and Awards

Excellent Research Award Mar. 2025
Recognition for high-quality research results at Ritsumeikan University in 2025

Research Grant For Doctoral Student Aug. 2024
For a short-term exchange at the Technical University of Munich, Germany (JPY 500,000)

Research Encouragement Award Feb. 2024
Recognition for high-quality research results at Ritsumeikan University in 2023

Research Grant For Doctoral Student Jan. 2024
For a foreign research exchange (JPY 300,000)

Young Author Award Jan. 2024
SICE International Young Author Award, with prize money of JPY 100,000 in SII2024

Excellent Research Award Mar. 2023
Recognition for high-quality research results at Ritsumeikan University in 2022

Japanese Government Scholarship (MEXT) Oct. 2022 – Sep. 2025
Merit-based grant for students pursuing Ph.D. education in Japan

Candidates to be student representatives at the degree awarding ceremony Spring 2022
Chosen based on overall academic and research performance during M.E. study

Japanese Government Scholarship (MEXT) Oct. 2020 – Sep. 2022
Merit-based grant for students pursuing M.E. education in Japan

Third Prize of Science Research Competition for Student May 2019
Prize for research results on evolutionary algorithm in the automation of antenna design

Skills

Languages: Strong reading, writing and speaking competencies for English and Vietnamese.
Programming: Python (Pytorch, NumPy, SciPy, Matplotlib, Pandas), C/C++, Assembly, MATLAB.
Document Creation: Microsoft Office Suite, LaTex, Markdown.