

Bach Nguyen

PHD STUDENT · 3D COMPUTER VISION · ROBOTICS PERCEPTION

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"Maybe it's not about getting up. Maybe it's about stumbling. Stumbling in the right direction."

Summary

An enthusiastic graduate student with passion for 3D computer vision / robotics perception, and hands-on robotics simulation. My current research interests are underwater visual SLAM, sensor fusion (camera-sonar, camera-lidar). I enjoy taking on challenging tasks and growing up with colleagues around me. That's why I record and share my projects, curiosities and findings on Github and Technical Blog.

Education

Shibaura Institute of Technology

Tokyo, Japan

PHD. IN FUNCTIONAL CONTROL SYSTEMS

from Oct. 2023

- Teaching Assistant (Oct. 2023 - present)
- Research on Underwater Visual SLAM
- Focus on camera-sonar sensor fusion, underwater visual odometry, underwater image enhancement

Shibaura Institute of Technology

Tokyo, Japan

MSC. IN GLOBAL COURSE OF ENGINEERING AND SCIENCE

Oct. 2021 - Sep. 2023

- Teaching Assistant (Oct. 2022 - Jul. 2023)
- Research on Light Field image, multiple-view geometry
- Focus on graph-based Light Field image compression

Hanoi University of Science and Technology

Hanoi, Vietnam

BSC. IN COMPUTER SCIENCE

Sep. 2016 - Aug. 2021

- Teaching Assistant (Mar. 2020 - Sep. 2020)
- Research on learning-based network intrusion detection & prevention

Chu Van An High School

Hanoi, Vietnam

GIFTED PROGRAM WITH MAJOR IN PHYSICS

Sep. 2013 - June. 2016

Honors & Awards

AWARDS

- | | | |
|-----------|---|----------------|
| 2022 | Best Presentation , competition organized by the Network Research Unit of Shibaura Institute of Technology | Tokyo, Japan |
| Oct. 2022 | Best Group Presentation , Global Project Based Learning on Internet of Things (gPBL on IOT) | Hanoi, Vietnam |
| 2019 | 2nd Place , WhiteHat Wargame 2019 (CTF competition) | Hanoi, Vietnam |
| 2019 | 3rd Place , SVATTT 2019 final (CTF competition) | Hanoi, Vietnam |

HONORS

- | | | |
|------|---|----------------|
| 2023 | Japanese Government (MEXT) scholarship (full tuition + monthly support) , for Doctoral study | Tokyo, Japan |
| 2021 | Japanese Government (MEXT) scholarship (full tuition + monthly support) , for Master study | Tokyo, Japan |
| 2016 | Top 25 nationally , University Entrance Tests' overall score: 27.53 / 30 (Math: 9 / 10, Physics: 9 / 10, English: 9.53 / 10) | Hanoi, Vietnam |

Work Experience

CyStack Corp.

Hanoi, Vietnam

SECURITY RESEARCHER & DEVELOPER

Jul. 2018 - Oct. 2020

- Software pentester: exploiting Stack / Format string / Heap vulnerabilities, fuzzing (AFL), malware analysing
- Participating in CTF (capture-the-flag) competitions: Binary Exploit (pwn), Reverse, Forensics
- Multi-platform Endpoint product (system monitoring & protection): developing software/firmware (C++), implementing API microservices, integrating with AWS (EC2, S3)

- Research GPT models, prompt engineering, develop front-end (VueJS)
- Build "project scoper" tool: generate detailed project scopes based on user-defined objectives, actions, deliverables, users
- Build "automate setup": automate all steps of creating project, receiving only company's website link, then crawling company's basic information using Apollo.io tool, and auto-filling suitable steps

Skills

Programming / Debugging	Python, C++/C, Matlab
Computer Vision & Deep Learning	OpenCV, Pytorch
DevOps	ROS2, Git, Docker, Heroku, AWS
Simulation Tools	Gazebo, RViz2, HoloOcean (Unreal Engine)
Languages	English, Vietnamese

Projects & Writing

Technical Blog

BACHZZ.GITHUB.IO

Online

from 2024

Deploy Renderable Neural Radiance Map (RNR-Map, trained in Habitat simulator) into Gazebo + ROS2 environment for Visual Navigation (Image-Goal)

IMPLEMENTING & WRITING

Online

May. 2025

Vectorized implementation for Mutual Information -based Camera-Lidar extrinsic calibration

IMPLEMENTING & WRITING

Online

Mar. 2025

Implement Visual-Sonar SLAM (monocular ORB-SLAM2 + sonar) in HoloOcean simulation

IMPLEMENTING & WRITING

Online

Feb. 2025

Global Project Based Learning on Internet of Things (gPBL on IoT), organized by Shibaura Institute of Technology, and Hanoi University of Science and Technology

PARTICIPANT

Hanoi, Vietnam

Oct. 2022

- Improve eye blinking detection model for mind wandering prevention
- Develop web app for real time demo of mind wandering prediction

Global Project Based Learning on Robotics (gPBL on Robotics), organized by Shibaura Institute of Technology, and Hanoi University of Science and Technology

PARTICIPANT

Hanoi, Vietnam

Nov. 2018

- Develop Line-Tracing Robot
- Develop Voice controlled & Interactive Robot

Publications

INTERNATIONAL JOURNAL

2024	"Underwater Image Enhancement with Physical-based Denoising Diffusion Implicit Models", Nguyen Gia Bach, Tran Minh Chanh, Nguyen Duc Tho, Phan Xuan Tan, and Eiji Kamioka; journal: Journal of Image and Graphics
2023	"Super-rays grouping scheme and novel coding architecture for computational time reduction of graph-based Light Field coding", Nguyen Gia Bach, Tran Minh Chanh, Nguyen Duc Tho, Phan Xuan Tan, and Eiji Kamioka; journal: Journal of Image and Graphics
2022	"Novel Projection Schemes for Graph-Based Light Field Coding", Nguyen Gia Bach, Tran Minh Chanh, Nguyen Duc Tho, Phan Xuan Tan, and Eiji Kamioka; journal: Sensors
2021	"Improvement of K-nearest Neighbors (KNN) Algorithm for Network Intrusion Detection Using Shannon-Entropy", Nguyen Gia Bach, Le Huy Hoang, Tran Hoang Hai; journal: Journal of Communications

INTERNATIONAL CONFERENCES

2024	“Attenuation-Aware Weighted Optical Flow with Medium Transmission Map for Learning-based Visual Odometry in Underwater terrain” , <u>Nguyen Gia Bach</u> , Tran Minh Chanh, Eiji Kamioka, and Phan Xuan Tan; conference: IEEE 7th International Conference on Multimedia Information Processing and Retrieval (MIPR 2024)	<i>San Jose, USA</i>
2023	“Message Passing Neural Network based Light Field Image Compression” , <u>Nguyen Gia Bach</u> , Tran Minh Chanh, Nguyen Duc Tho, Phan Xuan Tan, and Eiji Kamioka; conference: IEEE 6th International Conference on Multimedia Information Processing and Retrieval (MIPR 2023)	<i>Singapore</i>