Quang Nhat Nguyen

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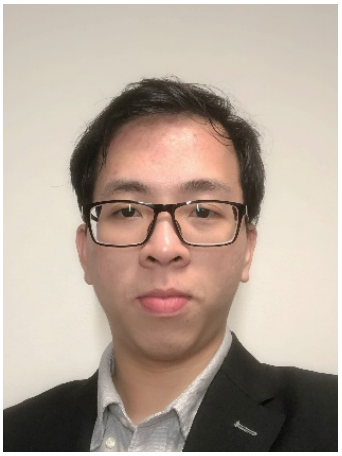
Languages: Vietnamese (native), English (proficient – IELTS 8.0), Japanese (JLPT N2)



Affiliated Research Institute

April 2020 – Present

Takeda Laboratory

Driving Behaviour and Perception Research Group

Department of Intelligent Systems, Graduate School of Informatics, Nagoya University

Current Research Topic

Material classification from multispectral and multimodal perception data: A novel approach for semantic segmentation and photorealistic LiDAR sensor simulation

Research interests: Perceptive intelligence of autonomous robots and vehicles, Intelligent systems, Data science, Computer vision, Artificial intelligence, Digital twin creation, 3D mapping and reconstruction.

Professional Experience

September 2022

Research Intern at RIKEN Centre for Computational Science (R-CCS)

In participation to the High-Performance Computing (HPC) Computational Science Research Internship

April 2022 – Present

Research Assistant at NEDO (New Energy and Industrial Technology Development Organisation)

November 2021 – March 2022

Research Assistant at JARI (Japan Automobile Research Institute)

Education

October 2021 – September 2023 (expected)

Master of Engineering in Electrical Engineering

Nagoya University, Japan

October 2017 – September 2021

Bachelor of Engineering in Electrical Engineering, Electronics, and Information Engineering

Nagoya University, Japan

August 2014 – May 2017

High School Diploma with specialisation in Mathematics

Le Quy Don High School for Gifted Students, Da Nang City, Vietnam

Publications

Physics-based LiDAR waveform simulation method for realism improvement of driving simulators

Quang Nhat Nguyen, Alexander Carballo, and Kazuya Takeda
International Symposium on Future Active Safety Technology toward zero-traffic-accident (FAST-zero), September 2021

On radial Schrödinger operators with a Coulomb potential: general boundary conditions

Jan Dereziński, Jérémy Faupin, Quang Nhat Nguyen, and Serge Richard
Advances in Operator Theory 5, pp. 1132 – 1192, July 2020
DOI: 10.1007/s43036-020-00082-6

Grants / Scholarships

October 2021 – Present
Japan Government's Scholar

Recipient of MEXT Scholarship as a graduate student, awarded by the Ministry of Education, Culture, Sports, Science and Technology of Japan

October 2017 – September 2021
Japan Government's Scholar

Recipient of MEXT Scholarship as an undergraduate student, awarded by the Ministry of Education, Culture, Sports, Science and Technology of Japan

Honours / Awards

Vingroup Science and Technology Scholarship Nomination
August 2022, nominated by Vingroup.

Outstanding Presentation Award
July 2022, awarded by Nagoya University.

Valedictorian of Nagoya University School of Engineering
September 2021, honoured by Nagoya University.

First Prize, Municipal Mathematics Olympiad
2017, awarded by the Department of Education of the Municipal Government of Da Nang City, Vietnam.

Third prize, Municipal Robotics Competition *ROBODNIC*
2017, awarded by the Association of the Science and Engineering Organisations in Da Nang City, Vietnam.

Second Prize, National Computer Science Competition
2012, awarded by the Ministry of Education of Vietnam.

Licenses / Qualifications

Stanford University – Specialisation in Machine Learning
Credential ID: JV2NK7M6HMSN

Amazon Web Services – Specialisation in Cloud-based Application Development on AWS
Credential ID: YWFXB8CS6DTJ

Skills

Programming
Data science and **AI implementation** in Python, **High performance** computing, **Cloud-based** and **containerised** application development, **Graphics engine** (Unreal Engine) programming

Autonomous driving systems development, and others
Autonomous driving simulators (CARLA, SVL, Autoware), **Robotics perception** programming (ROS, SLAM, sensors fusion), **Electronics circuit** design and implementation, **3D CAD**

Research & Academic Experience

Autonomous driving vehicle research, Automotive perception

Multispectral and multimodal data capturing system with multiple LiDAR sensors, 360°-surround visual imaging system, and 360°-surround thermal imaging system

Project at Nagoya University, NEDO, and JARI, December 2021 – Present. Roles:

- Design the system, using 3D CAD and mechanical structural strength simulator, to ensure sufficient mechanical strength and optimised field of view for every sensor.
- Design and construct the sensors calibration mechanism.
- Design, construct, and program the Raspberry Pi-based electronics circuit for sensors synchronisation using electrical signal protocol and ethernet communication protocol.
- Design and construct a support system for equipment placement inside the data-capturing vehicle.
- Assemble the system, install the sensors, and mount the system on top of the data-capturing vehicle.

Autonomous driving vehicle research, Simulation environment creation from reality (real-to-sim)

Digital twin reconstruction with materials segmentation using 3D mapping, sensors fusion, and learning from multispectral and multimodal perception data

Master's research project component, Takeda Lab, Nagoya University, February 2022 – Present.

Research project at R-CCS (RIKEN Centre for Computational Science)

Mathematical derivation and implementation of the LETKFCC (Local Ensemble Transform Kalman Filter with Cross Correlation) and analysis of the cross-correlated observation and forecast error's influence on the assimilation accuracy

Research project conducted in the Data Assimilation Research Group at R-CCS during the High-Performance Computing (HPC) Computational Science Research Internship, September 2022. Roles:

- Conduct mathematical derivations for the LETKFCC (Local Ensemble Transform Kalman Filter with Cross Correlation).
-Implement the LETKF and LETKFCC from scratch.
- Implement parallel computation on a computational server at R-CCS (RIKEN Centre for Computational Science) to efficiently conduct tens of thousands of data assimilation experiments.
- Analyse the impact of the cross correlation between the observation errors and forecast errors on the assimilation accuracy.

Unreal Engine usage, C++ programming

Implementation of a simulated 3D LiDAR sensor in Unreal Engine 4 with customisable comprehensive parameterisation to accurately simulate any real-world LiDAR sensor.

Implementation of such module in Unreal Engine 4 using the UE4's C++ API with comprehensive parameterisation and Physics factors such as atmospheric attenuation and BRDF scattering coefficients based on different materials and incident angles. Takeda Lab, Nagoya University, October 2021 – January 2022.

Undergraduate research, Computer simulation

Monte Carlo simulation algorithm for LiDAR signal based on Physics and Optics

Bachelor's research project under supervision of Prof. A. Carballo and Prof. K. Takeda, Graduate School of Informatics and Institutes of Innovation for Future Society, Nagoya University, Autumn 2020 – Autumn 2021.
Outcome: Work published in FAST-zero international conference, September 2021.

Mathematics research

Mathematics research project on radial Schrödinger operators with a Coulomb potential and general boundary conditions

Project contributor under supervision of Prof. S. Richard, Graduate School of Mathematics, Nagoya University, Autumn 2018 – Spring 2020. Roles:

- Conduct study and literature review on functional analysis.
- Perform and revise mathematical derivations.
- Conduct numerical analyses and generate graphical visualisations.

Outcome: Work published in Springer Nature's Advances in Operator Theory journal, July 2020.

Robotics, Leadership

Captain of robotics team "LQD-INVENTORS" in ROBODNIC competition

2017 – Da Nang City, Vietnam
Roles: Team management; Robot structure, electrical system, and pneumatic system design and construction; Strategies planning.
Outcome: Third prize overall, recognised for the uniqueness and creativity of robot design idea.

Teaching Experience

10/2018 – 2/2021

Tutor for the following courses at Nagoya University:

Mathematics for Machine Learning (Autumn 2020), **Graph Theory** (Spring 2020), **Calculus I** (Autumn 2019), **Differential Geometry** (Autumn 2018)