QUANG-HA PHAM

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RESEARCH INTERESTS

SLAM, Localization, State Estimation and Control.

EDUCATION

M.Eng. University of Technology, VNU-HCM Oct 2019 – present
- **Major**: Control Engineering & Automation (*Research Program*)

B.Eng. University of Technology, VNU-HCM Sep 2016 – Nov 2020
- **Major**: Control Engineering & Automation (*Honors Program*)
- **GPA**: 8.42/10.0
- **Thesis**: Constructing Map and Collision-Free Path for Autonomous Vehicles (*defended with 9.58/10.0*)

RESEARCH EXPERIENCE

Graduate Research Assistant Oct 2020 – present
Vietnam Automation & Mechatronics Laboratory
- Develop an efficient camera-lidar fusion mechanism for SLAM system in natural environments (*ongoing*).
- Build ROS-based software suite, namely VIAM-USV-VC, on Jetson Nano embedded computer for VIAM-USV2000: implement previously simulated WAM-V's algorithms; realize data interchange with STM32F407 microcontroller through CAN, with VIAM-USV-GC through MAVLink.
- Simulate automous capabilities for surface vessel on Gazebo: refine 3D model of WAM-V; implement R-modelled sliding-mode heading controller, straight-or-bspline-LOS path following, SBG obstacle avoidance.

Research Assistant Jul 2018 – Oct 2020
Vietnam Automation & Mechatronics Laboratory
- Develop an online LiDAR SLAM system which features PLICP scan-matcher and g2o-based pose graph optimization, running on embedded computers, tested with Hokuyo UTM-30LX 2D LiDAR in both structured and natural environments.
- Customize QGroundControl to arrive at the official ground control station for VIAM-USV2000 surface vessel, namely VIAM-USV-GC.
- Build Qt-based GUI to remotely command and monitor Delivery AGV: implement Dijkstra's algorithm for global path planning; realize data interchange with Android App through MQTT.
- Build ROS-based software suite on Rasberry Pi 4 embedded computer for Delivery AGV: implement LOS path following, PID heading control; realize data interchange with STM32F407 microcontroller through UART, with monitor GUI through MAVLink.

PUBLICATIONS

2021

P. Q. Ha, T. N. Huy, N. T. Toan and T. T. Phuc, "Online Robust Sliding-Windowed LiDAR SLAM in Natural Environments," accepted at *2021 International Symposium on Electrical and Electronics Engineering (ISEE)*, Ho Chi Minh City, 2021.

2020

T. N. Huy, V. M. Hung, N. T. Cuong, P. M. Tam and **P. Q. Ha**, "Implementation and Enhancement of Set-Based Guidance by Velocity Obstacle along with LiDAR for Unmanned Surface Vehicles," in *2020 5th International Conference on Green Technology and Sustainable Development (GTSD)*, Ho Chi Minh City, 2020.

P. Q. Ha and P. M. Tam, "Constructing Map and Collision-Free Path for Autonomous Vehicles," *Bachelor Thesis*, University of Technology, Vietnam National University Ho Chi Minh City, 2020.

P. Q. Ha, T. N. Huy and T. T. Phuong, "Design and Control of Automated Guided Vehicle," *Applied Mechanics and Materials*, vol. 902, pp. 33-42, 2020.

PRESENTATIONS AND INVITED LECTURES

Paper Presentation, "Online Robust Sliding-Windowed LiDAR SLAM in Natural Environments," *International Symposium on Electrical and Electronics Engineering (ISEE)*, 15/4/2021.

Paper Presentation, "Implementation and Enhancement of Set-Based Guidance by Velocity Obstacle along with LiDAR for Unmanned Surface Vehicles," *International Conference on Green Technology and Sustainable Development (GTSD)*, 28/11/2020.

PROJECTS

Design and Control a Delivery AGV Sep 2019 – Sep 2020

2019 Scientific Research for Student, University of Technology, VNU-HCM

- **Role**: I was responsible for building the software infrastructure on embedded computer, implementing guidance and control laws, designing monitor GUI on laptop.
- **Description**: We aim to make local delivery faster and cheaper without human intervention by designing an automated guided vehicle. Our team managed to design the electrical components of Delivery AGV, build ordering app for buyers and monitor GUI for shop-owners, automate the vehicle's journey.
- **Result**: Our project earned an acceptance certificate a the end of the program.

HONORS AND AWARDS

Certificate of Merit Jan 2021

For outstanding research achievements in 2019 – 2020 academic year, signed by Principal of University of Technology, VNU-HCM.

City Excellent Student April 2016

Second prize of the Excellent Student in English, organized by the Department of Education Training, Ho Chi Minh City, Vietnam.

SKILLS

Maths: Linear Algebra, Probability Theory, Matrix Calculus, Vector Calculus, Calculus of Variations, Partial Differential Equation, Fourier Analysis, Numerical Analysis, Complex Analysis, Lie Theory.

Language: C++, Embedded C, Matlab, Python, QML.

Framework: ROS, Gazebo, Matlab/Simulink, Qt, g2o, MAVSDK.