Nhu Toan Nguyen

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Education

University of Bologna, Bologna, Italy 2024 - Now
Phd Student in Mechanics and Advanced Engineering Sciences, advised by Prof. Rocco Vertechy

Hanoi University of Science and Technology, Hanoi, Vietnam 2021 - 2023
Master of Science in Control Engineering and Automation *CPA: 3.74/4.0*

Hanoi University of Science and Technology, Hanoi, Vietnam 2017 - 2021
Bachelor of Science in Control Engineering and Automation *CPA: 3.52/4.0*

Experience

SAIMA Laboratory, University of Bologna Dec 2023 - Nov 2024
Research Assistant, advised by Prof. Rocco Vertechy

- Developing a human motion tracking system for a hand-guided collaborative mobile manipulator using wearable IMUs and RGBD cameras.
- Investigating collision avoidance and control algorithms for the mobile manipulator to ensure safety in human-robot collaboration applications.

Mechanical Eningeering Group Laboratory (MEG Lab) Dec 2021 - Dec 2023
Research Assistant, advised by Assoc. Prof. Tung Lam Nguyen

- Developed advanced control systems for 4-IWD autonomous vehicles, ensuring system's stability and adherence to safety constraints.
- Integrated controllers and observers for robotic systems, including parallel robots and tower cranes, enhancing system's adaptability and robustness to uncertainties and external disturbances.

VinGroup Big Data Institute, Hanoi, Vietnam Jul 2022 - Dec 2022
Artificial Intelligence Engineer Training Class (Generation 2)

- Focused on Artificial Intelligence and Data Science techniques, combined with hands-on projects.
- Implemented machine learning methods for a project involving vehicle tracking and a project focused on spinal lesion detection and classification.

Welfare and Service Robotics Laboratory (WSR Lab) Jan 2021 - Dec 2021
Research Assistant, advised by Assoc. Prof. Minh Duc Duong

- Implemented a navigation system for a 4-mecanum-wheeled mobile robot using SLAM and path planning algorithms.
- Developed a human tracking system for the mobile robot to follow a predefined person while maintaining a safe distance.

Image Processing and Signal Analysis Laboratory (IPSAL Lab) Aug 2019 - Jan 2021
Research Assistant, advised by Assoc. Prof. Van Truong Pham

- Developed deep learning neural networks (based on the U-Net architecture) and designed loss functions (inspired by the Mumford-Shah loss function and Active Contour models), leading to improvements in segmentation accuracy with the 2017 ACDAC and the 2018 ISIC Challenge medical image datasets.

Publications

- Nguyen, M.-C., **Nguyen, N.-T.**, Bui, D.-N., Nguyen, T.-L. (2023). "Adaptive fuzzy Lyapunov-based model predictive control for parallel platform driving simulators." *Transactions of the Institute of Measurement and Control, 45, 838–852* [html][code]
- Do, Q.-H., Le, T.-T., Ngo, M.-T., **Nguyen, N.-T.**, Bui, D.-N. (2022). "Design a Nonlinear MPC Controller for Autonomous Mobile Robot Navigation System Based on ROS." *International Journal of Mechanical Engineering and Robotics Research* [html][code]

- **Nguyen, N.-T.**, Le, D.-T., Dang, V.-T., Pham, V.-H., Nguyen, D.-H., Hoang, D.-C., Nguyen, T.-L. (2022). "Prescribed Tracking Performance for Lateral Control of an Autonomous Vehicle with High-Gain Observer." *In 2022 11th international conference on control, automation and information sciences (iccais) (pp. 158–163)* [html][code]
- **Nguyen, N.-T.**, Nguyen, M.-C., Bui, D.-N., Nguyen, V.-A., Nguyen, D.-H., Nguyen, T.-L. (2023). "Observer-Based Lateral Motion Control of an Autonomous Vehicle Via Takagi-Sugeno Fuzzy System." *In Computational intelligence methods for green technology and sustainable development (pp. 401–412)* [html][code]
- **Nguyen, N.-T.**, Nguyen, V.-A., Nguyen, M.-C., Nguyen, D.-H., Nguyen, T.-L. (2022). "A Fuzzy Approximation Supported Model-Free Tracking Control Design for Tower Crane Systems." *In Intelligent systems and networks (pp. 62–70)* [html][code]
- Nguyen, M.-C., **Nguyen, N.-T.**, Bui, D.-N., Nguyen, T.-L. (2022). "High-Gain Observer-Based Super-Twisting Sliding Mode Control for Car Driving Simulator Systems." *In 2022 6th international conference on green technology and sustainable development (gtsd) (pp. 557–563)* [html][code]
- Le, D.-T., Nguyen, T.-A., Pham, X.-D., Le, Q.-M., **Nguyen, N.-T.**, Nguyen, D.-H., Hoang, D.-C, Nguyen, T.-L. (2023). "Extended state observer-based backstepping sliding mode control for wheel slip tracking." *In The international conference on intelligent systems and networks (pp. 176–185). Springer* [html][code]
- Pham, V.-H., Le, D.-T., **Nguyen, N.-T.**, Dang, V.-T., Nguyen, T.-V.-A., Nguyen, D.-H., Nguyen, T.-L. (2023). "Backstepping sliding mode control design for active suspension systems in half-car model." *In Advances in engineering research and application (pp. 281–289)* [html]
- Thi, H. L., Dang, V. T., **Nguyen, N. T.**, Le, D. T., Nguyen, T. L. (2022). "A Neural Network-Based Fast Terminal Sliding Mode Controller for Dual-Arm Robots." *In Advances in engineering research and application: Proceedings of the international conference on engineering research and applications, icera 2022 (pp. 42–52). Springer* [html][code]
- Trinh, M.-N., **Nguyen, N.-T.**, Tran, T.-T., Pham, V.-T. (2022a). "A Deep Learning-Based Approach with Image-Driven Active Contour Loss for Medical Image Segmentation." *In Proceedings of international conference on data science and applications (pp. 1–12). Springer* [html][code]
- Trinh, M.-N., **Nguyen, N.-T.**, Tran, T.-T., Pham, V.-T. (2022b). "A Semi-supervised Deep Learning-Based Approach with Multiphase Active Contour Loss for Left Ventricle Segmentation from CMR Images." *In Proceedings of third international conference on sustainable computing (pp. 13–23). Springer* [html][code]
- **Nguyen, N.-T.**, Trinh, M.-N., Tran, T.-T., Pham, V.-T. (2021). "Refining skip connections by fusing multi-scaled context in neural network for cardiac mr image segmentation." *In Soft computing: Biomedical and related applications (pp. 47–57)* [html]

Prizes and Honors

- **VinIF Scholarship for domestic Master and Doctoral training**, 2023, from the Vingroup Innovation Foundation.
- **Honda-YES Scholarship**, 2022, from the Honda Foundation and the Honda Vietnam Company.
- **The Excellent Scholarship**, 2021, from Hanoi University of Science and Technology.
- **The Excellent Scholarship**, 2020, from Hanoi University of Science and Technology.
- **The AES Scholarship**, 2020, from the AES Mong Duong Power Company Limited and Hanoi University of Science and Technology.

Certificates

- Modern Robotics, Course 1: Foundations of Robot Motion, by Coursera.
- Introduction to Self-driving Cars, by Coursera.
- Motion Planning for Self-driving Cars, by Coursera.

- Introduction to Git and GitHub, by Coursera.
- Device-based Models with TensorFlow Lite, by Coursera.
- Perform Real-time Object Detection with YOLOV3, by Coursera.
- 3rd-ranking Artificial Intelligence Course Graduation, by VietAI Center, Vietnam.
- 1st-ranking Machine Learning Course Graduation, by Center for Science and Technology Development, Vietnam (CENSTED).

Languages

- IELTS: 7.0

Skills

- **Domain**: Optimization, Planning and Control, State Estimation, Machine Learning, Computer Vision.
- **Programming**: C/C++, Python, Matlab.
- **Software**: ROS 1/2, Gazebo, Simulink, Git, Pytorch, Carsim, Carla, Gtsam.

Proofs

For further proves and information, please access to this Dropbox.