

LOC THANH PHAM

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EDUCATION

- **Universitat de Girona - University of Zagreb** Girona, Spain - Zagreb, Croatia
Erasmus Mundus Joint Master in Intelligent Field Robotic Systems Sep 2023 - present
GPA: 9.10/10 (Extinction - Ranked 2nd)
Master thesis: Deep Reinforcement Learning of UAV Obstacle Avoidance
Courses: Aerial Robotics, Deep Learning, Multi-robot Systems, Human-Robot Interaction, Robotic Sensing, Perception and Actuation, Probabilistic Robotics, Autonomous Systems, Machine Learning, Multiviews Geometry, Robot Manipulation
- **Hanoi University of Science and Technology** Hanoi, Vietnam
Bachelor of Control Engineering and Automation 2015 - 2020
Courses: Control Theory, Robust and Optimal Control, Fuzzy Control and Neural Networks, Control System Design, Robot Engineering, Microprocessors, Embedded Control System Design, Programming Techniques, Probability and Statistics, Electrical Circuit, Numerical Methods, Digital Control Systems

SKILLS SUMMARY

- **Languages:** C, C++, C#, Python, Matlab/Simulink
- **Frameworks:** ROS, Pytorch, Stable-Baseline3, Ardupilot/PX4, GTSAM, OpenCV
- **Simulator:** Gym, Issac Gym, Mujoco, PyBullet, Gazebo
- **Tools:** Docker, GIT
- **Platforms:** Linux, Windows, Arduino, Raspberry
- **Soft Skills:** Leadership, Event Management, Writing, Time Management

EXPERIENCE

- **Viettel High Technology Industries Corporation** Hanoi, Vietnam
Technical Lead — Robotics - Autopilot (Full-time) 2021 - 2023
 - **Autopilot team leader:** of 5 members, responsible for technical decisions, team communication
 - **Autopilot Software:** Designed, developed and maintained autopilot software to Kamikaze Drone, VTOL Drone and Navigation System projects
- **Viettel Aerospace Institute** Hanoi, Vietnam
Robotic Engineer (Full-time) 2020 - 2021
 - **UAV Navigation System:** Based on sensor fusion technique and calibrating methods on sensors: IMU, Barometer, GNSS and Magnetometer to develop a navigation system for UAV.
- **Hanoi University of Science and Technology** Hanoi, Vietnam
Junior Researcher (Part-time) 2016 - 2020
 - **Reinforcement Learning:** Developed Online Actor-Critic Reinforcement Learning Control for Uncertain Surface Vessels based on Control Theory. Simulated in Matlab/Simulink.
 - **Sliding Model Control:** Developed SMC Controller for Flexible Joint Manipulator Systems based on Control Theory. Simulated in Matlab/Simulink.

PROJECTS

- **Deep Reinforcement Learning for Drone Obstacle Avoidance:** Designed a deep reinforcement learning framework to enable autonomous UAVs to perform real-time obstacle avoidance using onboard depth sensing. Combined CNN for perception with RNN and policy optimization algorithms (TD3/PPO) for decision-making. Simulated training with synthetic noise and occlusion to enhance robustness. Integrated with Gym Pybullet Drone.
- **Adaptive/Approximate Dynamic Programming:** Developed an optimal path following controller based on Model-Free Reinforcement Learning (Actor-Critic model). Applied to Perturbed Uncertain Surface Vessels and Manipulator. The researches were published on International Journal during 2019-2022
- **Controller and Seeker for Suicide Drone:** Designed controllers in attack phase based on image processing data. They allow drones to attack the target with an error of less than 3 meters. Tech: C, Python, OpenCV.
- **Controlling a Swarm of Robots using Reynolds' Rules:** Focuses on Craig Reynold's behavioral rules: Separation, Alignment, and Cohesion, Navigation and Obstacle avoidance to control a robot swarm within a 2D simulator Stage. The implementation is evaluated in various maps to analyze their behavior across different environments.
- **Formation Control of Multi-Robot Systems Using Consensus Protocols:** Implemented consensus protocol-based strategies for the robust coordination and formation control of multi-robot systems. Focusing on rendezvous and formation control, we crafted a software framework utilizing graph theory for dynamic robot swarm control.
- **Pick and Place Task on Turtlebot Kobuki 4-DoF Mobile Manipulator:** Applied Task-Priority Kinematic Controller for mobile base and manipulator, Image Processing to detect objects, Behavior-tree for task planning. Tech: ROS1, Python, Stonefish Simulator, OpenCV, Behavior-tree, Turtlebot Kobuki.

- **Robust Graph SLAM for Autonomous Navigation:** Implemented an online SLAM and full SLAM using GTSAM library and ROS on the turtlebot platform with onboard sensors - 2D LIDAR, Wheel Encoders, and Magnetometer compass. The system's positioning error is less than 3cm in lab environment and is capable of close-loop detection. Tech: ROS1, C++, GTSAM, Stonefish Simulator.
- **GNSS-Denied Navigation System for Unmanned Aerial Vehicles:** Applied Extended Kalman Filter and SLAM to navigation system which allow UAV to operate in GNSS-denied environment. Optimized modelling and calibration methods for low-cost sensors: IMU, Barometer, GNSS receiver helping to reduce the cost of products. Tech: Sensor Fusion, GTSAM, C, ardupilot/PX4, FlightGear Simulator, Matlab/Simulink
- **Autonomous Exploration and Path Planning in 3D Environments:** Used TARE planner for global planner and Falco for local planner to solve the exploration task. The system was deployed in turtlebot with depth camera. Tech: ROS, StoneFish Simulator, TARE planner, Turtlebot Kobuki
- **Visual Inertial Odometry:** Integrated Camera and IMU data through Smart Projection Pose Factors for efficient state estimation. Tech: ROS, C++, GTSAM, StoneFish Simulator, Turtlebot Kobuki, KITTI dataset
- **Personalized LLM-Based Smart Home Assistant:** Proposed a robust framework that combines these capabilities with the TIAGo robotic platform to create a personalized home assistant robot. By leveraging OpenAI Whisper, ChatGPT 4o, and ElevenLabs, the system aims to enable seamless interactions between humans and robots, facilitating context-aware tasks and adaptability in dynamic home environments.

PUBLICATIONS

- **Journal: Disturbance Observer-Based Adaptive Reinforcement Learning for Perturbed Uncertain Surface Vessels:** ISA Transactions, Volume 130, November 2022, Pages 277-292. Van Tu Vu, **Thanh Loc Pham**, Phuong Nam Dao
- **Journal: Online Actor-Critic Reinforcement Learning Control for Uncertain Surface Vessel Systems with External Disturbances:** International Journal of Control, Automation and Systems, Vol. 20, No. 3, pp. 1029-1040, 2022. Van Tu Vu, Quang Huy Tran, **Thanh Loc Pham**, Phuong Nam Dao
- **Journal: Sliding Variable-based Online Adaptive Reinforcement Learning of Uncertain/Disturbed Nonlinear Mechanical Systems:** Journal of Control, Automation and Electrical Systems, Vol. 32, Issue. 2, pp. 281-290, 2021. Van Tu Vu, Phuong Nam Dao, **Pham Thanh Loc**, Tran Quang Huy
- **Conference: Disturbance Observer based Sliding Mode Control for Flexible Joint Manipulator Systems:** 4th International Conference on Mechatronics and Robotics Engineering, Valenciennes, France, February 2018. Dao Phuong Nam, **Pham Thanh Loc**, Do Trong Tan, Vu Van Dung

HONORS AND AWARDS

- Erasmus Mundus Joint Masters Scholarship in Intelligent Field Robotic Systems (IFRoS) - 2023
- Excellent Engineer Awards in Viettel Corporation - 2021, 2022
- Bronze Medals in the National Physics Olympiad - 2015

REFERENCES

- **Assistant Professor, Dr. Sc. Goran Vasiljević**
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 - **Relationship:** Master Thesis Supervisor
- **Associate Professor, Dr. Phuong Nam Dao**
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 - **Relationship:** Bachelor Thesis Supervisor
- **Associate Professor, Dr. Sc. Tamara Petrović**
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 - **Relationship:** Master Program Supervisor