LUONG TIN PHAN, Ph.D

+84 8-7777-4753
luongtin@gmail.com
www.linkedin.com/in/luongtinphan
https://scholar.google.com/citations?hl=en&user=3RO0jCIAAAAJ

EXPERIENCE

10/2022 ~ Present Technical Lead
Next Robotics (FPT Software Spin-off), Ho Chi Minh, Vietnam

The Product Owner of the Fleet Management System (FMS) for autonomous robots

The product wirelessly communicates with multiple robots periodically to coordinate their motion, control traffic, assign and manage tasks received from the customer's warehouse management system, as well as schedule the charging process of robots.

- Lead the team to develop the Fleet Management System to coordinate multiple AMRs working in warehouses, manufacturing sites
- Design the architecture of the module and products as well
- Improve the algorithms for motion planning and multi-robot management
- Communicate product plans and progress to CTO, CEO.
- Collaborate with sales and marketing teams on sale strategies
- Meet potential customers to propose, discuss and analyze the solutions

The First Fleet Management System for robots, made by Vietnam, deployed at several big FDI companies in Vietnam, controlled over 25 robots doing daily tasks at their sites in 24h/6 working mode.
Reference: https://nextrobotics.io/portfolio/nextarm/

10/2021 ~ 10/2022 Solution Architect
FPT Software, Ho Chi Minh, Vietnam

The Owner of the Motion Planning module for autonomous technologies in cars and mobile robots

The product uses cameras, radars and ultrasonic sensors to perceive surrounding environments and detect available slots within the view of the car. Once a parking slot is confirmed, the motion planning module controls both the steering wheel and gas throttle to automatically maneuver the car into the chosen parking slot.

- Lead the Motion Planning team to develop motion planner for **Auto Parking** feature in Autonomous Car and warehouse applications in Autonomous Mobile Robots (AMRs)
- Design the architecture of the module and products as well
- Improve the algorithms for high precision positioning (**10** cm in Auto Parking feature and **3** cm in AMR applications
- Plan the tasks and document the product's requirements (PRD)

The First in Vietnam to deploy a complete Auto Parking Feature that supports Perpendicular, Parallel and Angle Parking Slot types.
The First in Vietnam to deploy multiple AMRs in industrial warehouses.
Video**:**
https://youtu.be/pTBnXuosToo
https://youtu.be/oVjjflFvbXA

03/2021 ~ 10/2021 Robotics Software Engineer
VinAI Research, Ho Chi Minh, Vietnam

Develop motion planning and control for autonomous driving cars

The system uses a camera-based vision system to detect lanes and localize the car's position relative to the lane, then controls both the steering wheel and gas throttle to keep the car in the current lanes. Additionally, the system also uses a RTK-GPS system as an input for improving the accuracy of the localization.

- Develop motion algorithms for autonomous vehicle
- Use DDS protocol for data communication
- Integrate motion planning and control with other modules to control car behaviors.
- Test and deploy algorithms in real vehicle in normal roads
- Improve vehicle performance for smooth motion and high speeds.

Successfully develop the Vietnam's first autonomous car that can operate in normal roads at high speeds.
Video: https://youtu.be/RZoli9RyG9s

03/2020 ~ 04/2021 Robotics Software Engineer
Rapyuta Robotics, Tokyo, Japan

Develop robot behaviors and motion solutions for mobile robots operated for warehousing, construction applications.

Autonomous mobile robots use a LiDAR-based Simultaneous Localization and Mapping system to determine their current pose in a working environment. There are cameras attached in the robot's body to detect objects (humans, pallets) as inputs for required tasks.

- Work with big partners in Japan such as Sumitomo NACCO Forklift, Taisei Corporation.
- Plan and discuss demo scenarios, criteria for evaluating projects
- Test and benchmark the performance of robots
- Develop behaviors of automatic forklift in navigation, pallet detection, pallet pick and drop actions using ROS topics, services, actionlibs
- Contribute in developing and testing mobile robots in multi-agent scenarios in both simulation and real environments using Gazebo and Rviz
- Use ROS navigation stack in mapping and localizing robots
- Have experience in working with both laser-based SLAM (Hokuyo sensors) and vision-based SLAM (Alphasense devices)
- Work with team to test UI for interfacing with robots
- Set up, configure safety devices (SICK laser scanners), switches, proximity sensors
- Plan and organize daily/weekly tasks in Wrike
- Use docker, github and CI in daily work

Projects:

1. Develop multi-robot software stack for automobile robots to deploying in warehouses
2. Develop automatic forklift to work in both indoor warehouses and outdoor environments

Prize: Silver Prize in **OpenCV** Spatial AI Competition 2020 with Realtime Perception for Autonomous Forklifts > Details

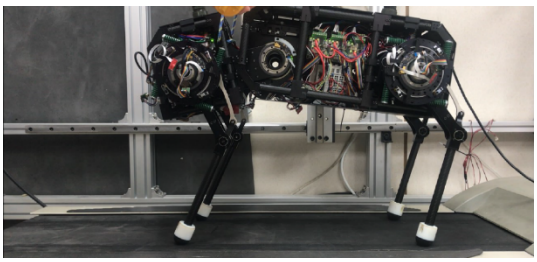
EDUCATIONAL RECORD

03/2013 ~ 02/2020 Master/PhD Combined Candidate in Quadruped Robots
School of Mechanical Engineering, Sungkyunkwan University, South Korea
(Ranked #89 worldwide)

- Research on principles of quadruped locomotion.
- Model quadruped robot and optimize the locomotion.
- Simulate control algorithm on MATLAB/Gazebo/ROS
- Implement and utilize the developed algorithm on real systems.
- Build force/torque control algorithms for series elastic actuators, fast motion planning based on polynomial trajectory, Bezier or NURBS curve.
- **One published journal** paper, **One journal** paper in minor review, **2 IROS** conference papers (top 2 in Robotics), **2 URAI** conference papers.
- Award: Full scholarship for **outstanding students** during Ms/Ph.D course
- **Projects:**
  1. *Development of multi-modal legged locomotion technology for applying to high-tech urban environments in the future*

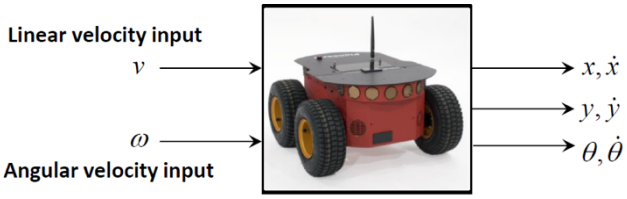
  - Design and build quadruped robot for daily service.
  - The robot with **12 DOF**
  - Use **EtherCAT/ROS** on **Ubuntu**
  - Control algorithm is built in **C++**
  - Period of time: **01.06.2016 – 31.05.2019**
  - Sponsor: Gyeonggi Technology Development Program funded by Gyeonggi Province (code R2016001).

  2. *Development of high-speed running quadruped with articulated spinal joint*



- Investigate the effect of whole body compliance on the quadruped running and propose the principles of design and control of the whole body compliance.
- The robot with **10 Degree-of-freedom (DOF)** actuated by **Series Elastic Actuators** (**SEA**), 2 DOF per leg, 2 DOF at body
- The robot is able to run at **4km/h**.
- Use **EtherCAT/ROS** on **Ubuntu** as real-time communication protocol
- Control algorithm is built in **C++/Python**
- Period of time: **01.05.2014 – 31.04.2017**
- Sponsor: National Research Foundation of Korea (No.2014R1A2A2A01005241)
- Demo Video Link

3. *Trajectory planning for mobile robot using **Model Predictive Control** (**MPC**) to automatically avoid the obstacles*



- Use **MPC** algorithm to re-plan the robot's path to avoid the obstacles on the way to go to the goal points.
- Code built in **MATLAB/C++/Python**
- Demo Video Link

- **Thesis:**
  - **Thesis Title:** *Control strategy for running quadruped robot with articulated spine*
  - **Supervisor:** Professor Hyouk Ryeol Choi
    - Director of Robotics Innovatory Laboratory
    - President of Korea Robotics Society
    - Website: http://mecha.skku.ac.kr
    - Email: hrchoi@me.skku.ac.kr
    - Phone: +82 31 290 7449

09/2007 ~ 08/2012 Undergraduate Student
Danang University of Technology, Vietnam

- Selected among **top students** in Vietnam to attend the Excellent Engineer Training Program (PFIEV)-certificated as France qualifications
- **Major**: Automation
- **Scholarship**: Excellent student scholarships 2010, 2011.

KNOWLEDGEABLE SKILLS

- Operating Systems/Platforms**: Windows, Ubuntu**, **Robot Operating System** (**ROS**)
- Programming Language Skills: **C++, Python**, **Matlab**
- Additional skills for robotics**: AI library** (Open AI gym)**, Vision** on ROS for perception

PROFESSIONAL ACTIVITIES

- **Reviewer** for the following **conferences**: IEEE Conference on Intelligent Robotics

and Systems, IEEE Conference on Robotics and Automation, American Control Conference.

- **Reviewer** for the following **journals**: Advanced Robotics, IEEE Access, Journal of Mechanical Engineering Science, Robotics and Autonomous Systems.

AWARDS

Academic:

Outstanding Foreign Student Scholarship – Sungkyunkwan University, S.Korea (2013-2017)
Student Excellent Scholarship – Danang University of Technology, Vietnam (2010, 2011)
Silver Prize in OpenCV Spatial AI Competition 2020 > Details

Sports:

Soccer Champion in VSAK Tournament 2014, then promoted to be **the team's caption** in following year.

LANGUAGE SKILLS

Vietnamese: native
English: fluent
French and Korean: basic understanding and conversation

PUBLICATIONS

Yoon Haeng Lee, Young Hun Lee, Hyunyong Lee, Jun Hyuk Lee, **Luong Tin Phan**, Sungmoon Jin, Yong Bum Kim, Dong-Yeop Seok, Seung Yeon Lee, Hyungpil Moon, Ja Choon Koo and Hyouk Ryeol Choi, "Development of A Quadruped Robot System with Torque-Controllable Modular Actuator Unit" in *IEEE Transactions on Industrial Electronics*, 2020

Luong Tin Phan, Yoon Haeng Lee, Young Hun Lee, Hyunyong Lee, Hansol Kang and Hyouk Ryeol Choi, "Study on Effects of Spinal Joint for Running Quadruped Robots" in *Intelligent Service Robotics*, 2020

Luong Tin Phan, Yoon Haeng Lee, Young Hun Lee, Hyunyong Lee, Hansol Kang and Hyouk Ryeol Choi, "Study on Quadruped Bounding with a Passive Compliant Spine" in *2017 IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2017

Luong Tin Phan, Yoon Haeng Lee, Young Hun Lee, Hyunyong Lee, Hansol Kang and Hyouk Ryeol Choi, "Effects of Spinal Joint on Quadrupedal Bounding," in *The 14th International Conference on Ubiquitous Robots and Ambient Intelligence*, 2017

Luong Tin Phan, Yoon Haeng Lee, Dong Youn Kim, Hyunyong Lee and Hyouk Ryeol Choi, "Stable Running with a Two-segment Compliant Leg" in *Intelligent Service Robotics*, vol. 10, pp. 173-184, 2017

Luong Tin Phan, Yoon Haeng Lee, Dong Youn Kim, Hyunyong Lee, and Hyouk Ryeol Choi, "Hybrid Quadruped Bounding with a Passive Compliant Spine and Asymmetric Segmented Body" in *2016 IEEE/RSJ International Conference on Intelligent Robots and Systems*, pp. 3387–3392, 2016

Luong Tin Phan, Yoon Haeng Lee, Dong Youn Kim, Hyunyong Lee, and Hyouk Ryeol Choi, "Quadruped Bounding with a Passive Compliant Spine," in *The 12nd International Conference on Ubiquitous Robots and Ambient Intelligence*, pp. 415–416, 2015

REFEREES

1. Professor Hyouk Ryeol Choi

- Director of Robotics Innovatory Laboratory
- President of Korea Robotics Society
- Website: http://mecha.skku.ac.kr
- Email: hrchoi@me.skku.ac.kr
- Phone: +82 31 290 7449