TRONG-DOAN NGUYEN

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SUMMARY

Enthusiastic robotics software engineer with 5+ years of experience in analysis, design, development, testing, and implementation of various software systems for robotics/IoT applications. Strong theoretical background with two Master's degrees and practical experience in Machine Learning, Control, and Robotics.

SKILLS

- Proficient in Python, C/C++, and Matlab
- Experience with developing complex robotics applications
- Experience in machine learning, robot dynamics and control (feedback/optimal control)
- **Platforms**: Linux, Nvidia Jetson Nano/TX2, Raspberry Pi 4B/Zero W, ESP32, STM32F4
- **Sensors**: Lidar (Hokuyo UST-10LX,Sick Tim551, RPLidar A2M8, YDLidar G4), IMU (SparkFun 9DoF Razor M0), Camera (Aducam IMX219), SCD30 CO2 sensor
- **Other hardwares**: Brushless Motor (Traxxas Velineon 3500), Servo, Step motor, Speed Controller (VESC 6 PLUS)
- **Tools:** FreeRTOS, Segger Systemview, Git, ROS, tensorRT, tensorflow, pytorch, opencv, CasADi, numpy, gpflow, scikit-learn, matplotlib, GPTIP.

WORKING EXPERIENCE

ROSTek
Embedded Software Engineer   *Feb 2020 - now*

- The project was developing the autonomous driving capability for Automated Guided Vehicles (AGV).
- Responsible for developing a navigation stack for AGVs using ROS, which involves all components needed for robotics systems to perform self-driving tasks: perception, localization, path planning, and control. The system uses Lidar and IMU for localization.
- Implemented rapid prototype using python and C++, then ported to pure C++ for performance guarantee on the products.
- Simulated the operation of the AGV using Gazebo and Rviz for algorithm testing and performance evaluation before implemented it on commercial products.
- **1 of 10 wining teams** in Qualcomm Vietnam Innovation Challenge 2020.
- In the beta testing phase at our customer's warehouse for tuning and improvement.
  (Demo: https://youtu.be/UboG2f4byXs)

ICONS Lab., NAU
Research Assistant   *Aug 2019 - now*

- Worked on "Indoor occupancy density tracking and air ventilation measurement" project to combine physical distances and air/ventilation quality to better assess and maintain healthy indoor environments during a pandemic.
  - Developed a distributed IoT network of multiple CO_2 sensors and Cameras for human detection, localization and CO_2 measurement. Each CO_2 sensor connected to a Raspberry Pi Zero W and each camera run on a Jetson Nano.
  - Evaluated performance and accuracy of multiple deep learning-based object detection algorithms. Implemented an optimized version of Yolov4 on Jetson TX2 and Nano using TensorRT to utilize the CUDA acceleration framework of Nvidia GPUs.
  - Used MQTT protocol for message exchanges and stored data on a local database using SQL.
  - Developed a GUI software for data visualization using PyQt.

- Worked on project: Approximate optimal control law of Model Predictive Control (MPC) controllers by deep neural networks (DNN).
  - Developed Nonlinear MPC and Linearized MPC controllers using CasADi optimization toolbox using Python and C++. Implemented it on the F1/10th autonomous race car platform (http://ff1rr.nxtlab.org).
  - Study the mathematical connection between the solution of MPC and output of DNN.
  - Implemented DNN to approximate the solutions of Linear MPC, NMPC, and Linearized MPC with performance benchmark.

VINSMART
Embedded Software Engineer   *November 2018 - July 2019*

- Participated in developing an architecture for layer 3 of Vinsmart's 5G NR base station.
- Implemented components of the layer 3 software using C/C++.

Automation Control Lab.
Research Assistant   *Aug 2016 - Aug 2018*

- Developed a symbolic regression-based method to improve the quality product of the Selective Laser Melting (SLM) process.
- Implemented the method on industrial SLM machines of ITRI's Laser and Additive Manufacturing Technology Center (Taiwan).

EDUCATION

Master of Science in Informatics   NOTHERN ARIZONA UNIVERSITY
Accumulated GPA: 3.88/4.00
Master of Science in Mechanical Engineering   NATIONAL CHIAO TUNG UNIVERSITY
GPA: 4.0/4.0
Mechatronics Engineering   HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY
GPA: 3.2/4.0 (top 5%)

AWARD & PUBLICATION

- **Fast Pitch Award** - AzSEC - 8th Arizona Student Energy Conference   2019
- **Academic Achievement Award** of National Chiao Tung University   2017
- **Full Scholarship** of Ministry of Science and Technology Taiwan for Master students   2016
- **TOKAI GOKYO Scholarship** (TOKAI company) for excellent students of Hanoi University of Science and Technology   2014
- **Bronze medal,** National Mechanics Olympiad Contest, subject: Engineering mechanics   2013
- **Silver medal,** Creative contest for Vietnam youth and students   2010
  One of Vietnam students participated in "International Exhibition for Young Inventors", Nigeria
- **Third prize,** Creative Ideas and Solutions for Saving Energy and Protecting Environment, Ho Chi Minh Communist Youth Union   2010
- Published paper:

[1]   T. X. Nghiem, **T. Nguyen**, and V. Le. "Fast Gaussian Process based Model Predictive Control with Uncertainty Propagation". In: *2019 57th Annual Allerton Conference on Communication, Control, and Computing (Allerton)*. Sept. 2019, pp. 1052–1059. DOI: 10.1109/ALLERTON.2019.8919857.