Tung Do

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EDUCATION

University of Michigan, Ann Arbor Aug 2023 – Present
Master of Science in Electrical and Computer Engineering, emphasis in Robotics 4.0/4.0

California State Polytechnic University, Pomona Aug 2018 – May 2023
Bachelor of Science in Electromechanical Systems Engineering Technology – Valedictorian 3.7/4.0

PROFESSIONAL EXPERIENCE

Research Assistant at the University of Michigan, Ann Arbor Ann Arbor, MI
USV Autonomous Maritime Robots Research with UM Field Robotics Group Dec 2023 - Present

- Programmed the Unmanned Surface Vehicle's (USV) Unified Robot Description Format (URDF) model and the University of Michigan's Marine Hydrodynamics Lab "world" model to establish the simulation environment using ROS2 and Gazebo Garden. This setup facilitated the testing of autonomous functions and the conduct of deep-learning research.
- Developed an object avoidance algorithm using Python and C++ to assess the experiment's performance in both real-world and simulated environment.
- Conducted real-world tests to collect LIDAR, odometry, drive, velocity, and IMU data, which was then replicated in the simulation environment. Currently, efforts are focused on analyzing and post-processing the data using Python.

TD-Rex Autonomous Rover Research with ROAHM Lab Aug 2023 - Present

- Built and programmed embedded control systems on STM32 VESC and Jetson TX2 board's Linux environment for a second autonomous rover, preparing it for multi-agent experiments.
- Migrated legacy ROS Python from the Jetson TX2 board to the Jetson AGX Orin board to leverage increased raw GPU power.
- Addressing compatibility conflict between multiple versions of PyTorch, TensorFlow, CUDA, CUDNN, TensorRT, and NumPy to ensure smooth operation on limited hardware of the Jetson AGX Orin board.
- Optimizing the board's performance using the UNet deep learning architecture to enhance the efficiency of semantic segmentation.

Embedded Software Engineer at California State Polytechnic University, Pomona Pomona, CA
Unmanned Aerial & Ground Vehicle (UAV & UGV) for Northrop Grumman Collaboration Project Aug 2022 – May 2023

- Developed Python scripts for the Jetson Nano computer to implement autonomous in-flight control on the Pixhawk controller. Successfully met the Northrop Grumman Demo's requirement by autonomously piloting the UAV at 200 feet from the ground for 10 minutes to scout the test area for wildfires and injured hikers.
- Programmed embedded software using Embedded C with STM32 microcontroller and developed ROS Python scripts for communication between two Raspberry Pi computers to wirelessly control the UGV over a range of 700ft. Achieved the Northrop Grumman Demo's objective of safely transporting the injured hiker back to the Ground Control Station.

PROJECTS

Monocular 3D Object Detection | Team Lead Oct 2023 – Dec 2023

- Led the analysis and training of the MonoCon model using PyTorch, incorporating transfer learning, image augmentation, and pre-processing techniques to improve visibility and enhance detection accuracy and robustness under various weather conditions, notably in fog. Our team achieved 2nd place with an Average Precision (AP) value of 25.82, trailing behind the first-place team, which had an AP value of 32.

Advanced Driver Assistance Systems (ADAS) Simulation | Embedded Software Engineer Aug 2023 – Dec 2023

- Developed Embedded C code, block diagram, and S-function for implementing Manual Control, Adaptive Cruise Control, and Auto-Steering on the NXP S32 board. This setup controls car simulation in Simulink using a haptic wheel connected to an encoder DC motor. Developed embedded C code that enables communication with other car simulations via the CAN network. This allows for the mutual transmission of each car's position to be displayed on the screen.

Autonomous/Remote Control Mecanum Wheel Tesla Roadster 1:6 | Project Owner Jan 2022 – Dec 2022

- Enabled remote control of signal lights, steering, wipers, rear and headlights via 6 Arduinos with 160ft wireless range.
- Developed autonomous self-parking and object avoidance features using C, C++ to evaluate the performance of the Mecanum Wheel system in real-life vehicle scenerio. The vehicle can switch between idle, remote control, and autonomous modes.

SKILLS

- Robotics: ROS, ROS2, Simulation (Rviz, Gazebo), Sensor Integration (LIDAR, Camera, IMU), Machine Learning (PyTorch, TensorFlow), Control Systems (PID, MATLAB, Simulink), Computer Vision (OpenCV)
- Software: Python, C++, C, Linux, Bash/Shell Scripting, Git, Debugger, Docker
- Hardware: Microcontrollers, ARM, GPIO, ADC, PWM, Timer, ISR, RTOS, CAN, I2C, SPI, USART, USB
- CAD: SolidWorks, 3D Printing, ANSYS FEA