Tommy Le

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Education

M.S. in Mechanical Engineering — Expected May 2024
Northern Illinois University, DeKalb, IL — GPA: 4.00/4.00

B.S. in Mechatronics Engineering, Minor in Electrical Engineering — May 2023
Northern Illinois University, DeKalb, IL — GPA: 3.93/4.00

Experience

Graduate Research Assistant — Oct 2021 – Present
Northern Illinois University | ARM and Omron Lab — DeKalb, IL

- Implemented MPC using LPV formulation, simulating the control of autonomous tasks for self-driving vehicles
- Designed an EKF and UKF to simulate an autonomous vehicle, resulting in 0 mean error with minimal variance
- Simulated an RRT-based SLAM algorithm in ROS for an indoor autonomous vehicle equipped with LiDAR

Embedded Systems Intern — May 2023 – Aug 2023
Yaskawa America Inc. | Motion and Drives R&D Division — Santa Clara, CA

- Improved motion planning for robots using SLERP, allowing specification of gripper orientation for pick and place tasks
- Automated manual tests checking discontinuities in robot motion profiles using DSP, reducing story points from 4 to 0

Robotics Engineering Intern — May 2022 – Jan 2023
Argonne National Lab | Robotics and Remote Systems Division — Lemont, IL

- Integrated hardware into a haptic telerobotic system using ROS which was selected to be presented at a DOE event
- Updated a haptic VR application by interfacing 3D point cloud data with Gazebo, allowing a Phantom Omni stylus to control a Baxter Robot and interact with objects remotely
- Designed a signal synthesis algorithm to mimic high frequency tactile feedback, emulating surface contact in VR

Robotics Engineering Intern — May 2021 – Aug 2021
PBC Linear | Applied Cobotics R&D Department — Roscoe, IL

- Improved sales by $800k by designing grippers and interfacing PLCs with robot work cells enabling 24/7 manufacturing
- Automated workstations using PLCs and microcontrollers to reduce cycle times by 80%
- Designed a mechatronic smart cart, managing a 45+ part assembly and designing wireless communication

Projects

Thesis, Magnetometer-less Estimation of Mobile Robots using Cascaded Kalman Filters — June 2023 – Present

- Developed a novel estimation algorithm for mobile robots in C, providing a magnetometer-less localization method
- Modeled sensors and vehicle kinematics in MATLAB, simulating and validating the proposed estimation framework
- Manufactured a robot and camera stand, creating a simple and modular platform for autonomous robotics research

Senior Design, Development and Control of a Small-Sized Spherical Robot V2 — Oct 2022 – May 2023

- Architected a vision-based control package in ROS, earning the “Innovation in Software and Controls” award
- Created BLE, Bluetooth, and Wi-Fi communication protocols in C and Python, allowing data to be passed quickly from a local PC to the robot with a latency of 15 milliseconds
- Designed and tested a PCB in KiCad allowing for simple motor control interfacing and I2C communication to sensors, shrinking the overall size of the robot and exceeding client requirements by 15 mm in diameter

Computer Vision Based Autonomous Mobile Robot — Apr 2022 – May 2022

- Implemented PD motor control for target and obstacle detection using color detection and depth estimation, leading to no collision maze navigation with the 2nd fastest target detection time
- Programmed a vanishing point, lane following, and obstacle avoidance algorithm in Python for an iCreate robot equipped with a webcam and Raspberry Pi, allowing lane centering and adaptive cruise control navigation

Skills

Software: ROS, Gazebo, OpenCV, SolidWorks, Git, Eigen, KiCad, TensorFlow, Simulink, ANSYS, COMSOL
Languages: C, Python, C++, MATLAB, JavaScript, CSS, HTML, Lua