Juo-Tung Chen

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Education

JOHNS HOPKINS UNIVERSITY — Maryland
M.S.E. in Robotics - Perception and Cognitive Systems Track — Aug. 2022 - May. 2024 (expected)

NATIONAL TAIWAN UNIVERSITY — Taipei, Taiwan
B.S. in Biomechatronics Engineering (GPA: 3.72/4.0) — Sept. 2017 – Jun. 2022

Skills

- **Programming language:** C/C++, Python, Matlab, LaTeX, HTML, CSS, Javascript
- **Software:** ROS, GIT, Docker, SolidWorks, Simulink, QT, Rviz, Gazebo, MoveIT, OpenCV, MySQL, Pytorch
- **Operating system:** Linux, Windows, MacOS
- **Embedded Systems:** Raspberry Pi, Arduino, TX2, Concerto(F28M3X)

Internship Experience

Coretronics Intelligent Robotics Corporation — Hsinchu, Taiwan
R&D Intern in AI Team — Jul. – Sept. 2020

- Implemented system identification using Matlab and constructed a 2D simulation for autonomous forklift using Simulink, QT, C++, and OpenCV
- Performed research on Convex Elastic Smoothing algorithm and developed a Double Continuous Curvature path planning algorithm with an error $< 3\%$

Research Experience

Course Projects at JHU — Maryland

Motion Planning for Autonomous Parallel Parking — Dec. 2022 – Jan. 2023

- Implemented Direct Collocation method with Python to generate trajectories and control inputs with minimum control effort for autonomous parallel parking.
- Incorporated obstacle avoidance feature by designing a algorithm calculating the minimum distance between the car's corner and the obstacles, and integrated it into inequality constraints
- Designed and integrated an obstacle avoidance algorithm through incorporating minimum distance between the car and obstacles into inequality constraints
- Developed simulation environment with interactive user interface and 8 selectable parking slots

Adversarial Attacks and Defensive Distillation for Neural Network — Oct. – Nov. 2022

- Implemented GoogLeNet using Pytorch and trained on CIFAR-10 dataset with an accuracy of 92.68 %
- Applied three adversarial attacks including Fast Gradient Sign Method (FGSM), Noise, and Semantic attack
- Introduced Defensive-Distillation as a defense mechanism against FGSM attack and successfully retained an accuracy of 89.13 % instead of 28.15 % without defense

National Taiwan University, Robots and Medical Mechatronics Lab — Taipei, Taiwan

Collaborative Tea-Harvesting Robot — Jul. 2019 – Aug. 2021

- Created an intelligent vehicle capable of carrying tea harvesting tool with a side-by-side walking feature and object avoidance to pluck tea with a human worker collaboratively
- Devised path planning with Reed & Shepp curve to perform autonomous turns between tea trees
- Performed object avoidance and SLAM using Lidar through Robot Operating System (ROS)

Intelligent Sensing and Precise Cultivating System in Greenhouses

- Led a team of 5 undergraduate students to conduct research activities and organized tasks for team members
- Utilized SolidWorks to design a 5 DoF robotic arm equipped with a Chlorophyll Fluorescence Imaging sensor to automatically detect water stress within a tomato plant
- Simulated kinematics and motion planning for robotic arm with Simulink and Rviz

Competitions

Taoyuan ROS summer school: 3rd place in the advanced robot competition — Aug. 2020

- Implemented SLAM and path planning algorithm on an ADLink NeuronBot (Omni-directional mobile robot) with ROS/ROS2 and Rviz
- Conducted object recognition using OpenVino with 97% of training accuracy