CHUN-YU (JERRY) HOU

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RESEARCH INTERESTS

Main topics: Robotics, Self-driving Car, Computer Vision, Machine Learning.
My research interests are in robot perception and state estimation, with a particular focus on radar perception.

EDUCATION

National Yang Ming Chiao Tung University (NYCU) — GPA:4.08/4.3   Hsinchu, Taiwan
Master of Science, Electrical and Computer Engineering (5th-Year Master's Program)   Sep. 2022 - Aug. 2023
Advised by Prof. Chieh-Chih(Bob) Wang
Co-advised by Prof. Wen-Chieh(Steve) Lin
National Yang Ming Chiao Tung University — GPA:3.93/4.3   Hsinchu, Taiwan
Bachelor of Science, Electrical and Computer Engineering   Sep. 2018 - June. 2022

PUBLICATIONS

<u>Chun-Yu Hou</u>, Chieh-Chih Wang, Wen-Chieh Lin, "Automotive Radar Missing Dimension Reconstruction from Motion", 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Detroit, MI, USA, 2023, pp. 11226-11232. [Paper] [Video]

Chia-Le Lee, <u>Chun-Yu Hou</u>, Chieh-Chih Wang, Wen-Chieh Lin, "Extrinsic and Temporal Calibration of Automotive Radar and 3D LiDAR in Factory and On-Road Calibration Settings", in IEEE Open Journal of Intelligent Transportation Systems, vol. 4, pp. 708-719, 2023. [Paper]

RESEARCH EXPERIENCE

Robot Perception and Learning Laboratory (NYCU)   Hsinchu, Taiwan
Graduate Student   Sep. 2021 - Aug. 2023
Undergraduate Research Assistant   Sep. 2020 - June. 2021
Advisor: Prof. Chieh-Chih Wang

Automotive Radar Missing Dimension Reconstruction from Motion

- Enabled existing automotive radars to distinguish targets at high elevations accurately.
- Proposed reconstructing the elevation angle of automotive radar from ego motion and Doppler velocity.

Extrinsic and Temporal Calibration of Automotive Radar and 3D LiDAR in Factory and On-Road Calibration Settings

- Proposed simultaneous extrinsic and temporal calibration of automotive radar and 3D LiDAR method.
- Proposed both factory and on-road calibration solutions.

DRI of Hardware Integration of LiDAR-free Perception Subsystem Project [Video]

- Lead 14 people team design and assemble the sensor rack, including 3D and 4D automotive radars, scanning radars, cameras, and LiDARs, and configure drivers.
- Implemented radar-LiDAR and camera-LiDAR calibration.

TEACHING EXPERIENCE

Teaching Assistant, Self-Driving Cars [Video] [Overview]   Fall 2022

- Hosted LiDAR localization and multiple object tracking competition.
- Designed Kalman filter assignments and tutorials.
- Designed robot localization fusing LiDAR and IMU information assignment and tutorial.

Teaching Assistant, Statistical Techniques and Deep Learning in Robotics   Spring 2022, 2023

WORK EXPERIENCE

Mechanical and Mechatronics Systems Laboratories, Industrial Technology Research Institute
Self-driving Car Special Project Group   Hsinchu, Taiwan
Research Intern in Perception Team   Oct. 2021 - Oct. 2022

PROJECTS

Representing Scenes As Compositional Generative Neural Feature Fields with Hair Conditions [Poster]

- Applied hair conditions on generative neural feature fields.
- Achieved changes in hair color without affecting the object's appearance.

Boosting Stochastic Trajectory Prediction using Conditional Latent Diffusion Model [Report]

- Employed diffusion model as a method for predicting trajectories.
- Incorporate semantic traffic information in addition to motion data.

Human Tracking and Following using UAV [Video]

- Implemented object detection using YOLOv5 and retrained to detect customized object.
- Implemented PID controller to control the UAV smoothly.

LiDAR Localization for Self-driving Car [Video]

- Deployed ICP scan matching algorithm for LiDAR localization.

Localization for Drone and Pyrobot by Apriltag [Video]

- Implemented object detection using YOLOv5 with depth camera.
- Deployed outlier filter to optimize the precision of object position.
- First place in class.

Argo Tracking Competition - Multiple Objects Tracking

- Implement Extended Kalman Filter to improve tracking results.

3D Tetris Battle [Video]

- Implemented with 2D drawing library only in C++ as a final project of Object Oriented Programming course.

SKILLS

Software   C/C++, Python, Java, LaTeX, ROS, Linux, PyTorch, PyTorch Lightning, Docker.