Yi-Cheng(Jerry) Liu

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Education

University of Michigan, Ann Arbor **Sept 22 - Apr 24**
Master of Science in Electrical and Computer Engineering (GPA: 4.0/4.0) *Ann Arbor, MI*

- **Related courses**: Linear Control Theory, Embedded Control Laboratory, Mobile Robots(SLAM), Computer Vision, Database Applications, Computer Programming for Scientists and Engineers, Math for Robotics

National Taipei University of Technology **Sept 17 - Jun 21**
Bachelor of Science in Vehicle Engineering (GPA: 3.71/4.0, Last 60 GPA: 3.93/4.0) *Taipei, Taiwan*

- **Related courses**: Automatic Control, Vehicle Control Laboratory, Intelligent Vehicle Dynamic and Control, Introduction to Robotics, Python Program Design and Application

Professional Experience

Cheng Feng Service Center, Peugeot **Jun 19 - Aug 19**
Assistant Automotive Technician *Taichung, Taiwan*

- Conducted mechanical and structural inspections and maintenance; examined, repaired and replaced auto parts
- Diagnosed and repaired electrical, electronic and cooling systems
- Offered emergency roadside assistance services

Projects

SLAM-based Driver Assistance System Applications | *C++, Simulink, CAN bus, Autoware* **Sept 20 - Jun 21**

- Calibrated Velodyne LiDAR, VLP-16, and integrated camera by Autoware object detection package for Emergency Brake Assist (EBA)
- Implemented integration of **model-based control** subsystems (wheel-hub motors, Electric Power Steering, ibooster) with the TI F28069M microcontroller using **CAN bus** protocol
- Created 3D campus-scale pointcloud maplps using Autoware, achieved localization and recorded waypoints with the maps
- Developed custom CAN packets to transmit control commands to the microprocessor through the CAN bus, resulting in the activation of actuators

Error-State Extended Kalman Filter for Vehicle Localization | *Python, Numpy* **Aug 22 - Dec 22**

- Localized a vehicle with **ES-EKF** using prerecorded sensor data, including IMU, GPS, and LIDAR position updates
- Examined the effects of sensor miscalibration on vehicle pose estimates, and adjusted the filter to compensate for errors
- Investigated the effects of sensor dropout on the vehicle position estimate and the uncertainty in the position estimate

4-DOF Serial Link Robotic Manipulator and Mobile Robots | *MATLAB, LabVIEW* **Feb 21 - Jun 21**

- Applied forward and inverse kinematics on robotic arm by MATLAB and LabView to move designated objects onto mobile robots with suction cups and claws
- Designed object tracking system by morphology, particle filter and color thresholding and achieved 80% accuracy
- Implemented **PI control** algorithm on mobile robots with infrared, ultrasonic sensor and camera

Drifting Stabilization Along Circular Trajectories | *MATLAB, LQR control* **Feb 21 - Jun 21**

- Stabilized the side-slip angle to match different desired curvatures and realize drifting motion
- Achieved error dynamics and nonlinear model inversion to calculate desired operating points, steering angle, yaw rate, rear drive force and longitudinal velocity
- Designed **LQR controller** for steering angle and proportional control for rear drive force
- Held course angle error under 0.9 degrees and visualized the high side-slip maneuver process in Simulink

Technical Skills

Programming Languages: C/C++, Python, MATLAB (Simulink, Stateflow), LabVIEW, HTML/CSS, Docker, Jenkins
Application and Tools: ROS, Git, Autoware, BUSMASTER, SocketCAN, AutoCAD, Kvaser
Coursera Course: State Estimation and Localization for Self-Driving Cars, Supervised Machine Learning, Computer Vision Basics, DevOps CI/CD with Git Jenkins and Kubernetes