Haojun Chen

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WORKING EXPERIENCE

Westinghouse Air Brake Technologies Corporation - Trip Optimizer Erie, PA
Control Engineer *January 2023 - Present*

- Conceptualized and designed Drag Charging strategies in **Simulink** Model within design requirements, contributing extra energy utilization and enhancing Electric Locomotives' charging opportunities by 15% in a trip.
- Devised comprehensive test plans and validated the drag charging strategies to ensure 100% compliance with design specifications for notch command locomotives, bitpack of drag charging status, and replan triggering.
- Analyzed locomotive break-in-two field data in **Matlab** and provided solutions by extending air brake releasing time which reduced coupler force between locomotives by 40% during air brake applications.
- Resolved the train dynamic calculation defect in **C** by utilizing alternative variables and validated the solutions through virtual simulator under the defect scenario, ensuring the accurate force calculations and system reliability.

EDUCATION

Washington University in St. Louis (GPA: 3.68/4.00) St. Louis, MO
Master of Science in Mechanical Engineering *September 2021 - December 2022*

University of California, Irvine Irvine, CA
Bachelor of Science in Mechanical Engineering *September 2017 - March 2021*

SKILLS

Engineering Software: C++, Python (PyTorch), MATLAB (Simulink), ROS (Gazebo, Rviz), ROS2, AWS (Linux)
Skillsets: Motion Planning, Autonomous Navigation, Machine Learning (LLaVA, YOLOv8), Vehicle Dynamics Control

PROJECT EXPERIENCE

Flyward.ai *March 2024 - October 2024*

- Delivered a 3D motion planning product for eVTOL in **ROS2** using **C++**, capable of generating a collision-free and optimized paths integrated with multiple sources including Digital Elevation Model (DEM) heights, urban building heights, no-fly-zones, and eVTOL location and characteristic file.
- Trained and optimized YOLOv8 models to detect 17 different objects using aerial images from Google Earth. Achieved a 96.8% detection success rate in identifying and tracking objects from a moving drone at altitudes over 300 meters.
- Enhanced decision-making in path planning and increased safety in autonomous navigation for eVTOLs by utilizing the Nano-LLaVA model to assess severe weather conditions and disasters in real time.

Motion Planning and Autonomous Driving Control for Vehicle *May 2023 - January 2024*

- Minimized velocity and yaw angle error between vehicle states and reference points by optimizing the control algorithm and validated controller output in **Carla** by monitoring the parameter and observing vehicle behavior.
- Implemented Model Predictive Controller to control the vehicle steering angles for tracking reference paths such as lane changing and animated vehicle behavior in **Python**.
- Applied Extended Kalman Filter to estimate and track the vehicle's position, velocity, and orientation by integrating data from Lidar, GPS, and Gyroscope in **C++**; achieved 0.02% error between true and estimated states.

Autonomous Robotic Lab (Washington University in St. Louis) *June 2022 - January 2023*

- Utilized a LiDAR sensor to accurately map obstacles in the testing area enhancing the robot localization capability.
- Automated TurtleBot movement using **Python** by publishing the linear and angular velocity from a NeuralNetwork Controller and subscribing to odometry data from the IMU sensor at 0.1-second intervals in **ROS**.
- Evaluated the efficiency of a Neural-Symbolic Controller across 45 navigation tasks in **Matlab** resulting with 100% accuracy in meeting expected results.