Luying Zhang

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EDUCATION

University of Pennsylvania, Philadelphia, USA *Aug. 2023 – May 2025(Expected)*

Master of Science in Engineering (Robotics)

GPA: 4.0/4.0

Core courses: CIS 5200 Machine Learning, CIS 5810 Computer Vision & Computational Photography, ESE 5000 Linear System Theory

Tongji University, Shanghai, China *Sep. 2018 – Jul. 2023*

Bachelor of Engineering in Vehicle Engineering (Automobile)

GPA: 4.56/5.0

WORK EXPERIENCE

FIFE - Penn STEM and CS Academy Coding Clubs *Philadelphia, PA*

CS Academic Instructor *Oct. 2023 – Dec. 2023*

- Instruct school students in Python and Raspberry Pi, encouraging students to explore, experiment, and embrace the challenges of coding and inspiring their passion in programming
- Illustrate practical applications of programming in real-world scenarios with my experiences of Formula Student

Porsche Engineering (Shanghai) Co., Ltd. *Shanghai, China*

ICV Intern, Electric & Electronics *Sep. 2022 – Mar. 2023*

- Developed a specialized autonomous driving simulation platform from source called PEVATeC Carla, serving as a foundational tool for Porsche ADAS Pre-development Project
- Accomplished map reconstruction by using high-precision 3D map data and added traffic signs, buildings and road information in RoadRunner and Houdini, providing a precise and vivid scene for autonomous simulation
- Deployed control, decision making, communication and safety function ROS nodes to integrate Carla, ROS and V2X systems, realizing ego-car control in different scenarios to avoid collision and elevate traffic efficiency
- Created multiple scenarios through PythonAPI and vehicle behaviors using py-trees, achieving autonomous navigation, obstacle avoidance, lane change and emergency braking on a 3km road scene

NIO Automotive Technology Co., Ltd *Shanghai, China*

Data Analysis Intern, Battery Test Sub-team *Apr. 2022 – Sep. 2022*

- Extracted battery test data using Canalyzer/CANoe and processed millions of cell data from battery experiments
- Developed programs in MATLAB and designed over 20 visual diagrams to evaluate the consistency of battery dynamic internal resistance and static voltage, enhancing data processing efficiency for Battery Test Team

RESEARCH EXPERIENCE

Quadrotor Control and Motion Planning Algorithm Development *Philadelphia, PA*

Project leader *Jan. 2024 – Mar. 2024*

- Built a dynamic model of a quadrotor and implemented geometric nonlinear controller with PD control and implemented Dijkstra and A* algorithms to find the shortest path to the goal
- Generated trajectory using mininum snap with inequility constraints and cost optimization, achieving collision-free and high speed (4.1m/s) quadrotor control

Query Image Guided Instance Detection and Segmentation Algorithm Development *Philadelphia, PA*

Project leader *Oct. 2023 – Dec. 2023*

- Developed a query image-guided real-time instance detection and segmentation algorithm based on YOLACT and ResNet50 architecture for common objects such as iPads/phones, cups and T-shirts
- Created a dataset with thousands of sythetic pictures and frames extracted from manually taken videos, ensuring rigorous testing, training and validation of the model
- Trained model based on the dataset and validated the feasibility and generalization of our model, achieving over 0.8 confidence level for class prediction and processing frame eate of 16.12fps on laptop

Digital Twin for Driving as Planning Support Tool *Philadelphia, PA*

Research Assistant *Advisor: Prof. Rahul Mangharam* *Jan. 2024 – Present*

- Work with Jitsik LLC, a startup company in Mixed Reality, testing the Unity and Unreal API of the Earth to create Virtual Reality models, extending the work for application as a planning support tool
- Extracted high-precision 3D map data from google map and built scenes of high accuracy in Roadrunner
- Created complicated simulations of real traffic scenarios to help redesign the Roosevelt Blvd in Philadelphia, improving safety and accommodating high-capacity transit infrastructure

Virtual Prototype Technology Based on Adams/Car *Shanghai, China*

Research Assistant *Advisor: Prof. Guangqiang, Wu* *Jul. 2022 – Dec. 2022*

- Built a VW car model on Adams/Car, laying foundation for virtual simulation of vehicle dynamic performances
- Conducted a comprehensive multibody dynamics simulation based on Adams/Car and analyzed simulation results from virtual prototype in MATLAB, contributing to cost reduction and experimental efficiency elevation
- Established electrical control systems such as ABS and ESP through joint simulation between Adams/Car and MATLAB/SIMULINK, achieving the combination of virtual prototype and control theory

Tongji University DIAN Driverless Formula Student Autonomous Team *Shanghai, China*

Core Member *Advisor: Prof. Zhiming Zhang* *Nov. 2021 – Nov. 2022*

- Developed a comprehensive perception algorithm based on ROS to detect the exact location and different colors of pile buckets within 20m, improving the efficiency of path planning for car racing
- Created a 3D point cloud map reconstruction of test field and real-time positioning of racing car by utilizing multisensor fusion, improving the accuracy by 5% on advanced SLAM framework
- Participated in Formula Student Autonomous China (2021) and won Third Place overall

Tongji University DIAN Racing Formula Student Electric Team *Shanghai, China*

Electrical Group Leader *Advisor: Prof. Zhiming Zhang* *Oct. 2019 - Jul. 2022*

- Designed a wheel side sensor node consisting of an IMU and temperature sensors to measure tire parameters, thus improving chassis tuning efficiency and optimizing VCU dynamic algorithms
- Introduced a resource sharing platform called Yuque to over 100 group members. Created more than 50 technical and administrative documentations regarding embedded development and dynamic control algorithms
- Participated in Formula Student Electric China (FSEC) Design Final Defense as Chief Electrical Engineer, achieving Second Place in Design Final Defense and First Prize (fourth place) in FSEC overall

SKILLS

- **Programming** Python, MATLAB/SIMULINK, C/C++
- **Robotic Systems** ROS, Carla, OpenCV
- **Design & Simulation** Altium Designer, AutoCAD, LabVIEW, CANoe, Adams/Car, Solidworks, STM32
- **Languages** Chinese (Native), English(C1), German(B2)