

Yiming Zhang

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OBJECTIVE

- Seeking a Ph.D. program in the field of robotics with a focus on autonomous systems, machine learning for robotics, and advanced control algorithms to contribute to cutting-edge research and development in robotic technologies.

EDUCATION

University of Michigan	Ann Arbor, MI	Dec. 2014
M.S.E in Aerospace Engineering	GPA: 3.79/4.00	
Courses: Feedback Control, Linear Systems, Intermediate Dynamics		

Beihang University	Beijing, China	Jul.2013
B.S. Aeronautics Science and Engineering	GPA: 3.87/4.00	

Positions

Senior Software Engineer	Motional	May.2018-Present
<ul style="list-style-type: none">• Vehicle Lateral Tracker Design: Reformulated the vehicle model by incorporating transient tire dynamics. Designed an LQI-based steering controller and developed an observer to estimate tire dynamic delays, enhancing vehicle tracking performance and robustness to unknown disturbances.• Vehicle State Estimation: Developed an extended Kalman filter for lateral velocity estimation and a steady-state Kalman filter for angular acceleration, significantly improving state estimation accuracy.• System Design: Designed a comprehensive system to manage operational states of various vehicle actuators, including the steering, propulsion, and brake systems, ensuring seamless integration and control.• Override Detection: Created advanced signal filters for various control signals, enhancing error detection and monitoring systems.• Diagnostics: Created advanced signal filters for various control signals, enhancing error detection systems.• Controller Simulation (Software/Hardware in the Loop): Integrated vehicle model and controller, simulating vehicle feedback signals using a mock device, streamlining the testing process.• Hands-on experience: dSpace micro auto box, RT3000 (GNSS/INS), CANoe / CANape (CAN communication tools).		

Application Engineer	American Mitsuba Corporation	Feb.2015-May.2018
<ul style="list-style-type: none">• Power Sliding Door Controllers: Designed PID controllers with pinch force constraints, ensuring optimal performance across extreme inclinations and thermal conditions. Verified system through vehicle and hardware-in-the-loop tests.• Hands-on experience: Fabricated and maintained various testing harnesses and in-house tools using Arduino boards, high-accuracy resistor meters, and PLC (RSLogix 5000).		

Publications and Patents

- Zhang, Yiming, Ludong Sun, and Ahmed El Shaer. "Vehicle control time delay compensation." U.S. Patent Application 17/526,195, filed May 18, 2023.
- Qin, Wubing B., Yiming Zhang, Dénes Takács, Gábor Stépán, and Gábor Orosz. "Nonholonomic dynamics and control of road vehicles: moving toward automation." Nonlinear Dynamics 110, no. 3 (2022): 1959-2004.

Personal Projects

Drone simulator

- Developed a Python drone simulation in 3D space, applying control algorithms in aerial robotics.
- Replicated a trajectory tracking controller and a minimum snap trajectory generator.
- (Work in progress) Replicating a meta-learning based adaptive controller under unknown disturbance, exploring cutting-edge adaptive control methods.

Vehicle simulation

- Built a vehicle model (dynamic bicycle model) to track a trajectory in a Simulink environment.
- Integrated Pacejka's tire model and designed an LQR controller for both longitudinal and lateral control, showcasing comprehensive vehicle dynamics understanding.

Autonomous Rover (course project)	Coursera	Oct.2017-Dec.2017
<ul style="list-style-type: none">• Built an autonomous rover to navigate in environment with obstacles.		

- Integrated Raspberry Pi (ROS environment), IMU, and camera for rover sensing and control.
- Coded motion planning algorithm(Dijkstra's algorithm) and Extended Kalman Filter in Python.
- Acquired the foundations of robot motion planning, perception, estimation and localization.

Dynamic Vehicle Steering Design (MSE Thesis)

University of Michigan

Jan.2014-Dec.2014

Y. Zhang: *Nonholonomic models for automobile steering*, MSc Thesis, University of Michigan, 2014

- Developed a steering model to predict the motion of a vehicle using Lagrangian and Appellian frame works
- Simulated vehicle path following maneuver using a feedback controller

Certifications

- *UL Certified Functional Safety Professional* by UL Solutions
- *Robotics Specialization* by University of Pennsylvania on Coursera
- *Machine Learning* by Stanford University on Coursera