Jeongyong Yang

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Summary

M.S. candidate student in safety-critical control and planning under uncertainty for autonomous and robotic systems. My research integrates data-driven learning with formal safety guarantees to develop autonomy that is provably safe, scalable, and reliable. With a multidisciplinary background in mechanical, electrical, and computer engineering, I pursue the unification of learning, control, and formal verification toward trustworthy intelligent systems.

Education

Korea Advanced Institute of Science and Technology (KAIST) — Daejeon, Korea
M.S. Candidate in Electrical Engineering — Mar. 2024 – Present

- Advisor: Prof. SooJean Han
- GPA: 4.26 / 4.3

Hanyang University — Seoul, Korea
B.S. in Automotive Engineering — Mar. 2018 – Feb. 2024
B.S. in Convergence Technology for Advanced Vehicles (Dual Degree; Interdisciplinary Program in Computer Science)

- GPA: 4.24 / 4.5

Work Experience

ACEWORKS, Control Engineer Intern — Seoul, Korea, Jun. 2022 – Aug. 2022

- Implemented the fuel quantity calculation logic for the K2 tank engine in MATLAB/Simulink, covering modules such as engine start, speed control, drivability, fuel limitation, etc.
- Built a dashboard interface for vehicle status monitoring in C++.

Republic of Korea Army, Sergeant — Seoul, Korea, Apr. 2020 – Oct. 2021

- Air Defense Systems Maintenance

Publications / Preprints

[1] **Jeongyong Yang**, Minseok Jeong, and SooJean Han, "Random Fourier Features Lifted Physics-Informed Koopman Network," in *Proceedings of the Korean Society for Aeronautical & Space Sciences (KSAS)*, Nov. 2025. (in Korean)

[2] **Jeongyong Yang***, Seunghwan Jang*, and SooJean Han, "SafeFlowMatcher: Safe and Fast Planning using Flow Matching with Control Barrier Functions," *arXiv preprint*, Oct. 2025. (under review)

[3] **Jeongyong Yang***, KwangBin Lee*, and SooJean Han, "Heterogeneous Predictor-based Risk-Aware Planning with Conformal Prediction in Dense, Uncertain Environments," *arXiv preprint*, Jul. 2025. (under review at ACC)

[4] **Jeongyong Yang**, Hojin Ju, and SooJean Han, "Curvature and Energy-based Trajectory Optimization in Unstructured Environments," in *Proceedings of the Korea Robotics Society Annual Conference (KRoC)*, Feb. 2025. (in Korean)

(Equal contribution)*

Projects

KIAST: Development of Risk-Aware Prediction and Evaluation Technologies for Safe Urban Drone Flight — 2025

- Implemented uncertainty propagation for drone dynamics using the Koopman operator, based on data-driven moment and PDF propagation methods, to estimate probabilistic risk regions for

safe urban drone operations (related publication: [1]).

ETRI: Self-Improving Agent through Uncertainty-Aware Questioning 2025

- Developed an out-of-distribution (OOD) detection module for an imitation learning agent using conformal prediction to ensure safe task execution.

Capstone Project: Lane Keeping System for Passenger-Trailer Vehicle 2023

- Modeled the error dynamics of an articulated passenger-trailer vehicle and designed a lane keeping controller based on Linear Quadratic Gaussian control.
- Applied a linear-filtered look-ahead curvature as a feedforward term to improve cornering stability and safety.
- Designed and validated the controller and estimator in MATLAB/Simulink, and verified performance through CarMaker simulations.

Vehicle Electronic Control: Electronic Stability Control (ESC) Fall 2023

- Designed an ESC algorithm including desired yaw rate computation, entrance/exit criteria, and brake pressure control using MATLAB/Simulink.
- Generated embedded code for the Infineon XC167CI board and performed real-time testing on a dSPACE MicroAutoBox HIL system under a double-lane change maneuver.

Operating Systems: Kernel Extension of xv6 Spring 2022

- Implemented new system calls, Multilevel Queue/Multilevel Feedback Queue (MLQ/MLFQ) CPU schedulers, and lightweight process management in the xv6 operating system.

Students Mentored

Mentored on vehicle dynamics and model predictive control

- Hohyeon Song (Electrical Engineering)

Mentored on linear systems and control theory fundamentals

- Yongmin Kim (Electrical Engineering)
- SeungEon Lee (Electrical Engineering)

Mentored on computational thinking, data structures, and programming fundamentals

- Hongryeol Lim (Mechanical Engineering)

Scholarships

Hanyang Brain (Academic Excellence) Scholarship, Hanyang University Fall 2022, Spring 2023

AE Academic Excellence Scholarship, Department of Automotive Engineering, Hanyang University Spring 2022, Fall 2023

Diamond-7 Scholarship, Hanyang University 2018 – 2019

Skills

Languages: C, C++, Python, MATLAB/Simulink

Frameworks & Tools: CarMaker, CarSim, ROS1, ROS2

CAD: CATIA