Jongann **Lee**

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Research Interest: Mobile Robotics, Reinforcement Learning, Safety in Control

Education

Seoul National University
Seoul, Republic of Korea

B.S. in Mechanical and Aerospace Engineering
Mar. 2019 - Aug. 2025

- Overall GPA: 4.17/4.30 | Major GPA: 4.19/4.30

Sejong Science High School
Seoul, Republic of Korea

Special high school for gifted STEM students
Mar. 2017 - Feb. 2019

- Graduated one year early with *magna cum laude*

Research Experience

Polytechnique Laboratory for Assistive and Rehabilitation Technologies
Montréal, QC, Canada

Advisor: Prof. Abolfazl Mohebbi
Jun. 2024 - Oct. 2024

- Designed a novel 2-DoF ankle exoskeleton using compliant mechanisms to enable inversion and eversion movements as well as dorsiflexion and plantarflexion.

Interactive and Networked Robotics Laboratory
Seoul, Republic of Korea

Advisor: Prof. Dongjun Lee
Mar. 2023 - Jun. 2024

- Created a geometric tracking controller for the 5-CDoF multirotor capable of tracking a 5-variable trajectory consisting of position, yaw, and pitch, which was shown to be differentially flat outputs of the vehicle dynamics.
- Proved the almost global exponential attractiveness of the controlled vehicle dynamics using Lyapunov analysis, and demonstrated the stability using a Matlab numerical simulation.
- Designed an adaptive quadrotor controller by combining an adaptive control scheme based on the geodesic distance of the manifold of physically consistent inertial parameters with the geometric tracking controller for the quadrotor.

Projects

Reinforcement Learning based Tuner for the Geometric Tracking Attitude Controller for the Quadrotor
Advisor: Prof. Hyunjin Kim

Undergraduate Thesis
Sept. 2023 - Jun. 2024

- Created an automatic tuner for the parameters of the geometric tracking attitude controller using the TD3 RL algorithm.
- Designed a custom action and reward architecture to enable stable training.
- Trained the RL based tuner using data from a pybullet quadrotor simulation wrapped in a Gym environment.

Disturbance Observer Controller for a Unicycle
Advanced Control Methods Class

Class project
Oct. 2023 - Dec. 2023

- Augmented an existing PD controller for a unicycle by adding a disturbance observer inner loop.
- Implemented and tested the controller in Matlab and Simulink, confirming the performance improvement in the form of reduced overshoot.

Autonomous Quadrotor System for Payload Delivery
Drone Club Bulnabi

2023 Korea Robot Aircraft Competition
Jul. 2022 - Jul. 2023

- Created an autonomous quadrotor capable of detecting and avoiding obstacles, automatically landing on a designated landing area, detecting a pre-determined delivery point and delivering a payload to it.
- Implemented a fast DDS based communication system for sending flight data and commands between the PX4-Autopilot and ROS2 systems.
- Designed and implemented a real time Bezier curve trajectory generation algorithm with the ability to update the destination in real time.

Work Experience

J.Maple *Seoul, Republic of Korea*

Research Intern *Sept. 2023 - Dec. 2023*

- Implemented various LiDAR inertial odometry(LIO) algorithms for quadrotor navigation without GPS.
- Tested the algorithm's computational and tracking performance using pre-recorded LiDAR data.

Data Design Engineering *Seoul, Republic of Korea*

Research Assistant *Jun. 2022 - Aug. 2022*

- Performed research on satellites and their payload, specifically focusing on Earth observation satellites and synthetic aperture radar(SAR).

Republic of Korea Air Force(military service) *Pyeongtaek, Gyeonggi, S.Korea*

English-Korean Interpreter/Translator *May. 2020 - Feb. 2022*

- Worked as an interpreter/translator for the Air Force Operations Command A3, interpreting various operational dialogue between ROK and US air force officers, and translating English USAF documents, doctrines and emails for our ROK members and vice versa.

Extracurricular Activity

SNU Drone Club Bulnabi *Seoul National University*

President *Mar. 2019 - Jun. 2024*

- Designed and built a model fixed wing aircraft in 2019.
- Served as the vice president from Jan. 2022 to Jul. 2023, leading the communication team for the Korea Robot Aircraft Competition.
- Served as the president from Aug. 2023 to Jun. 2024, growing the club from 10 members to 40 members. Organized weekly seminars for new members and planned winter break projects to train new members. Assembled a 25 member team for the 2024 Korea robot aircraft competition.

SNUBuddy(Exchange Student Helper) *Seoul National University*

Member *Jan. 2022 - Jun. 2022*

- Helped international exchange students at Seoul National University settle into Korea and experience Korean culture by taking them around various venues and events.

Honors

2023 **Kwanjeong Domestic Undergraduate Scholarship**, Kwanjeong Educational Foundation

2022 **Boeing Korea Scholarship**, Boeing Korea

2019 **College of Engineering Scholarship for Academic Excellence**, SNU College of Engineering

2018 **Hanseong Nobel Prodigy Scholarship**, Hanseong Sonjaehan Scholarship Foundation

Skills

Programming Python, C/C++, Matlab

Engineering ROS, PX4-Autopilot, Pytorch, Simulink, Solidworks

Languages Korean (native proficiency), English (bilingual proficiency, TOEFL iBT 117)