Minhyuk Jang

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Education

Seoul National University (SNU) **Mar. 2019 – PRESENT**

B.S. in Mechanical Engineering, Interdisciplinary Major in Artificial Intelligence *Seoul, South Korea*

- **GPA : 3.99/4.0**, Outstanding B.S. Thesis Presentation Award
- Relevant Coursework: Nonlinear System Theory (Graduate, A+), Advanced Control Techniques (A+)
- 18 months of military service included

Research Interests

- Control Theory (Robust Control, Optimal Control, Data-Driven Control, Adaptive Control, Nonlinear Control)
- Safety Guarantee, Safety-Critical Systems (Multirotor, VTOL, Robotics, etc), Multi-Agent Systems

Publications

- **Minhyuk Jang**, Astghik Hakobyan, and Insoon Yang. ***Distributionally Robust Control and State Estimation for Linear Stochastic Systems*, IEEE Transactions on Automatic Control (TAC)**, (under review), [arXiv]
- **Minhyuk Jang**. *Stability Analysis of Disturbance Observer under Model Uncertainty with Different System Degrees between True and Nominal Systems*, Institute of Control, Robotics and Systems (**ICROS**), 2024

Experience

SNU Control and Optimization Research (CORE) Lab **Mar. 2023 – PRESENT**

Research Intern - Advisor: Prof. Insoon Yang *Seoul, South Korea*

- Developed unified algorithm for Distributionally Robust Control and State Estimation in partially observable linear stochastic systems, addressing ambiguities in probability distributions of disturbances and measurement noise
- Formulated a tractable semidefinite programming problem that iteratively determines the worst-case covariance matrices of all uncertainties, significantly enhancing the scalability and efficiency of the proposed algorithm

NEARTHLAB **Jan. 2024 – Feb. 2024**

Aerospace Engineering Intern, GNC Team *Seoul, South Korea*

- Implemented DOB and LQR based position/velocity controllers in C++&ROS2 and tested through Gazebo simulation
- Integrated a flight controller with a companion computer for quadrotor offboard control, implemented DOB+LQR and DOB+PID trajectory tracking controllers, and conducted extensive outdoor flight experiments

Selected Projects (See more at HERE)

Automated Hyperparameter Tuning Algorithm for MPPI Control **Sep. 2023 – Jun. 2024**

Outstanding B.S. Thesis Presentation Award *Seoul, South Korea*

- Designed an adaptive algorithm to automatically adjust the hyperparameter (Inverse temperature) for MPPI control
- Implemented the algorithm in the MuJoCo MPC (MJPC) framework, improving control performance, reducing state fluctuations and control costs, and enabling smoother trajectories in quadrotor hovering and racing tasks

VTOL (Vertical Take-off and Landing) Projects **Mar 2024 – Sep 2024**

Team Leader – Korea Robot Aircraft Competition (Grand Award) *Taean, South Korea*

- Constructed two A-tail Quadplane VTOLs with autonomous flight capabilities, each with wingspans of 1.5m and 2.0m
- Oversaw the full system engineering process, from selecting electronic components (servos, motors, flight controller, batteries, GPS, PDB, RC, etc.) to wiring, sensor calibration, and mission task planning

AIAA Design/Build/Fly (DBF) Competition **Sep. 2024 – PRESENT**

Control Team *Tucson, AZ, USA (2025)*

- Developed landing algorithm for a glider launched from a mothership at a 100m altitude, with a 250g weight limit
- Modified and tested Ardupilot guidance algorithm, followed by outdoor flight experiments to validate performance and ensure accurate landing on a target location

Leadership / Extracurricular activities

Bulnabi - SNU Drone Club **Sep. 2023 – PRESENT**
Team Leader *Seoul, South Korea*

- Organized and conducted over five Quadrotor Build/Fly seminars, teaching hardware assembly, sensor calibration, Ground Control Station usage, flight experiments, and flight log analysis
- Led a 25-member team for the Korea Robot Aircraft Competition, focusing on VTOL system design and autonomous flight missions; conducted over 30 outdoor fixed-wing missions and successfully stabilized all flight phases.

KATUSA (Korean Augmentation to the United States Army) **Sep. 2021 – Mar. 2023**
Squad Leader – Sergeant, 8th Army, Camp Humphreys *Pyeongtaek, South Korea*

- Led and managed a 10-solider squad, ensuring their training, well-being, and mission preparedness
- Provided essential translation and interpretation support during Combined Exercises, leveraging language proficiency
- Engaged in daily collaboration with American colleagues within a U.S. Army office

G.I.V - SNU Volunteering Club **Mar. 2019 – Sep. 2020**
Vice President *Seoul, South Korea*

- Delivered educational support in math, science, and art to teenagers in rural areas, emphasizing experiential learning
- Organized and engaged in various volunteer activities, including secondhand markets, mural painting, and food drives

Honors / Awards

Grand Award - Korea Robot Aircraft Competition **2024**
1st Place among 39 University Teams *Minister of Commerce, Industry and Energy*

Outstanding B.S. Thesis Presentation Award **2024**
Department of Mechanical Engineering *Seoul National University*

Outstanding Materials and Manufacturing Processes Award **2024**
Materials and Manufacturing Processes Contest *Seoul National University*

Excellence Award - Mechatronics Competition **2023**
Department of Mechanical Engineering *Seoul National University*

ARCOM (Army Commendation Medal) **2022**
United States Department of the Army *Camp Humphreys*

Kwanjeong Scholarship **2021**
Recipient of a full tuition scholarship along with a stipend for two years *Kwanjeong Educational Foundation*

Merit-based Scholarship **Spring 2020, Fall 2020**
Department of Mechanical Engineering *Seoul National University*

Talks

- **Invited Talks:** ***Design and Development of a Lightweight, 3D-Printed VTOL Aircraft with Autonomous Flight Capabilities for Advanced Air Mobility (AAM),*** UVS Symposium, Daejeon, South Korea, 2024

Technical Skills

Programming: C/C++, Python, MATLAB (Simulink)
Libraries/Softwares: PX4-Autopilot, ROS2, Gazebo, Arduino, MuJoCo, PyTorch, SolidWorks, LaTeX
Hardware Skills: Drone operation, soldering and wiring, laser cutting, 3D printing