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** (4.19/4.3), Outstanding B.S. Thesis Presentation Award
- 18 months of military service included

Research Interests

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

Publications

- **Minhyuk Jang**, Astghik Hakobyan, and Insoon Yang. *Wasserstein Distributionally Robust Control and State Estimation for Partially Observable Linear Systems*, **arXiv preprint**, [link]
- **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 Wasserstein Distributionally Robust Control and State Estimation in partially observable linear stochastic systems, addressing unknown probability distributions of disturbances and measurement noises
- 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*
- Developed 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 - Advisor : Prof. Dongjun Lee   *Seoul, South Korea*
- Developed an adaptive algorithm to tune the hyperparameter λ (Inverse Temperature) for MPPI control, minimizing state fluctuation while maintaining low control cost
- Implemented the algorithm within the MuJoCo MPC (MJPC) framework, demonstrating improved control performance, reduced fluctuations, and smoother trajectories in quadrotor hovering and racing tasks.

VTOL Projects   **Mar 2024 – Sep 2024**
- Developed two Standard Quadplane type A-tail VTOLs, each with wingspans of 1.5m and 2.0m
- Conducted the complete system engineering process, including the selection of electronic components (servo, motor, flight controller, batteries, GPS, PDB, RC, etc), wiring, sensor calibration, and mission task design

Leadership / Extracurricular activities

Bulnabi - SNU Drone Club   **Sep 2023 – PRESENT**
Team Leader   *Seoul, South Korea*
- Led and developed over five Quadrotor Build/Fly seminars, teaching hardware assembly, sensor calibration, Ground Control Station usage, flight experiments, and flight log analysis
- Directed 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.

Senior KATUSA (Korean Augmentation to the United States Army)   **Sep 2021 – Mar 2023**
Sergeant, 8th Army, Camp Humphreys   *Pyeongtaek, South Korea*
- Led and managed a 10-solider squad, ensuring their training, well-being, and mission preparedness
- Operated within a U.S. Army office, collaborating extensively with American colleagues on a daily basis
- Applied language proficiency to deliver crucial translation and interpretation support during Combined Exercises

Relevant Coursework

- Nonlinear System Theory (Graduate, A+)
- Advanced Control Techniques (A+)

Honors / Awards

Grand Prize – Korea Robot Aircraft Competition   **2024**
1st Place among 39 University Teams   *Korea Aerospace Industries Association*

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*

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*

Technical Skills

Programming: C/C++, Python, MATLAB
Libraries/Softwares: PX4-Autopilot, ROS2, SolidWorks, MuJoCo, PyTorch, LaTeX