JUSUK LEE

Name : JUSUK LEE
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EDUCATION

B. S. Mechanical Engineering, Yonsei University **(Mar 2017 – Feb 2024)**

Combined M. S. and Ph.D Mechanical and Aerospace Engineering, Seoul National University **(Mar 2024 – Present)**

RESEARCH INTERESTS

Aerial Robotics, Aerial Manipulation, Robot Foundation Models

WORK EXPERIENCE

Undergraduate researcher experiences

A. Control-Versatile Design for Intelligence & Precision Lab **Dec 2021 – Feb 2022**

- Organize motors in a program through FEMM and MATLAB.
- Design a structure that can reduce torque ripple.

B. Human-Robotics Lab **Jun 2022 – Sep 2022**

- Design a structure that can offset the disadvantage of PAM(Pneumatic Artificial Muscles) which used in soft robotics.

Projects

A. Multi-agent Reinforcement Learning

a. Multi-Agent Actor-Critic for Cooperative Environments

- Implement MADDPG algorithms for making 4 drones cooperate to deliver the box to its destination while keeping it flat.

B. Autonomous Flight of Drone

a. Local Planner

- Implement 3DVFH* local planner by referring to PX4-Avoidance and change the code to operate in 'Offboard mode'.

b. Drone navigation using reinforcement learning

- Using a RL algorithm (DDPG), the drone can navigate successfully from an arbitrary starting position to a goal position in shortest possible way.

c. Precision Landing

- Design safe and accurate landing using aruco marker and PID control. Also, use a Kalman filter to reduce sensor noise.

d. Precision Landing using reinforcement learning

- Using RL algorithm (SAC), the drone can safely land on the desired location.

e. Change controller of PX4-Autopilot to custom controller

- Change the existing drone controller(PID control) to feedback linearization and adaptive sliding mode control.

C. Yonsei Rehabilitation Volunteer Project

a. Wheelchair Rearview Camera and Detection System

- Design a system using raspberry pi and ultrasonic sensor.

b. Posture Correction System

- Design a system that detects disabled children's wrong posture using computer vision.

Research Papers

A. **"Collision detection system based on computer vision for Human-Robot Interaction," Fall 2022, Undergraduate Thesis Supervised by Dr. Byeong Kwon Min**
   - Propose a system that detects collision between an operator and a robot and returns a signal by using computer vision and a Depth camera that obtains RGB images and depth images.

EXTERNAL ACTIVITIES

School Swimming Club **Mar 2018 – Jan 2019**
Sep 2020 – Dec 2021

- I like swimming and was the club president.

School Robot Club 'Roboin' **Mar 2022 – Jan 2023**

- Fabricate a 3-axis robotic arm and mimic the pick and place motion

Yonsei Rehabilitation volunteer **Jun 2022 – Jan 2023**

- Design assistive devices for children with disabilities

School Club 'Yonsei Drone' **Sep 2022 – Mar 2024**

- Won second place in the 21st Korea Robot Aircraft Contest

SCHOLARSHIPS

Scholarship for academic excellence (2020-2, 2021-2)
Service Scholarship(2020-2)

Awards

Secretary's Award in 21st Korea robotics and Aircraft Competition.