Sung Jae Park

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Education

Seoul National University: **Mar. 2017 – Present**

Department of Mechanical Engineering (Double Major in Mathematics), **Accumulative GPA: 4.24/4.3**

Gyeonggi Science Highschool for the Gifted: **Mar. 2014 – Feb. 2017**

Research Interests

I am interested in learning a robot for complex, long-horizon robot manipulation. Ultimately, I aim to develop a general-purpose robot system. To achieve this, the specific topics I am interested in :

- Learning an agent with physical understanding & reasoning ability
- Efficient reinforcement learning algorithms
- Contact-rich dexterous manipulation

Major Coursework

- Dynamics / Control Theory
- Introduction to Deep Learning
- Mechatronics
- Numerical Optimization
- Thermodynamics / Heat Transfer
- Probabilistic Graphical Model
- Mathematical Analysis / Abstract Algebra
- Introduction to Robotics
- Mathematical Foundations of Deep Learning
- Data Structure
- Fluid Mechanics
- Solid Mechanics / Mechanics and Design
- Introduction to Topology

Research Experience

Cognitive Learning for Vision and Robotics Lab Research Intern | **Jul. 2022 – Present**
Advisor: Joseph J. Lim from Korea Advanced Institute of Science and Technology (KAIST)
• Developing an efficient reinforcement learning algorithm based on task-oriented state criticalness.
• With a simple modification to the existing RL algorithm to consider the different importance of states, learning becomes much more sample efficient.

SNU Robotics Lab Undergraduate Thesis Research Intern | **Mar. 2022 – Dec. 2022**
Advisor: Frank C. Park from Seoul National University
• Developed cross-embodiment learning with object-centric planning.
• With an object-centric planner learned from offline demonstration data of another robot, the target robot can efficiently learn the same task.

Dynamic Robotics Systems Lab Research Intern | **Jul. 2021 – Aug. 2021, Jan. 2022 – June. 2022**
Advisor: Jaeheung Park from Seoul National University
• Developed a vision-based peg-in-hole algorithm for dual robot arm with hole detection using a hand-eye camera and YOLO. Vision system enabled robust and accurate performance compared to the previous algorithm without a vision system.
• Developed motion planning algorithm under constraint with Block Neural Autoregressive Flow for Panda Franka robot arm. The density estimation model was used to determine the discontinuity of the manifold.

Awards and Honors

Presidential Science Scholarship **Mar. 2021 – Present**
International Design Contest Robocon 2018 2nd place **Aug. 2018**
Gangwon Future Highflier Scholarship **Jan. 2018 – Present**
Full-funded scholarship for academic excellence **Mar. 2018 – Dec. 2019, Mar.2021**
Silver Prize (Math/Computation Field), Samsung Humantech Paper Award **Feb. 2015**

Skills

Language: C++, Python, Java
Libraries/Frameworks: Pytorch, ROS, YOLO, SMACH
Modeling: SolidWorks

Teaching Experience

Teaching Assistant | Introduction to Robotics **Mar. 2022 – Jun. 2022**

Undergraduate Tutoring | Linear Algebra 1 **Mar. 2021 – Jun.2021**

Undergraduate Tutoring | Physics 1,2 **Mar. 2018 – Dec. 2018, Mar. 2021 – Dec.2021**

English Proficiency

GRE: Verbal Reasoning 160/170, Quantitative Reasoning 170/170, Analytical Writing 4.0/6.0

TOEFL: 112/120 (Reading 29/30, Listening 30/30, Speaking 26/30, Writing 27/30)