Siyeon Kim

Computer Science and Engineering · Robotics

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RESEARCH INTERESTS

My research focuses on the intersection of **robot perception** and **manipulation** to establish an intelligent robot framework; solving various manipulation problems using **robot learning** and developing robust system with the optimized **task and motion planning**.

EDUCATION

Ewha Womans University — Seoul, Korea

Master of Science in Computer Science Engineering — Mar. 2019 – Feb. 2021

- Advisor: Professor Young J. Kim
- Cumulative GPA of 4.05 / 4.30 (Major GPA of 4.23 / 4.30)

Bachelor of Science in Physics — Mar. 2013 – Aug. 2018

- Top 6% in College of Natural Sciences (Fall 2017)
- Dean's List (Fall 2016, Spring 2017, Fall 2017)
- Cumulative GPA of 3.61 / 4.30

RESEARCH EXPERIENCES

Computer Graphics Lab | Ewha Womans University — Seoul, Korea

Researcher (*Advisor: Professor Young J. Kim*) — Mar. 2021 - Current

■ Autonomous Robotic Arrangement of Objects via Deep Generative Models.

- Proposed an integrated framework that enables a robot to arrange objects from a cluttered scene to organized form without providing human instruction.
- Generated the target arranged scenes with deep learning models using object rotation and location priors.
- Demonstrated that a manipulator, Fetch robot, can autonomously find goals for object arrangement and perform the alignment with various real-world benchmarks.

■ BrainBot: Intelligent robotic goal generation using brain-computer interfaces.

- Sorted cubes into target-colored baskets according to the guided goals from brain EEG signals.
- Extracted 6D object poses & colors from point cloud against table segmentation and euclidean clustering.
- Carried out pick-and-place tasks with Fetch robot utilizing MoveIt! with OMPL and Rviz.

M.S. student — Mar. 2019 - Feb. 2021

■ Synthesizing the Roughness of Textured Surfaces for an Encountered-type Haptic Display.

- Participated in the study on delivering profound haptic feedbacks to provide immersive VR user experiences.
- Attached textured surfaces on an end-effector of KUKA iiwa robot; calculated angles of scanning direction and translational velocities.
- Constructed a VR environment using Unity 3D; tracked the user's hand motions using an IR sensor and HMD.

Research Intern — Dec. 2018 - Feb. 2019

Project : "Design the biped passive walker"

- Designed the biped passive walker using a 3D Computer-Aided Design (CAD) tool and Matlab.
- Prototyped the whole biped model using 3D printers.

Biomedical Mechanics & **Materials Lab** | Ewha Womans University — Seoul, Korea
Undergraduate Researcher (*Advisor: Professor Tae-Yong Lee*) — Sep. 2017 - July 2018

- Improved a novel indentation system through revising an indentor design using CAD.
- Established foot tissue models and analyzed their kinematics using Finite Element Method (FEM).

Cell and Molecular Biology Lab | Ewha Womans University — Seoul, Korea
Undergraduate Researcher (*Advisor: Prof. Jaesang Kim*) — Summer 2015

- Created knock-out model of EIF4EBP1 which plays a crucial for hyperactivated mTOR signaling.
- Confirmed knock-out by carrying out gel electrophoresis, RT-PCR, and Western Blot.

Spin Device Physics Lab | Ewha Womans University — Seoul, Korea
Undergraduate Researcher (*Advisor: Prof. Tae-Hee Kim*) — Summer 2014

- Utilized Atomic Force Microscopy (AFM) to scan Fe_3O_4/MgO/Ta/SiO_2 and Fe_3O_4/MgO multi-layered structures for studying the spin Hall magnetoresistance (SMR) effect in Pt/Fe_3O_4.

PUBLICATIONS

Conference Papers

- **Siyeon Kim**, Yaesol Kim, and Young J. Kim. "Autonomous Robotic Arrangement of Objects via Deep Generative Models." (In preparation)
- Jungryul Seo, **Siyeon Kim**, and Young J. Kim. "BrainBot: Intelligent robotic goal generation using brain-computer interfaces." (In preparation)

Journal Articles

- Yaesol Kim, **Siyeon Kim**, Uran Oh, and Young J. Kim. "Synthesizing the Roughness of Textured Surfaces for an Encountered-type Haptic Display using Spatiotemporal Encoding", IEEE Transactions on Haptics, 2020.

Thesis

- **Siyeon Kim**, "Toward Autonomous Robotic Arrangement of Objects using Deep Image Manipulation", Ewha Womans University, 2021.

TEACHING EXPERIENCES

Teaching Assistant, Ewha Womans University

- [20642-01] Numerical Methods — Spring 2020
  - Covered matrix, calculus, linear algebra, numerical methods, and analysis.
  - Assisted over 60 students, and held weekly office hours.
- [38559-01,02] Introduction to Human, Mechanical and Biomedical Engineering — Spring 2018
  - Covered basic kinematics and kinetics.
  - Graded midterm and final exams and provided feedback to over 90 students for inquires.

Private Tutoring

- Mathematics — June 2017 - Nov. 2017
  - Tutored middle and high school students; focus on algebra, geometry, and vector.

HONORS AND AWARDS

Research Assistant Scholarship (Full Tuition), Ewha Womans University — 2020
Admissions Scholarship (Full Tuition), Ewha Womans University — 2019
Honors Scholarship, Ewha Womans University — Spring 2017, Fall 2017, Spring 2018
Scholarship (College Specialization), Ewha Womans University — Fall 2015

TECHNICAL SKILLS

Programming Languages	Python, C/C++, Java, MATLAB, LaTeX
Robotics Hardware	Fetch, KUKA iiwa 7 R800, UR5e
Robotic Programming	ROS, Gazebo, Rviz, MoveIt!
Computer Vision	OpenCV, PyTorch, Tensorflow