

Siyeon Kim

CONTACT

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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
Undergraduate Researcher (*Advisor: Professor Tae-Yong Lee*)

Seoul, Korea
Sep. 2017 - July 2018

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

Cell and Molecular Biology Lab | Ewha Womans University
Undergraduate Researcher (*Advisor: Prof. Jaesang Kim*)

Seoul, Korea
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
Undergraduate Researcher (*Advisor: Prof. Tae-Hee Kim*)

Seoul, Korea
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 inquiries.

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, L ^A T _E X
Robotics Hardware	Fetch, KUKA iiwa 7 R800, UR5e
Robotic Programming	ROS, Gazebo, Rviz, MoveIt!
Computer Vision	OpenCV, PyTorch, Tensorflow