Siyeon Kim

Kahlert School of Computing · Robotics track
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Research Interest

Task-and-Motion Planning (TAMP), Robot Learning, Robot perception, Reinforcement Learning

Education

The University of Utah, Salt lake city, Utah

2022 - Present **Ph.D. in Kahlert School of Computing (Track: Robotics)**
Advisor: Professor Tucker Hermans

Cumulative GPA: 4.00 / 4.00

Ewha Womans University, Seoul, Korea

2019 - 2021 **M.S. in Computer Science Engineering**
Advisor: Professor Young J. Kim

Cumulative GPA: 4.05 / 4.30 (Major GPA: 4.30 / 4.30)
Thesis: "Toward Autonomous Robotic Arrangement of Objects using Deep Image Manipulation", Ewha Womans University, 2021. [Paper]
Committee: Young J. Kim (**advisor**), Dongbo Min, Uran Oh

2013 - 2018 **B.S. in Physics**
Advisor: Professor Young J. Kim

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

Research Experience

Aug 2022 - Present **Learning Lab for Manipulation Autonomy (LL4MA)**, University of Utah
Research Assistant (Advisor: Professor Tucker Hermans)

[P4]: Improve Task-and-Motion Planning (TAMP) using Learning from Demonstrations

- Integrating Learning from Demonstration (LfD) approaches with a Task-and-Motion planning (TAMP) algorithms to deal with geometric feasibility issues for a long-horizon tasks.
- Proposing a framework for robotic object rearrangement that enables a robot to keep the memory on objects even though they will be hidden or occluded by other obstacles.
- Pre-computing reachability maps using the existing Inverse Kinematics (IK) solvers before performing the motion planning and trajectory optimization.

Mar 2021 - Mar 2022 **Ewha Computer Graphics Lab**, Ewha Womans University
M.S. Researcher (Advisor: Professor Young J. Kim)

[P3]: 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.

Mar 2019 - Feb 2021 *Research Assistant (Advisor: Professor Young J. Kim)*

[P2]: 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.

Dec 2018 - Feb 2019 *Undergraduate Researcher (Advisor: Professor Young J. Kim)*

[P1]: Synthesizing the Roughness of Textured Surfaces for an Encountered-type Haptic Display

- Designed the biped passive walker using a 3D CAD tool and Matlab.
- Prototyped the whole biped model using 3D printers.

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

- 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).

June 2015 - Aug 2015 **Cell and Molecular Biology Lab**, Ewha Womans University
Undergraduate Researcher (Advisor: Professor Jaesang Kim)

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

June 2015 - Aug 2015 **Spin Device Physics Lab**, Ewha Womans University
Undergraduate Researcher (Advisor: Professor Tae-Hee Kim)

- Scanned multi-layered structures, $Fe_3O_4/MgO/Ta/SiO_2$ and Fe_3O_4/MgO, using Atomic Force Microscopy (AFM), to study the spin Hall magnetoresistance (SMR) effect in Pt/Fe_3O_4.

Publication

Journal Articles

[J01] 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. [Project Page] [Paper] [Video]

Teaching Experience

Spring 2020 **Teaching Assistant** , [20642-01] Numerical Methods
Covered matrix, calculus, linear algebra, numerical methods, and analysis.

Spring 2018 **Teaching Assistant** , [38559-01,02] Introduction to Human, Mechanical & Biomedical Engg.
Covered basic kinematics and kinetics.

Technical skills

Programming Languages	Python, C/C++, Java, MATLAB, LaTeX
Robotics Hardware	Fetch mobile manipulator, KUKA iiwa 7 R800 manipulator, UR5e manipulator, ReFlex TakkTile 2 Hand
Robotic Programming	ROS, IsaacGym, Gazebo, CoppeliaSim, OMPL, MoveIt!
Others	PyTorch, Tensorflow, OpenCV, OpenGL