

Dongwon Son

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EDUCATION

- **Seoul National University** Seoul, Korea
Bachelor - Mechanical Engineering *March 2010 - Feb 2014*
- **Seoul National University** Seoul, Korea
Master - Mechanical Engineering - Advisor: Dongjun Lee *March 2018 - Feb 2020*
Thesis: Multi-Contact Simulator and Reinforcement Learning for Screw Tightening Tasks
- **Korea Advanced Institute of Science and Technology (KAIST)** Seoul, Korea
PhD student - AI Graduate School - Advisor: Beomjoon Kim *Sep 2022 - Present*

SKILLS SUMMARY

- **Languages:** Python, C++, MATLAB
- **Frameworks:** TensorFlow, Keras, Jax, ROS, OpenGL, Pybullet, Open3D, OMPL, FCL
- **Tools:** SolidWorks, EasyEDA

EXPERIENCE

- **Samsung/Hanwha Techwin** Changwon, Korea
QA Engineer - Gas Turbine Engine Division *May 2014 - Sep 2017*
- **Samsung Research** Seoul, Korea
AI Researcher - AI Methods Team *Feb 2020 - June 2022*
 - **Data-driven Grasping:** Develop algorithm for grasping in a heavily cluttered environment.
 - **Sim-to-real Transfer:** Reduce sim-to-real gap through robot control and domain randomization.
 - **Planning:** Apply AlphaGo Zero to arrangement task.
 - **Data Efficient Reinforcement Learning Algorithm:** Develop data efficient RL algorithm for vision-based object manipulation.

PROJECTS

- **Manipulator Identification:** identification of physics parameters for Franka Emika Panda
- **Manipulator Controller Design:** impedance controller, admittance controller, compliance controller
- **Motor Driver Design And FOC Control:** PCB design, MCU programming, anticogging, FOC control

PUBLICATIONS

- **DEF-oriCORN: efficient 3D scene understanding for robust language-directed manipulation without demonstrations:** Dongwon Son, Sanghyeon Son, Jaehyung Kim, and Beomjoon Kim. under review. 2024. paper site
- **An Intuitive Multi-Frequency Feature Representation for SO(3)-Equivariant Networks:** Dongwon Son, Jaehyung Kim, Sanghyeon Son, and Beomjoon Kim. ICLR. 2024. paper site
- **Preference learning for guiding the tree searches in continuous POMDPs:** Jiyong Ahn, Sanghyeon Son, Dongryung Lee, Jisu Han, Dongwon Son, and Beomjoon Kim. CoRL. 2023. video paper site
- **Local object crop collision network for efficient simulation of non-convex objects in GPU-based simulators:** Dongwon Son, and Beomjoon Kim. R:SS. 2023. video paper site
- **Grasping as Inference: Reactive Grasping in Heavily Cluttered Environment:** Dongwon Son. RA-L. 2022. video paper
- **Reinforcement Learning for Vision-based Object Manipulation with Non-parametric Policy and Action Primitives:** Dongwon Son, Myungsin Kim, Jaechol Sim, and Wonsik Shin. IROS. 2021. video paper
- **Sim-to-Real Transfer of Bolting Tasks with Tight Tolerance:** Dongwon Son, Hyunsoo Yang, and Dongjun Lee. IROS. 2020. video paper
- **Learnable Environment Model with Data Efficiency for MPC of Assembly Tasks:** Dongwon Son, Hyunsoo Yang, and Dongjun Lee. IROS Workshop LRPC. 2019. video paper
- **Data-driven Contact Clustering for Robot Simulation:** Myungsin Kim, Jaemin Yoon, Dongwon Son, and Dongjun Lee. ICRA. 2019. paper

RESEARCH INTERESTS

- Manipulation (object manipulation, grasping, vision-based assembly, long-horizon manipulation)
- Computationally efficient simulator (physics engine, rendering)
- Sim-to-real transfer
- Structured network design for manipulation
- Shape representation for planning
- Open-source cost efficient manipulator design