Daeun Song

Computer Science and Engineering · Robotics

songd@umd.edu | daeunSong.github.io | daeunSong | daeunSong

Research Interests

Robot Path and Motion Planning, Human-Robot Interaction, Machine Learning

Education

Ewha Womans University, Seoul, Korea

2017 - 2023 **Ph.D in Computer Science and Engineering**

- Supervised under Prof. Young J. Kim
- Dissertation titled "Artistic Robotic Pen Drawing System using High-DoF Manipulators"
- Graduate student representative of CSE department in 2020

2013 - 2017 **B.S. in Computer Science and Engineering**

Research Experience

University of Maryland, MD, USA

AUG 2023 - Present **GAMMA, Postdoctoral Associate [H11], [C07-09]**

- Supervised under Prof. Dinesh Manocha

LAAS-CNRS, Toulouse, France

JUN 2019 - SEP 2019 **Gepetto Team, Summer Internship [J02], [C03,04]**

- Supervised under Prof. Steve Tonneau.

Ewha Womans University, Seoul, Korea

MAR 2023 - JUN 2023 **Graphics Lab, Postdoctoral Associate [C06]**

- Supervised under Prof. Young J. Kim

MAR 2017 - FEB 2023 **Graphics Lab, Research Assistant [J03], [C01,02,05], [D01-04], [H06-10], [P01]**

- Supervised under Prof. Young J. Kim

JAN 2016 - FEB 2017 **Graphics Lab, Undergraduate Researcher [J01], [H04,05]**

- Supervised under Prof. Young J. Kim

Patents

[P02] Y. J. Kim, **D. Song**, Robot Path Creating Method, Computing Device for Performing the Method, Korean intellectual Property Office, *(under review)*.

[P01] Y. J. Kim, **D. Song**, J. Kim, Robotic apparatus and method for artistic pen drawing on an arbitrary surface, Korean intellectual Property Office, 1019356400000.

Publications

International Journals

[J03] **D. Song**, J. Kim, Y. J. Kim, **SSK: Robotic Pen-art System for Large, Non-planar Canvas**, *IEEE Transactions on Robotics (T-RO)**, 39(4), Aug. 2023.

[J02] **D. Song**, P. Fernbach, T. Flayols, A. D. Prete, N. Mansard, S. Tonneau, Y. J. Kim, **Solving Footstep Planning as a Feasibility Problem using L1-norm Minimization**, *IEEE Robotics and Automation Letters (RA-L)**, 6(3), July 2021.

[J01] Y.-h. Kim, T. Kwon, **D. Song**, Y. J. Kim, **Full-body Animation of Human Locomotion in Reduced Gravity using Physics-based Control**, *IEEE Computer Graphics and Applications (CG&A)*, (Special issue on Physically Based Animation)*, 37(6), Nov/Dec 2017.

International Conference Papers

[C09] T. Guan, R. Xian, X. Wang, X, Wu, M. Elnoor, **D. Song**, and D. Manocha, **AGL-NET: Aerial-Ground Cross-Modal Global Localization with Varying Scales**, *under review.*

[C08] J. Liang, A. Payandeh, **D. Song**, X. Xiao, and D. Manocha, **DTG : Diffusion-based Trajectory Generation for Mapless Global Navigation**, *under review.*

[C07] **D. Song**, J. Liang, A. Payandeh, X. Xiao, and D. Manocha, **Socially Aware Robot Navigation through Scoring Using Vision-Language Models** , *under review.*

[C06] **D. Song**, E. Lim, J. Park, M. Jung, Y. J. Kim, **TSP-Bot: Robotic TSP Pen Art using High-DoF Manipulators**, *IEEE International Conference on Ubiquitous Robots (UR)*, Jun 2024.

[C05] I. Ilinkin, **D. Song**, Y. J. Kim, **Stroke-based Rendering and Planning for Robotic Performance of Artistic Drawing**, *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Oct 2023.

[C04] J. Chemin, P. Fernbach, **D. Song**, G. Saurel, N. Mansard, S. Tonneau, **Learning to steer a locomotion contact planner**, *IEEE International Conference on Robotics and Automation (ICRA)*, May 2021.

[C03] S. Tonneau, **D. Song**, P. Fernbach, N. Mansard, M. Taix, A. D. Prete, **SL1M: Sparse L1-norm Minimization for contact planning on uneventerrain**, *IEEE International Conference on Robotics and Automation (ICRA)*, May 2020.

[C02] **D. Song**, Y. J. Kim, **Distortion-free Robotic Surface-drawing using Conformal Mapping**, *IEEE International Conference on Robotics and Automation (ICRA)*, May 2019. **[H08]**

[C01] **D. Song**, T. Lee, Y. J. Kim, **Artistic Pen Drawing on an Arbitrary Surface using an Impedance-controlled Robot**, *IEEE International Conference on Robotics and Automation (ICRA)*, May 2018. **[H07]**

Domestic Conference Papers

[D04] **D. Song**, Y. J. Kim, Robotic Pen-art System for Large, Non-planar Canvas (extended abstract of [J03]), *Korea Computer Graphics Society Annual Conference (KCGS)*, Jul 2022.

[D03] E. Lim, J. Kim, **D. Song**, Y. J. Kim, TSP Pen Art using a Mobile Collaborative Robot (extended abstract of [C06]), *Korea Computer Graphics Society Annual Conference (KCGS)*, Jul 2021. **[H10 - Best Undergrad Paper Award]**

[D02] **D. Song**, Y. J. Kim, Distortion-free Robotic Surface-drawing using Conformal Mapping (extended abstract of [C02]), *Korea Robotics Society Annual Conference (KRoC)*, Aug 2020.

[D01] **D. Song**, T. Lee, Y. J. Kim, Artistic Pen Drawing on an Arbitrary Surface using an Impedance-controlled Robot (extended abstract of [C01]), *Korea Robotics Society Annual Conference (KRoC)*, Jan 2018. **[H06 - Best Paper Award]**

* : SCI (Science Citation Index)-listed journals

Technical Skills

Programming Languages: C/C++, Python, Java, Matlab

Robotic Hardware: KUKA iiwa 7 R800 manipulator, UR5e dual arm w/ Robotiq 3F gripper, Ridgeback mobile platform, Husky UGV, Fetch mobile manipulator, Turtlebots

Robotic Programming: ROS, OMPL, MoveIt!, HPP, CoppeliaSim, Isaac Sim

Others: Experience with OpenGL, OpenCV, PCL, PyTorch, Tensorflow

Honors & Awards

[H10] **MRC Postdoctoral Fellowship** | Maryland Robotics Center, University of Maryland (2023 - 2024)

[H09] **Best Undergrad Paper Award** | Korea Computer Graphics Society Annual Conference (KCGS 2021)

[H08] **Solvay Scholarship Award** | Outstanding Academic Performance (2019 - 2020)

[H07] **RAS Travel Award** | International Conference on Robotics and Automation (ICRA 2019)

[H06] **RAS Travel Award** | International Conference on Robotics and Automation (ICRA 2018)

[H05] **Best Paper Award** | The 13th Korea Robotics Society Annual Conference (KRoC 2018)

[H04] **Special Award** | Capston Awards (Engineering Education Festa 2016)

[H03] **1st Place** | Ewha Engineering Capstone Design Contest 2016

[H02] **1st Place** | Ewha Engineering Student Portfolio Contest 2016

[H01] **2nd Place** | Ewha Power ProgrammER(E-PPER) Contest 2016

Activities

Academic

- **Teaching Assistant** | Introduction to Physically-based Animation (Graduate) *Spring 2023*
- **Teaching Assistant** | Numerical Methods (Undergrad) *Spring 2022*
- **Teaching Assistant** | Computer Programming (Undergrad) *Spring 2016*

Talks & Demos

- **TALK** | Invited talk @SGVR Lab, KAIST, Daejeon, KR *NOV 2023*
- **DEMO** | Drawing simulation demo, ITRC Forum 2022, KR *APR 2022*
- **TALK** | The 5th NZ/KOREA Workshop on HDI4D *NOV 2017*
- **DEMO** | Drawing robot demo, Engineering Education Festa 2016, KR *NOV 2016*
- **DEMO** | Drawing robot demo, Hanium Expo 2016, KR *NOV 2016*

Others

- **Robotic Art Exhibition** | Artist, CO-DRAW, Collaborative Robotic Art Exhibition *MAY 2023*
- **Summer School** | Participate, AI & Robotics Summer School 2020 *AUG 2020*
- **Tutorial** | Participate, Reinforcement Learning Tutorial *JAN 2017*
- **Tutorial** | Participate, Arduino & IoT Sensing and Wireless Communication Control Tutorial *JAN 2016*
- **Summer School** | Participate, EWHA-EPITA Sumer School, Paris, France *JUL 2015*