JAEHYEONG JO

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RESEARCH INTERESTS

My research interest lies in understanding physical systems through the lens of geometrical structures, especially in the context of generative modeling. Previous works focus on the generation of geometrical structures with diffusion models, including graphs and data on Riemannian manifolds, and their applications to real-world tasks, e.g., drug discovery, protein design, and neural architecture search.

PREPRINTS

Generative Modeling on Manifolds Through Mixture of Riemannian Diffusion Processes
Jaehyeong Jo, Sung Ju Hwang
Preprint, 2023

DiffusionNAG: Task-guided Neural Architecture Generation with Diffusion Models
Sohyun An*, Hayeon Lee*, Jaehyeong Jo, Seanie Lee, Sung Ju Hwang
Preprint, 2023

Graph Generation with Destination-Driven Diffusion Mixture
Jaehyeong Jo*, Dongki Kim*, Sung Ju Hwang
Machine Learning for Drug Discovery Workshop at International Conference on Learning Representations **(MLDD Workshop @ ICLR)**, 2023

* denotes equal contribution.

CONFERENCE PUBLICATIONS

Text-Conditioned Sampling Framework for Text-to-Image Generation with Masked Generative Models
Jaewoong Lee*, Sangwon Jang*, Jaehyeong Jo, Jaehong Yoon, Yunji Kim, Jin-Hwa Kim, Jung-Woo Ha, Sung Ju Hwang
International Conference on Computer Vision **(ICCV)**, 2023

Exploring Chemical Space with Score-based Out-of-distribution Generation
Seul Lee, Jaehyeong Jo, Sung Ju Hwang
International Conference on Machine Learning **(ICML)**, 2023

Score-based Generative Modeling of Graphs via the System of Stochastic Differential Equations
Jaehyeong Jo*, Seul Lee*, Sung Ju Hwang
International Conference on Machine Learning **(ICML)**, 2022

Edge Representation Learning with Hypergraphs
Jaehyeong Jo*, Jinheon Baek*, Seul Lee*, Dongki Kim, Minki Kang, Sung Ju Hwang
Neural Information Processing Systems **(NeurIPS)**, 2021

* denotes equal contribution.

RESEARCH EXPERIENCE

MLAI (Machine Learning & Artificial Intelligence) Lab, KAIST — Seoul, Korea
Research Assistant (Advisor: Prof. Sung Ju Hwang) — Sep. 2021 - Present

· Conducting research on diffusion-based generative models with applications to real-world tasks such as drug discovery via graph generation, text-to-image generation, and neural architecture search.

Kimlab, UofT Toronto, Canada
Visiting student (Host: Prof. Philip Kim) Feb. 2023 - Feb. 2023

· Conducting research on protein generative model with diffusion models.

PAI (Probability Artificial Intelligence) Lab, KAIST Daejeon, Korea
Research Assistant (Advisor: Prof. Ganguk Hwang) Mar. 2020 - Aug. 2021

· Conducted research on graphs (edge representation learning using hypergraph structure).

TALKS

Generation of Graph-Structured Data with Diffusion Models Toronto, Canada
in University of Toronto (UofT) Feb 2023

Score-based Generative Modeling of Graphs via the SDEs Online
in LoGaG: Learning on Graphs and Geometry Reading Group Oct. 2022

Learning with Graph Structure Data Pohang, Korea
in Pohang University of Science and Technology (POSTECH) July 2022

Score-based Graph Generation for Material Design Suwon, Korea
in Samsung Advanced Institute of Technology (SAIT) Jun. 2022

EDUCATION

Korea Advanced Institute of Science and Technology (KAIST) Seoul, Korea
Ph.D. in Artificial Intelligence Sep. 2021 - Present
Advisor: Prof. Sung Ju Hwang Expected Graduation: Feb. 2025

Korea Advanced Institute of Science and Technology (KAIST) Daejeon, Korea
M.S. in Mathematical Sciences Mar. 2020 - Aug. 2021
Advisor: Prof. Ganguk Hwang

Korea Advanced Institute of Science and Technology (KAIST) Daejeon, Korea
B.S. in Mathematical Sciences Mar. 2016 - Feb. 2020
Minor in Computer Science & Engineering
GPA: 3.75/4.3

ACADEMIC SERVICES

Conference Reviewers

· Learning on Graphs Conference **(LoG)**, 2022, 2023
· International Conference on Learning Representations **(ICLR)**, 2022, 2023
· Conference on Neural Information Processing Systems (**NeurIPS**), 2022, 2023
· International Conference on Machine Learning **(ICML)**, 2022, 2023

SKILLS

Languages
Korean (native), English (fluent)

Programming (Coding)
Python, Java