# Donghoon Ahn

Undergraduate Research Intern, Computer Vision Lab @ KAIST
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## Research Interests

**Deep Generative Models**, **Diffusion Models**, **Image/Video/3D/4D Generation**, **Personalization**
Focused on integrating fundamental principles of the world into generative models as inductive biases to enhance image, video, and 3D model generation, with the aim of better understanding the real world.

## EDUCATION

**Korea University** 2019 — present
B.S. in Computer Science and Engineering GPA: 4.37/4.5 (overall) 4.46/4.5 (major)
*Two-year break for military service (Fall 2020 — Spring 2022)*

## PUBLICATIONS

**Self-Rectifying Diffusion Sampling with Perturbed-Attention Guidance**
**Donghoon Ahn***, Hyoungwon Cho*, Jaewon Min, Wooseok Jang, Jungwoo Kim, SeonHwa Kim, Hyun Hee Park, Kyong Hwan Jin and Seungryong Kim
*European Conference on Computer Vision **(ECCV)** 2024*

**Debiasing Scores and Prompts of 2D Diffusion for View-Consistent Text-to-3D Generation**
Susung Hong*, **Donghoon Ahn*** (equal contribution), and Seungryong Kim
*Advances in Neural Information Processing Systems (**NeurIPS**) 2023*

## PREPRINTS

**Geometry-Aware Score Distillation via 3D Consistent Noising and Gradient Consistency Modeling**
Min-Seop Kwak, **Donghoon Ahn**, Ines Hyeonsu Kim, Jin-Hwa Kim and Seungryong Kim
*Arxiv preprint*

## SCHOLARSHIP AND AWARDS

**Best Award, Independent Research Competition**, Korea University Spring 2024
*1st place for research on"Self-Rectifying Diffusion Sampling with Perturbed-Attention Guidance"*

**Veritas Program Scholarship**, Korea University Spring 2024

**Sung Ryun Scholarship Foundation Scholarship** *(Full Tuition)* Spring 2023, Spring 2024

**Chang Gang Foundation Scholarship** *(Full Tuition)* Fall 2023

**Semester High Honors**, Korea University Spring 2019, Spring 2020, Fall 2022, Spring 2023, Fall 2023

**Dean's List**, Korea University Fall 2023
*(GPA: 4.5/4.5)*

**Korea University Alumni Association Scholarship** *(Full Tuition)* Spring 2022

## RESEARCH PROJECT

**Improving Diffusion-Based Image Restoration Models with Guidance** 2023 — 2024
*Collaborative research with **Samsung Electronics** to enhance camera technologies*
Conducted research to improve the performance of diffusion model-based inverse problem solvers by applying Self-Attention Guidance (SAG). Resolved challenges in applying SAG, including artifact issues in unguided regions, by introducing innovative solutions such as refined mask edges and an inverted mask. Explored various guidance methods.

## COURSE PROJECT

**Improving Disentanglement of Diffusion Models via Gaussian Mixture Attention Guidance** 2023
*Course Project: 'Introduction to Computer Vision'*
Led a team to address object mixing issues in Stable Diffusion 1.x by following the latest research and defining key problems. Proposed a novel solution using Gaussian Mixture Models (GMM) for unsupervised learning applied to attention maps. Provided tutorials on diffusion models and contributed to coding and report writing.

## OPEN SOURCE CONTRIBUTIONS

**huggingface/diffusers** 2024
Collaborated with HuggingFace engineers to integrate Perturbed-Attention Guidance (PAG) into diffusers, significantly enhancing image/video generation quality.

## WORK EXPERIENCES

**Research Intern**, Korea University 2022 — 2024
*Advised by Prof. Seungryong Kim*
Gained experience conducting independent research as an undergraduate intern over two years. Published papers at NeurIPS 2023 and ECCV 2024. Developed skills in defining research topics, designing experiments, coding, writing papers, and collaborating with peers.

**Research Intern**, KAIST 2024 — present
*Advised by Prof. Seungryong Kim*
Currently researching diffusion models for video generation/personalization and analyzing and developing diffusion guidance methods.

**Air Force Information System Management Unit** 2020 — 2022
Refactored and developed several intranet systems as a team using the Spring framework during military service.

## OTHER EXPERIENCES

**AIKU: Deep Learning Society**, *Korea University* 2022 — 2023
Led a study group on generative models, focusing on diffusion models. Gave an introduction to image generation models and text-to-3D tasks.

## SKILLS

- **Programming:** Python, PyTorch, C++, JAVA, Kotlin, Scala, SQL
- **Soft Skills:** Experienced in team collaboration and leadership through military service and research projects. Skilled in sharing and developing ideas with colleagues, and capable of leading research projects through task delegation and role distribution.