

Seunghyeon Seo

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EDUCATION

- Seoul National University, Seoul, Korea** Mar. 2021 ~ Aug. 2025
- Ph.D. in Artificial Intelligence
- Seoul National University, Seoul, Korea** Mar. 2014 ~ Feb. 2021
- B.A. in Agricultural Economics / Data Sciences

RESEARCH INTERESTS

I am deeply engaged in developing efficient deep learning models for training and inference, aimed at practical real-world applications. Primarily, my research interest focuses on **improving the performance of NeRF and Gaussian Splatting given sparse input data** by various regularization methods, such as exploiting input data distribution, augmenting training rays, designing an effective ray parameterization, etc. In addition, I have recently developed a growing interest in **synthetic data training using generative models**, which further enhances my research focus on data efficiency and model robustness. Beyond these topics, I also maintain a broad curiosity and open-mindedness toward diverse areas of CV/ML/NLP.

WORK EXPERIENCE

- Meta Reality Labs, Burlingame, CA | Research Scientist Intern** May 2025 ~ Aug. 2025
- XRCIA, Datasets (Mentors: John Kim, Lei Xiao, Beibei Liu)
 - Research about synthetic egocentric data generation with high-quality body extremities using video diffusion transformer models.
 - Leveraged Wan 2.1 video diffusion model with LoRA fine-tuning to adapt generative outputs for egocentric perspectives.
- Meta Reality Labs, Burlingame, CA | Research Scientist Intern** Jul. 2024 ~ Jan. 2025
- XRCIA, Datasets (Mentors: John Kim, Shaojie Bai, Tianyang Ma)
 - Research about synthetic data generation using conditional multi-view diffusion models, and training framework of universal face encoder leveraging real+synthetic data.
 - Successfully reduced the cost of data collection by over an order of magnitude compared to traditional real-world capture workflows.
 - Built a high-quality synthetic dataset used alongside real data to train a universal face encoder, resulting in over 5% improvement on key metrics, surpassing the current best model.
- ThinkforBL Consulting Group, Seoul, Korea | Laboratory Assistant Researcher** Jun. 2020 ~ Nov. 2020
- Development of deep learning-based solutions for agriculture, addressing diverse client requests and implementing models, e.g., posture detection in sows, crop weight classification, and recommendation systems.
- Food and Agriculture Organization of the United Nations (FAO), Rome, Italy | Intern** Sep. 2019 ~ Feb. 2020
- Committee on World Food Security (CFS) (Supervisor: Christopher Hegadorn)
 - Research and report on datasets that are relevant to the proposed CFS workstream on <Data Collection and Analysis Tools>.

AWARDS AND SCHOLARSHIPS

- Best Doctoral Dissertation Award Honorable Mention** Aug. 2025
- Seoul National University
- Outstanding Reviewer Award** Sep. 2024
- ECCV 2024
- Qualcomm Innovation Fellowship Korea 2023 Winner** Nov. 2023
- Qualcomm AI Research
- Youlchon AI Star Scholarship** Aug. 2023
- Youlchon Foundation & AI Institute-Seoul National University
- AI Fellowship (Fully Funded)** Mar. 2022 ~ Feb. 2023
- Seoul National University

PATENT

Method and Apparatus based on NeRF using Flipped Reflected Ray, Korean Patent, 10-2024-0022118

PUBLICATIONS

Conference

- [1] Shaojie Bai*, **Seunghyeon Seo***, Yida Wang, Chenghui Li, Owen Wang, Te-Li Wang, Tianyang Ma, Jason Saragih, Shih-En Wei, Nojun Kwak, Hyung Jun Kim, [“Generative Head-Mounted Camera Captures for Photorealistic Avatars”](#), *SIGGRAPH Asia 2025*. (Journal Track) [\[Project Page\]](#)
- [2] **Seunghyeon Seo**, Yeonjin Chang, Jayeon Yoo, Seungwoo Lee, Hojun Lee, Nojun Kwak, [“ARC-NeRF: Area Ray Casting for Broader Unseen View Coverage in Few-shot Object Rendering”](#), *CVPRW 2025*. (Oral) [\[Project Page\]](#)
- [3] Donghoon Han*, **Seunghyeon Seo***, Eunhwan Park, SeongUk Nam, Nojun Kwak, [“Unleash the Potential of CLIP for Video Highlight Detection”](#), * indicates equal contribution, *CVPRW 2024*.
- [4] Yeonjin Chang, Yearim Kim, **Seunghyeon Seo**, Jung Yi, Nojun Kwak, [“Fast Sun-aligned Outdoor Scene Relighting based on TensoRF”](#), *WACV 2024*.
- [5] Donghoon Han, **Seunghyeon Seo**, DongHyeon Jeon, Jiho Jang, Chaerin Kong, Nojun Kwak, [“ConcatPlexer: Additional Dim1 Batching for Faster ViTs”](#), *NeurIPS 2023 Workshop*. (Oral)
- [6] **Seunghyeon Seo**, Yeonjin Chang, Nojun Kwak, [“FlipNeRF: Flipped Reflection Rays for Few-shot Novel View Synthesis”](#), *ICCV 2023*. [\[Project Page\]](#) [\[Code\]](#)
- [7] **Seunghyeon Seo**, Jaeyoung Yoo, Jihye Hwang, Nojun Kwak, [“MDPose: Real-Time Multi-Person Pose Estimation via Mixture Density Model”](#), *UAI 2023*. [\[Code\]](#)
- [8] Jaeyoung Yoo*, Hojun Lee*, **Seunghyeon Seo**, Inseop Chung, Nojun Kwak, [“End-to-End Multi-Object Detection with a Regularized Mixture Model”](#), * indicates equal contribution, *ICML 2023*. [\[Code\]](#)
- [9] **Seunghyeon Seo**, Donghoon Han*, Yeonjin Chang*, Nojun Kwak, [“MixNeRF: Modeling a Ray with Mixture Density for Novel View Synthesis from Sparse Inputs”](#), * indicates equal contribution, *CVPR 2023*. (Qualcomm Innovation Fellowship Korea 2023 Winner) [\[Project Page\]](#) [\[Code\]](#)
- [10] Jongmok Kim, Jooyoung Jang, **Seunghyeon Seo**, Jisoo Jeong, Jongkeun Na, Nojun Kwak, [“MUM: Mix Image Tiles and UnMix Feature Tiles for Semi-Supervised Object Detection”](#), *CVPR 2022*. [\[Code\]](#)
- [11] Kyuewang Lee*, Inseop Chung*, Daeho Um, Jaeseok Choi, Yeji Song, **Seunghyeon Seo**, Nojun Kwak, Jin Young Choi, “Multi-modal Object Detection, Tracking, and Action Classification for Unmanned Outdoor Surveillance Robots”, *ICCV 2021*.

Preprint

- [1] Yeonjin Chang, Juhwan Cho, **Seunghyeon Seo**, Wonsik Shin, Nojun Kwak, [“LoGoColor: Local-Global 3D Colorization for 360 Scenes”](#), Under Review. [\[Project Page\]](#)
- [2] Yeonjin Chang, Erqun Dong, **Seunghyeon Seo**, Nojun Kwak, Kwang Moo Yi, [“ROODI: Reconstructing Occluded Objects with Denoising Inpainters”](#), Under Review. [\[Project Page\]](#)
- [3] Ingyun Lee, Jae Won Jang, **Seunghyeon Seo**, Nojun Kwak, [“DivCon-NeRF: Generating Augmented Rays with Diversity and Consistency for Few-shot View Synthesis”](#), Under Review.

PROJECTS

Research on Novel View Synthesis Using NeRF Trained with Sparse Viewpoint Data

Funded by Samsung Electronics | Main Researcher

Jul. 2023 ~ Jul. 2024

- Neural rendering, NeRF, Few-shot learning
- Conducted research to improve the performance of NeRF under sparse input conditions, resulting in a published research paper at a top-tier computer vision conference.

Artificial Intelligence Research about Cross-Modal Dialogue Modeling for One-on-One Multi-Modal Interactions

Funded by Ministry of Science and ICT of Korea | Assistant Researcher

May 2022 ~ Jun. 2023

- Multi-modal learning, Object detection
- Assisted in building an object detection system that processes user-submitted images to identify clothing items and extract key attributes.

Development of Real-Time Multi-Camera Object Tracking and Identification Technology

Funded by Electronics and Telecommunications Research Institute | Project Manager

Jun. 2021 ~ Dec. 2021

- Multi-object tracking
- Developed a multi-view, multi-object tracking algorithm for real-time vehicle and pedestrian tracking within a parking lot environment.

Development of Multimodal Sensor-Based Intelligent Systems for Outdoor Surveillance Robots

Funded by Ministry of Science and ICT of Korea | Assistant Researcher

Jan. 2021 ~ Aug. 2021

- Multi-modal learning, Object detection
- Contributed to a research project on multi-modal object detection, tracking, and action classification for autonomous outdoor surveillance robots.

ACADEMIC SERVICE

Reviewer for AAAI '25/'26, CVPR '23/'24/'25/'26, ECCV '24, ICCV '25, NeurIPS '25, TCSVT

SKILLS

Programming Languages

- Python, R, CUDA

ML Development Stack

- PyTorch, Jax, Tensorflow, Slurm, MAST Scheduler

Language

- English (Professional), Korean (Native), French (Basic)

TALK

Generative Head-Mounted Camera Captures for Photorealistic Avatars

Jun. 2025

- Meta Reality Labs

Novel View Synthesis from Sparse Inputs via NeRF

Apr. 2025

- SNU Haedong Advanced Engineering