

Seunghun Lee

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RESEARCH INTERESTS

Interested in video object perception, understanding, and reasoning. Aiming to design pipelines capable of human-like reasoning for advanced multi-modal video analysis.

EDUCATION

Daegu Gyeongbuk Institute of Science and Technology (DGIST)

Daegu, South Korea

● M.S–Ph.D. Course in Electrical Engineering and Computer Science

Feb 2019 – Feb 2026 (Expected)

● B.S in Convergence Engineering

Feb 2015 – Feb 2019

EXPERIENCE

Independent Research (DGIST)

Feb 2019 – Present

- Achieved SOTA (55.7) on the MeViS benchmark for referring video object segmentation by temporal modeling with moment annotation. (previous SOTA: 53.7).
- Achieved SOTA (57.1) on the occluded video instance segmentation benchmark with a context-aware tracking framework (previous SOTA: 53.4). Received 80+ GitHub stars.
- Proposed a multi-target domain adaptation method for semantic segmentation, enabling a single model to adapt across multiple domains without domain-specific pretraining, achieving state-of-the-art performance.
- Proposed a cross-domain adaptation method that disentangles and transfers visual attributes in a latent space, enabling bi-/multi-directional adaptation while preserving scene structure, achieving state-of-the-art performance in digit classification and semantic segmentation.

Industry Consultant (AIMerch)

Feb 2025 – present

- Serving on the advisory board for the 'Robust Tracking Techniques for Handling Occlusion and Long Videos in Retail' project, providing technical guidance on advanced tracking algorithms.

Collaborative Research as Visiting Scholar (Stanford University, Supervisor: Prof. Ehsan Adeli) Sep 2024 – Feb 2025

- Achieved SOTA (54.0) on the long video instance segmentation benchmark, YouTube-VIS 2022, with a novel memory system and matching strategy (previous SOTA: 51.0).
- Proposed a pipeline incorporating learnable cluster queries to refine incomplete pseudo labels in the unsupervised nuclei segmentation project.

Collaborative Research (ETRI)

Jun 2021 – Feb 2024

- Proposed occlusion-robust context-aware object matching, improving performance by over 2% on the occluded video instance segmentation benchmark compared to the baseline.
- Achieved 99% accuracy in a vehicle license plate recognition task by developing a virtual training data generation system using domain adaptation techniques.

Collaborative Research (D-World)

Feb 2021 – Mar 2021

- Developed a data augmentation pipeline to address data scarcity in defect image datasets for training defect detection deep neural networks.

PUBLICATIONS (Co-first*)

C=CONFERENCE, J=JOURNAL, S=IN SUBMISSION

- [S.1] **Seunghun Lee***, Jiwan Seo*, Jeonghoon Kim*, Siwon Kim, Haeun Yun, Hyogyee Jeon, Wonhyeok Choi, Jaegoon Jeong, Zane Durante, Sanghyun Park, Sunghoon Im, "SAMDWICH: Moment-aware Video-text Alignment for Referring Video Object Segmentation", **Under review**.

- [S.2] Wonhyeok Choi, Kyumin Hwang, Jihun Park, Kyoungmin Lee, **Seunghun Lee**, Jaeyeul Kim, Minwoo Choi, Sunghoon Im, “TaskForce: Cooperative Multi-agent Reinforcement Learning for Multi-task Optimization”, **Under review**.
- [S.3] Jaehoon Jeong*, **Seunghun Lee***, Siwoo Nam, Ehsan Adeli, Sunghoon Im, Sanghyun Park, “Annotation-free Nuclei Segmentation with Cluster-wise Distribution Learning”, **Under review**.
- [S.4] Sanggyun Ma*, Wonjoon Choi*, Jihun Park*, Jaeyeul Kim, **Seunghun Lee**, Jiwan Seo, Sunghoon Im, “Bridging Geometric and Semantic Foundation Models for Generalized Monocular Depth Estimation”, **Under review**.
- [C.1] **Seunghun Lee**, Jiwan Seo, Minwoo Choi, Kiljoon Han, Jaegoon Jeong, Zane Durante, Ehsan Adeli, Sanghyun Park, Sunghoon Im, “LOMM: Latest Object Memory Management for Temporally Consistent Video Instance Segmentation”, *IEEE International Conference on Computer Vision (ICCV)*, 2025.
- [C.2] **Seunghun Lee***, Jiwan Seo*, Kiljoon Han, Minwoo Choi, Sunghoon Im, “CAVIS: Context-Aware Video Instance Segmentation”, *IEEE International Conference on Computer Vision (ICCV)*, 2025.
- [C.3] Jihun Park*, Kyoungmin Lee*, Jongmin Gim*, **Seunghun Lee**, Sunghoon Im, “Style-Editor: Text-driven object-centric style editing”, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)* [**Highlight, Top 3.7%**], 2025.
- [C.4] Hojin Kim, **Seunghun Lee**, Sunghoon Im, “Offline-to-Online Knowledge Distillation for Video Instance Segmentation”, *IEEE Winter Conference on Applications of Computer Vision (WACV)* [**Oral, Top 2.6%**], 2024.
- [C.5] Changjae Kim, **Seunghun Lee**, Sunghoon Im, “Multi-Target Domain Adaptation with Class-Wise Attribute Transfer in Semantic Segmentation”, *British Machine Vision Conference (BMVC)*, 2023.
- [C.6] **Seunghun Lee**, Wonhyeok Choi, Changjae Kim, Minwoo Choi, Sunghoon Im, “ADAS: A Direct Adaptation Strategy for Multi-Target Domain Adaptive Semantic Segmentation”, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2022.
- [C.7] **Seunghun Lee**, Sunghyun Cho, Sunghoon Im, “DRANet: Disentangling Representation and Adaptation Networks for Unsupervised Cross-Domain Adaptation”, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021.

ACADEMIC SERVICES

REVIEWER

● IEEE Conference on Computer Vision and Pattern Recognition (CVPR)	2023–present
● Conference on Neural Information Processing Systems (NeurIPS)	2023–present
● IEEE International Conference on Computer Vision (ICCV)	2023–present
● International Conference on Machine Learning (ICML)	2024–present
● International Conference on Learning Representations (ICLR)	2024–present
● European Conference on Computer Vision (ECCV)	2024–present
● Association for the Advancement of Artificial Intelligence (AAAI)	2024–present
● British Machine Vision Conference (BMVC)	2025
● Pacific Graphics	2024

AWARDS

● DGIST Post-Graduate Research Abroad Awards,	Jul 2024
● Participation prize, 30th HumanTech Paper Award, Samsung.	Feb 2024
● Outstanding Researcher Award, 2022 DGIST Student Conference, EECS	Aug 2022
● Participation prize, 28th HumanTech Paper Award, Samsung.	Feb 2022
● 3rd place Prize at ICT Paper Contest	Dec 2021

PATENTS

Granted

- COMPUTER PROGRAM AND MEHTOD FOR STYLE TRANSFER. (10-2023-0131272)
- APPARATUS AND METHOD FOR DOMAIN ADAPTATION OF IMAGE. (10-2021-0148255)

Pending

- MONOCULAR DEPTH ESTIMATION METHOD BASED ON FUSION OF GEOMETRIC AND SEMANTIC INFORMATION. (10-2024-0176489)
- COMPUTER PROGRAM, APPARATUS, AND METHOD FOR TRACKING OBJECT IN VIDEO. (10-2024-0176486)
- CONTEXT-AWARE VIDEO INSTANCE SEGMENTATION METHOD. (10-2024-0109424)
- COMPUTER PROGRAM FOR TEXT-BASED, OBJECT-ORIENTED STYLE TRANSFER. (10-2023-0195850)
- OFFLINE-ONLINE KNOWLEDGE DISTILLATION COMPUTER PROGRAM AND METHOD FOR OBJECT RECOGNITION IN VIDEO. (10-2023-0017568)
- COMPUTER PROGRAM AND METHOD FOR DOMAIN ADAPTATION. (10-2022-0087222)
- COMPUTER PROGRAM AND METHOD FOR DOMAIN ADAPTATION. (10-2022-0086614)

SKILLS

- **Languages:**Python, MATLAB, C, C++
- **Deep Learning Framework:** Pytorch, Tensorflow, Detectron2
- **Computer Vision:** Object Detection& Segmentation, Object Tracking, Domain Adaptation & Generalization
- **Tools & Environments:** Git, Jupyter, Numpy, Matplotlib