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. Highly motivated by the challenge of applying this research to solve practical, real-world problems.

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

- Won 1st Place at the ICCV'25 Amazon Challenge (Spatio-Temporal Action Localization in Retail) by proposing a "frame-to-frame matching with SAM2" algorithm that significantly improved tracking (Previous best: Tencent Wechat AI).
- 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*, Sungho Moon*, Siwon Kim, Haeun Yun, Hyogyeong Jeon, Wonhyeok Choi, Jaegoon Jeong, Zane Durante, Sanghyun Park, Sunghoon Im, "Temporal Grounding as A Learning Signal for Referring Video Object Segmentation", **Under review**.

[S.2] Sungho Moon* **Seunghun Lee***, Jiwan Seo, Sunghoon Im, "CVA: Context-aware Video-text Alignment for Video Temporal Grounding", **Under Review**.

[S.3] Jaehoon Jeong*, **Seunghun Lee***, Siwoo Nam, Ehsan Adeli, Sunghoon Im, Sanghyun Park, "Distribution-guided Nuclei Discovery for Unsupervised Nuclei Segmentation", **Under review**.

[S.4] 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.5] Jeonghoon Kim, JinHyung Lee, **Seunghun Lee**, Sehyun Hwang, Hao Ni, Jisoo Mok, Sunghoon Im, "AdaST: Adaptive Semantic Transformation of Visual Representation for Training-free Zero-shot Composed Image Retrieval", **Under review**.

[C.1] 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", *International Conference on Electronics, Information, and Communication (**ICEIC**)*, 2026.

[C.2] **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.3] **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.4] 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.5] 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.6] 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.7] **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.8] **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

- 1st place in 4th GroceryVision Challenge on Spatial Temproal Action Localization, ICCV 2025. Sep 2025
- 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 FOR TEXT-BASED, OBJECT-ORIENTED STYLE TRANSFER. (10-2023-0195850)
- COMPUTER PROGRAM AND MEHTOD FOR STYLE TRANSFER. (10-2023-0131272)
- COMPUTER PROGRAM AND METHOD FOR DOMAIN ADAPTATION. (10-2022-0086614)
- 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)
- 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)

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