YOUNGRAE KIM

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EDUCATION

University of Southern California (USC) — Los Angeles, CA, USA
Ph.D. in Computer Engineering (Advisor: Prof. Jay Kuo) — Aug. 2024 – Present

Korea Advanced Institute of Science and Technology (KAIST) — Daejeon, Korea
M.S. in Computer Science (Advisor: Prof. Dongman Lee) — Feb.2022 – Feb.2024
- Thesis: "Few-Shot Weather-Degraded Image Restoration"

Hongik University — Seoul, Korea
B.S. in Computer Engineering (Advisor: Prof. Young Yoon) — Mar.2016 – Feb.2022
- Major GPA: 98.41%; Cumulative GPA: 95.10%

RESEARCH INTERESTS

My research interests primarily lie in **computer vision**, **multi-modality** and **machine learning**. Specifically:

- **Controllable representation**: Modern AI models contain biased and non-transparent representations, leading to potentially catastrophic results. I am interested in developing a learning framework for unbiased, interpretable, and versatile representations.
- **Optimization through interaction with the surroundings**: Although a large dataset is used to train the model, the extremely dynamic real world contains a distribution of blind spots that typical models cannot address. I am interested in detecting this gap and optimizing a model by interacting with its surroundings.

PUBLICATIONS

1. DEVIAS: Learning Disentangled Video Representations of Action and Scene
   Youngrae Kim*, Kyungho Bae*, Geo Ahn*, Jinwoo Choi
   European Conference on Computer Vision (ECCV) 2024 – (**Oral** Presentation, **2.3%** acceptance rate)
2. MetaWeather: Few-Shot Weather-Degraded Image Restoration
   Youngrae Kim*, Yeonggeol Cho*, Thanh-Tung Nguyen, Seunghoon Hong, Dongman Lee
   European Conference on Computer Vision (ECCV) 2024
3. Beyond Entropy: Style Transfer Guided Single Image Continual Test-Time Adaptation
   Yeonggeol Cho*, **Youngrae Kim***, Dongman Lee
   Workshop on Vision-Centric Autonomous Driving at European Conference on Computer Vision (ECCV) 2024
4. Feature Augmentation based Test-Time Adaptation
   Yeonggeol Cho*, **Youngrae Kim***, Junho Yoon, Seunghoon Hong, Dongman Lee
   IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) 2025
5. Efficient Reference-based Video Super-Resolution (ERVSR): Single Reference Image is All You Need
   Youngrae Kim*, Jinsu Lim*, Hoonhee Cho*, Minji Lee*, Dongman Lee, Kuk-Jin Yoon, Ho-Jin Choi
   IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) 2023 – (**Oral** Presentation)
6. Zone-Agnostic Greedy Taxi Dispatch Algorithm Based on Contextual Matching Matrix for Efficient Maximization of Revenue and Profit
   Youngrae Kim, Young Yoon
   Electronics 2021

   (* denotes equal contribution)

PATENTS

- Dongman Lee, Yeonggeol Cho, **Youngrae Kim**, Junho Yoon. Korean Patent, Application No. 10-2025-0066479. Single Image Based Style Transfer Guided Continual Test-Time Adaptation System. 2025.

Research Experience

USC Media Communications Lab Aug. 2024 – Present
Graduate Research Assistant, Advisor: Prof. Jay Kuo
- Developed a Federated Learning framework to support a modularized, successive machine learning pipeline.
- Investigated methods to enhance neural network robustness against noise and variation introduced by analog neural network hardware.

KAIST CDSN Lab Mar. 2022 – Jul. 2024
Graduate Research Assistant, Advisor: Prof. Dongman Lee, Prof. Seunghoon Hong
- Designed a universal few-shot learner for arbitrary adverse weather, using the matching paradigm for meta-learning.
- Formulated a loss function to solve an ill-posed problem in typical entropy loss functions in test-time adaptation.
- Developed a test-time adaptation method that maximizes the use of limited samples after filtering out.

Kyung Hee University VLL Lab May 2023 – Mar. 2024
Research Collaborator, Advisor: Prof. Jinwoo Choi
- Investigated typical video models' limitations and clarified they are often biased to background or neglect the background in videos, which leads to inaccurate prediction or information loss.
- Developed a framework for disentangling both action and scene representations in a disentangled manner, leading to more holistic video understanding.

KAIST CS570 AI & ML Course Apr. 2022 – Aug. 2022
Advisor: Prof. Tae-Kyun Kim
- Developed a computational-efficient reference-based video super-resolution model, determining the sufficiency of a single frame as a reference feature instead of all frames.

Hongik University APL Lab Jul. 2020 – Dec. 2021
Research Intern, Advisor: Prof. Young Yoon
- Processed raw sensor traffic data; implemented and conducted experiments using realistic simulations to evaluate the effectiveness of various dispatching strategies.

Fellowships and Honors

Best Paper Award, Korea Computer Congress Jun. 2024
Full-tuition Government Scholarship for Science and Engineering, KAIST 2022 – 2024
Best TA Award, KAIST Fall 2022
Academic Excellence Scholarship for 7 semesters, Hongik University 2016 – 2022

Academic Services

Reviewer, IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) 2024, 2025
Reviewer, Association for the Advancement of Artificial Intelligence Conference (AAAI) 2025, 2026
Reviewer, IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) 2025
Reviewer, IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)

Teaching

Teaching Assistant, CS206 Data Structure, KAIST Fall 2022
Teaching Assistant, CS330 Operating System, KAIST Spring 2022

Military Experience

Honorable Discharge as a Sergeant, Troop Leader, Republic of Korea Air Force Apr. 2018 – Mar. 2020