Youngtaek Oh

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Research Interest

My research centers on developing data-efficient and robust recognition systems that address limitations and biases in image and video data. I am currently focusing on enhancing vision-language models to improve compositional reasoning and multimodal understanding for more robust and comprehensive recognition systems.

Keywords: Data-Efficient Learning, Multi-Modal Learning, Vision-Language Models

Education

Korea Advanced Institute of Science and Technology (KAIST) — Daejeon, South Korea
Ph.D. in Electrical Engineering — Sep. 2021 – Present
- Co-Advisors: Prof. In So Kweon and Prof. Junmo Kim

M.S. in Electrical Engineering — Mar. 2019 – Feb. 2021
- Advisor: Prof. In So Kweon

Korea University — Seoul, South Korea
B.S. in Electrical Engineering — Mar. 2015 – Feb. 2019
- GPA: 4.40/4.50

Publications (*equally contributed authors; †corresponding authors)

Workshop and Preprints

[W2] Exploring the Spectrum of Visio-Linguistic Compositionality and Recognition
Youngtaek Oh, Pyunghwan Ahn, Jinhyung Kim, Gwangmo Song, Soonyoung Lee†, In So Kweon†, Junmo Kim†
in **CVPRW 2024**: 'What is Next in Multimodal Foundation Models?' (**MMFM**) Workshop

[W1] Technical Report: Retrieval-based Data Discovery and Fusion for Zero-shot Image Captioning
Youngtaek Oh, Jae Won Cho, Dong-Jin Kim, In So Kweon†, Junmo Kim†
in **CVPRW 2023**: 'New Frontiers for Zero-shot Image Captioning Evaluation' (**NICE**) Workshop
2nd place in Zero-Shot Image Captioning Challenge in NICE Workshop

Peer-Reviewed Conferences and Journals

[C6] Preserving Multi-Modal Capabilities of Pre-trained VLMs for Improving Vision-Linguistic Compositionality
Youngtaek Oh, Jae Won Cho, Dong-Jin Kim, In So Kweon†, Junmo Kim†
in **EMNLP 2024**: Conference on Empirical Methods in Natural Language Processing

[J1] Empirical study on using Adapters for debiased Visual Question Answering
Jae Won Cho, Dawit Mureja Argaw, **Youngtaek Oh**, Dong-Jin Kim, In So Kweon
in **CVIU 2023**: Computer Vision and Image Understanding (IF=4.3)

[C5] Self-Sufficient Framework for Continuous Sign Language Recognition
Youngjoon Jang, **Youngtaek Oh**, Jae Won Cho, Myungchul Kim, Dong-Jin Kim, In So Kweon, Joon Son Chung
in **ICASSP 2023 (Oral)**: IEEE International Conference on Acoustics, Speech and Signal Processing
Top 3% Paper Recognition

[C4] Signing Outside the Studio: Benchmarking Background Robustness for Continuous Sign Language Recognition
Youngjoon Jang, **Youngtaek Oh**, Jae Won Cho, Dong-Jin Kim, Joon Son Chung, In So Kweon
in **BMVC 2022**: British Machine Vision Conference

[C3] DASO: Distribution-Aware Semantics-Oriented Pseudo-Label for Imbalanced Semi-Supervised Learning
Youngtaek Oh, Dong-Jin Kim, In So Kweon
in **CVPR 2022**: IEEE/CVF Conference on Computer Vision and Pattern Recognition
Finalist, Qualcomm Inovation Fellowship Korea

[C2] KSL-Guide: A Large-scale Korean Sign Language Dataset Including Interrogative Sentences for Guiding the Deaf and Hard-of-Hearing
Soomin Ham, Kibaek Park, Youngjoon Jang, **Youngtaek Oh**, Seokmin Yun, Sukwon Yoon, Chang Jo Kim, Han-Mu Park, In So Kweon
in **FG 2021**: IEEE International Conference on Automatic Face and Gesture Recognition

[C1] SideGuide: A Large-scale Sidewalk Dataset for Guiding Impaired People
Kibaek Park*, **Youngtaek Oh***, Soomin Ham*, Kyungdon Joo*, Hyokyoung Kim, Hyoyoung Kum, In So Kweon
in **IROS 2020**: International Conference on Intelligent Robots and Systems

Work Experience

Research Intern Sep. 2023 – Feb. 2024
LG AI Research Seoul, South Korea
- Worked on vision-language compositionality; Outcome: Paper [W2] and Software [S3]

Graduated Researcher Mar. 2021 – Aug. 2021
Korea Advanced Institute of Science and Technology (KAIST) Daejeon, South Korea

Projects

Developing and Demonstrating Innovative Products Based on Public Demand Nov. 2021 – Present
funded by the Ministry of Science and ICT (MSIT), Korea
- Consortium: KAIST, Hanbat National University, Miru Systems, Hanulsoft, Datamaker, Daejeon Transportation
- Objective: Develop a real-time system for masking and unmasking personal information in public CCTV services.
- Role: Designed a deep steganography algorithm to conceal and reveal personal information (face and license plate).

Korean Sign Language Dataset for AI Interpretation May 2020 – Dec. 2020
funded by the National Information Society Agency (NIA), Korea
- Consortium: KAIST, Korea Association of the Deaf, Testworks, Korea Nazarene University, EQ4ALL
- Objective: Establish a large-scale Korean Sign Language dataset for real-world use in sign language recognition.
- Role: Developed a continuous sign language recognition model compatible with Korean Sign Language datasets.
- Outcome: **Publications** ([C2], [C4], [C5]), **dataset** (KSL-Guide, *available to Koreans only*)

Korean Sidewalk Image Dataset for AI Assistance to the Visually Impaired May 2019 – Dec. 2019
funded by the National Information Society Agency (NIA), Korea
- Consortium: KAIST, Korea Spinal Cord Injury Association, Testworks, SelectStar, DTWORESOURCE
- Objective: Construct a dataset for sidewalk environments to enhance mobility rights for individuals with disabilities.
- Role: Designed the sidewalk obstacle dataset and validated it using object recognition models.
- Outcome: **Publications** ([C1]), **dataset** (SideGuide, *available upon request: application*)

Honors and Awards

Top 3% Recognition Certificates, ICASSP 2023 June 2023
Second place in the 2023 NICE Challenge at the NICE Workshop, CVPR 2023 ($5,000) May 2023
Finalist, Qualcomm Inovation Fellowship Korea Nov. 2022
Outstanding Reviewer Award, ECCV 2022 Oct. 2022
National Scholarship for Science and Engineering *(full tuition, merit-based)* Mar. 2017 – Feb. 2019

Softwares

Open-Sourced PyTorch Implementations

[S4] `fsc-clip`: Implementations of training CLIP models with hard negative captions, related to [W2], [C6].
- Supports training on 3 image-text datasets with unified evaluation using `vl_compo`.

[S3] `vl_compo`: A unified evaluation toolkit for compositional reasoning and multi-modal tasks, related to [W2], [C6].
- Incorporates a wide range of models and benchmarks for evaluation, continuously evolving to stay up-to-date.

[S2] `retriever`: An implementation of the second-place solution in the 2023 NICE Challenge, related to [W1].
- Enhances BLIP-2 with retrieval-augmented image captioning for world knowledge and specific details.

[S1] `daso`: A unified codebase for semi-supervised learning (SSL), related to [C3].
- Supports training of SSL algorithms, including techniques for class-imbalance.
- Integrates 6 base SSL algorithms and 4 class-imbalanced methods within a single codebase.

Acedemic Services

Conference Reviewer
- Conference on Computer Vision and Pattern Recognition (**CVPR**): 2022 – 2024
- European Conference on Computer Vision (**ECCV**): 2022 (Outstanding), 2024
- International Conference on Computer Vision (**ICCV**): 2023
- Conference on Neural Information Processing Systems (**NeurIPS**): 2023, 2024
- International Conference on Learning Representations (**ICLR**): 2024, 2025
- Winter Conference on Applications of Computer Vision (**WACV**): 2024, 2025
- International Conference on Acoustics, Speech, and Signal Processing (**ICASSP**): 2024, 2025
- AAAI Conference on Artificial Intelligence (**AAAI**): 2025

Journal Reviewer
- International Journal of Computer Vision (**IJCV**): 2024

Teaching Experience

Teaching Assistant (TA) at EE, KAIST
- EE735: Computer Vision (Fall, 2020)
- EE898: Advanced Topics in Deep Learning for Robotics and Computer Vision (Spring, 2020)
- EE405: Electronics Design Lab (Fall, 2019)

References

Prof. In So Kweon: M.S. Advisor and Ph.D. Co-Advisor
- Affiliation: School of Electrical Engineering, KAIST
- Email: iskweon77@kaist.ac.kr

Prof. Junmo Kim: Ph.D. Co-Advisor
- Affiliation: School of Electrical Engineering, KAIST
- Email: junmo.kim@kaist.ac.kr

Dr. Pyungwhan Ahn: Internship Mentor
- Affiliation: Multimodal Lab, LG AI Research
- Email: p.ahn@lgresearch.ai

Prof. Dong-Jin Kim: Collaborator
- Affiliation: Department of {Data Science, Computer Science, Artificial Intelligence}, Hanyang University
- Email: djdkim@hanyang.ac.kr

Prof. Jae Won Cho: Collaborator
- Affiliation: Department of Artificial Intelligence and Data Science, Sejong University
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