Sangmin **Woo**

Ph.D. Candidate in EE @ KAIST

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Glad to meet you! My name is Sangmin Woo. I am currently pursuing a Ph.D. degree in Electrical Engineering at the Korea Advanced Institute of Science and Technology (KAIST). In 2021, I completed an M.S. degree in Electrical Engineering and Computer Science from the Gwangju Institute of Science and Technology (GIST), after obtaining a B.S. degree in Electrical Engineering from Kyungpook National University in 2019. I thrive on creative challenges and enjoy building strong relationships along the way. Explore my history below, and contact me directly to learn more.

Research Interest

My research seeks to bridge the gap between machine perception and human-level understanding by leveraging the potential of **multi-modal** integration. I believe that our perception of the world is inherently **multi-modal**, with vision playing a crucial role in shaping our understanding of the environment. I strive to contribute to the advancement of intelligent systems that can effectively interpret and reason about **multi-modal** data with greater accuracy and efficiency.

My work explores the following, but not limited to:

- Design effective perception/recognition frameworks with multi-modal information: Vision + X ∈ {Language, Audio, Sketch, Graph, *etc.*}.
- Develop algorithms to increase the utility of multi-modal models in a variety of real-world scenarios.

Publication

INTERNATIONAL JOURNAL

[J7] What and When to Look?: Temporal Span Proposal Network for Video Relation Detection *2023*

EXPERT SYSTEMS WITH APPLICATIONS (**ESWA**) (**IF: 8.665**) *Under Review*

Sangmin Woo, Junhyug Noh, Kangil Kim

[J6] Modality Mixer Exploiting Complementary Information for Multi-modal Action Recognition *2023*

IEEE TRANSACTIONS ON IMAGE PROCESSING (**TIP**) (**IF: 11.041**) *Under Review*

Sumin Lee, **Sangmin Woo**, Yeonju Park, Muhammad Adi Nugroho, Changick Kim

[J5] Explore-And-Match: Bridging Proposal-Based and Proposal-Free with Transformer for Sentence Grounding in Videos *2023*

INTERNATIONAL JOURNAL OF COMPUTER VISION (**IJCV**) (**IF: 13.369**) *Under Review After Revision*

Sangmin Woo, Jinyoung Park, Inyong Koo, Sumin Lee, Minki Jeong, Changick Kim

[J4] Cross-Modal Alignment and Translation for Missing Modality Action Recognition *2023*

COMPUTER VISION AND IMAGE UNDERSTANDING (**CVIU**) (**IF: 4.886**)

Yeonju Park, **Sangmin Woo**, Sumin Lee, Muhammad Adi Nugroho, Changick Kim

[J3] Tackling the Challenges in Scene Graph Generation with Local-to-Global Interactions *2022*

IEEE TRANSACTIONS ON NEURAL NETWORKS AND LEARNING SYSTEMS (**TNNLS**) (**IF: 14.255**)

Sangmin Woo, Junhyug Noh, Kangil Kim

[J2] Impact of Sentence Representation Matching in Neural Machine Translation *2022*

APPLIED SCIENCES (**IF: 2.838**)

Heeseung Jung, Kangil Kim, Jong-Hun Shin, Seung-Hoon Na, SangKeun Jung, **Sangmin Woo**

[J1] Revisiting Dropout: Escaping Pressure for Training Neural Networks with Multiple Costs

2021

Electronics (**IF: 2.690**)

Sangmin Woo, Kangil Kim, Junhyug Noh, Jong-Hun Shin, Seung-Hoon Na

INTERNATIONAL CONFERENCE

[C8] Denoising Task Routing for Diffusion Models

2023

International Conference of Learning Representation (**ICLR**) (**H-index: 286**)

Under Review

Byeongjun Park*, **Sangmin Woo***, Hyojun Go*, Jinyoung Kim*, Changick Kim

[C7] Sketch-based Video Object Localization

2023

IEEE Winter Conference on Applications of Computer Vision (**WACV**) (**H-index: 76**)

Under Review

Sangmin Woo, Soyeong Jeon, Jinyoung Park, Minji Son, Sumin Lee, Changick Kim

[C6] AHFu-Net: Align, Hallucinate, and Fuse Network for Missing Multimodal Action Recognition

2023

IEEE International Conference on Visual Communications and Image Processing (**VCIP**)

Muhammad Adi Nugroho, **Sangmin Woo**, Sumin Lee, Changick Kim

[C5] Exploiting 3D Structure for Multimodal Group Activity Recognition

2023

IEEE International Conference on Visual Communications and Image Processing (**VCIP**)

Donguk Kim, Jinyoung Park, Sumin Lee, Muhammad Adi Nugroho, **Sangmin Woo**, Changick Kim

[C4] Audio-Visual Glance Network for Efficient Video Recognition

2023

IEEE International Conference on Computer Vision (**ICCV**) (**H-index: 239**)

Muhammad Adi Nugroho, **Sangmin Woo**, Sumin Lee, Changick Kim

[C3] Towards Good Practices for Missing Modality Robust Action Recognition

2023

AAAI conference on artificial intelligence (**AAAI**) (**H-index: 180**) (**Oral Presentation**)

Sangmin Woo, Sumin Lee, Yeonju Park, Muhammad Adi Nugroho, Changick Kim

[C2] Modality Mixer for Multi-modal Action Recognition

2023

IEEE Winter Conference on Applications of Computer Vision (**WACV**) (**H-index: 76**)

Sumin Lee, **Sangmin Woo**, Yeonju Park, Muhammad Adi Nugroho, Changick Kim

[C1] Temporal Flow Mask Attention for Open-Set Long-Tailed Recognition of Wild Animals in Camera-Trap Images

2022

IEEE International Conference on Image Processing (**ICIP**) (**H-index: 60**)

Jeongsoo Kim, **Sangmin Woo**, Byeongjun Park, Changick Kim

DOMESTIC CONFERENCE

[D2] On Learning Relations between Objects in Images

2022

Korea Institute of Military Service and Technology (**KIMST**)

Sangmin Woo, Changick Kim

[D1] Effective Trash Classification using Attentional Learning

2018

Korea Software Congress (**KSC**)

Sangmin Woo, Soon Ki Jung

Patent

Method and Appratus for Human Activity Recognition using Accelerometer and Gyroscope Sensors

2022

KR Patent Application: 10-2022-0094911

Changick Kim, Inyong Koo, Yeonju Park, Minki Jeong, Sumin Lee, **Sangmin Woo**

Method and Device for Inferring Dynamic Relationship between Objects in Video *2021*

KR Patent Application: 10-2021-0125704

Sangmin Woo, Kangil Kim

Scene Graph Generation Apparatus *2021*

KR Patent 10-2254-7680000

Sangmin Woo, Kangil Kim

Project

Image Query-based Video Object Localization *2023.02 present*

Center for Security Technology Research, KAIST

Center for Applied Research in Artificial Intelligence (CARAI), Phase 1 *2021.09 present*

Agency for Defense Development (ADD)

Development of Precise Content Identification Technology based on Relationship Analysis for Maritime Vessels/Structure *2021.09 2021.12*

Ministry of Science and ICT (MSIT)

Honors & Awards

2021 **Top Award ($ 10,000)**, LG Electronics Robot Contest *Seoul, Korea*
2019 **Excellence Award ($ 500)**, Creative Space G A.I&IoT Makerthon *Gwangju, Korea*

Academic Activity

I serve as a reviewer in the following journals and conferences.

AAAI Conference on Artificial Intelligence (AAAI)	2023, 2024
IEEE International Conference on Image Processing (ICIP)	2022, 2023
IEEE Transactions on Neural Networks and Learning Systems (TNNLS)	
IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)	
IEEE Access	

Research Experience

Computational Intelligence Lab @ KAIST *Daejeon, Korea*

Ph.D. (Advisor: Prof. Changick Kim) *Sep. 2021 - present*

Robot Vision Team @ NAVER LABS *Suwon, Korea*

Ph.D. (Advisor: Ph.D. Soonyong Park) *Apr. 2023 - Aug. 2023*

Intelligence Representation and Reasoning Lab @ GIST *Gwangju, Korea*

M.S. (Advisor: Prof. Kangil Kim) *Sep. 2019 - Aug. 2021*

Virtual Reality Lab @ Kyungpook National University *Daegu, Korea*

Undergraduate Research Intern (Advisor: Prof. Soon Ki Jung) *Jan. 2018 - Aug. 2019*

Education

Korea Advanced Institute of Science and Technology (KAIST)

Daejeon, Korea

Ph.D. in Electrical Engineering

Aug. 2021 - Present

Coursework: Computer Vision, Machine Learning, Graph Mining, Explainable AI

Gwangju Institute of Science and Technology (GIST)

Gwangju, Korea

M.S. in Electrical Engineering and Computer Science

Sep. 2019 - Aug. 2021

Coursework: Machine Learning and Deep Learning, Computer Vision, Natural Language Processing, Visual Recognition and Reasoning, Evolutionary AI, Algorithm

Kyungpook National University

Daegu, Korea

B.S. in Electrical Engineering (Minor in Computer Science and Engineering)

Mar. 2013 - Aug. 2019

Coursework: Data Mining, Multimedia Systems, Internet of Things, Data Structure, Algorithm, C Programming, Python Programming, JAVA Programming, Signal Processing, Random Process, Linear Algebra