

# JAEWOO LEE

Ph.D. Applicant @ Seoul, Korea  
AI Researcher

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## RESEARCH INTERESTS

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My goal is to promote AI democratization by developing resource-efficient multimodal models that make AI more accessible and interactive for anyone. Lowering resource barriers and enhancing language and multimodal understanding will broaden AI use for individuals and empower diverse groups to participate in AI development.

- **Multimodal:** Vision-Language, Audio-Visual, Interleaved modalities
- **Efficiency in data & algorithms:** Data selection, Continual learning, Curriculum learning ([empirical study](#))
- **Efficiency in architectures:** Mixture of Experts (MoE), Token reduction, Model Compression
- **Efficiency in systems:** Retrieval-Augmented Generation (RAG), Information retrieval
- **Interpretability:** Interpretable LLM and MLLM, Attribution methods

## EDUCATION

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### Korea Advanced Institute of Science and Technology (KAIST)

Seoul, South Korea

*Master of Science in Artificial Intelligence (GPA: 3.88/4.3)*

*Mar. 2023 – Aug. 2024*

- Advisor: Prof. Sung-Ju Hwang
- A half-year early graduation.
- Thesis: Efficient Training Techniques for Multimodal Learning

### Korea Advanced Institute of Science and Technology (KAIST)

Daejeon, South Korea

*Bachelor of Science in Electrical Engineering (GPA: 4.11/4.3)*

*Mar. 2020 – Feb. 2023*

- Summa Cum Laude.
- A one-year early graduation.
- **Selected Coursework:** Programming Structure, Data Structures and Algorithms, Engineering Random Processes, Introduction to Optimization Techniques, Information Theory, Deep learning for Computer Vision

## PUBLICATIONS

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\* denotes the equal contribution and ^denotes the equal advising

### [P1] Unified Multi-Modal Interleaved Document Representation for Information Retrieval

[Jaewoo Lee](#)\*, Joonho Ko\*, Jinheon Baek\*, Soyeong Jeong, Sung Ju Hwang

*Preprint (submitted to ICLR 2025)*

### [C3] Concept-skill Transferability-based Data Selection for Large Vision-Language Models

[Jaewoo Lee](#), Boyang Li<sup>^</sup>, Sung Ju Hwang<sup>^</sup>

*Conference on Empirical Methods in Natural Language Processing (EMNLP, 2024)*

### [C2] STELLA: Continual Audio-Video Pre-training with Spatio-Temporal Localized Alignment

[Jaewoo Lee](#)\*, Jaehong Yoon\*, Wonjae Kim, Yunji Kim, Sung Ju Hwang

*International Conference on Machine Learning (ICML, 2024)*

### [C1] Sound-based drone fault classification using multitask learning

Wonjun Yi, Jung-Woo Choi, [Jaewoo Lee](#)

*International Congress on Sound and Vibration (ICSV, 2023)*

RESEARCH EXPERIENCES

DeepAuto.ai

AI Researcher

Seoul, South Korea

Aug. 2024 - current

- Currently working on a layer-wise LLM compression approach to reduce deployment costs.

MLAI Lab-KAIST

Master’s Degree Student Researcher (Advisor: Sung Ju Hwang)

Seoul, South Korea

Mar. 2023 - Aug. 2024

- [P1] Suggested an information retrieval framework that uses a VLM to integrate interleaved multimodal content within a document into a unified document representation, improving retrieval abilities.
- [C3] Proposed a visual instruction tuning data selection method that uses a small model to group data into concept-skill clusters and selects data from each cluster, reducing time costs by 70%.
- [C2] Developed an audio-visual patch selection method that addresses dynamic multimodal semantics in continual pre-training, continuously adapting to new knowledge while reducing GPU memory consumption by 45%.

Smart Sound Systems Lab-KAIST

Undergraduate Student Researcher (Advisor: Jung-Woo Choi)

Daejeon, South Korea

Sep. 2021 - Jun. 2022

- [C1] Introduced a multitask learning approach and audio datasets ([link](#)) for UAV anomaly detection.

Urban Robotics Lab-KAIST

Undergraduate Student Researcher (Advisor: Hyun Myung)

Daejeon, South Korea

Jun. 2021 - Aug. 2021

- Worked on Simultaneous localization and mapping (SLAM) for autonomous navigation of self-driving cars.

ACADEMIC SERVICES

- **Reviewer:** NeurIPS Workshop on Continual Foundation Model 2024, ACL Rolling Review - 2024 October

AWARDS & HONORS

- **Summa Cum Laude Award** KAIST  
Graduated with highest honors and a 4.11/4.3 GPA. Feb. 2023
- **National Scholarship for Science & Engineering** Korea Student Aid Foundation  
Awarded for outstanding academics and potential impact in science and technology. Sep. 2022 - Feb. 2023
- **Encouragement Award for the Undergraduate Research Program** KAIST  
Earned a top ranking in the Undergraduate Research Program, competing against 65 teams. Aug. 2022
- **College of Engineering Dean’s List** KAIST  
Achieved within the top 3% of academic performance in the Electrical Engineering Department. Aug. 2022
- **School of Freshman Dean’s List** KAIST  
Achieved within the top 2% in academic excellence among Freshman. Aug. 2020

SKILLS

**Programming Ability** - Python, C, MATLAB, Pytorch, Tensorflow, Git, Linux, L<sup>A</sup>T<sub>E</sub>X, Markdown  
**Language Ability** - Native in **Korean**, Fluent in **English** (IBT TOEFL: 110)

EXTRACURRICULAR ACTIVITIES

LS Dream Science Class

Dec. 2019 - Feb. 2020

- Participated in a tutoring program for underprivileged students, teaching science for 6 hours a day for two months.

The Republic of Korea’s Army Sergeant

Feb. 2018 - Oct. 2019

- Served as a supply specialist in an armored battalion.
- Promoted to sergeant and corporal one month early, respectively, due to excellence in duty.