Kyuhan Lee

27, Teheran-ro 2-gil, Gangnam-gu, Seoul, 06241, Republic of Korea

+82 - 10 - 3132 - 7034 | kyuhan.lee@graphai.io | kyuhanlee.github.io/ | KyuhanLee

Education

Korea Advanced Institute of Science and Technology (KAIST) *Seoul, Korea*

Ph.D. in Artificial Intelligence *February 2025*

- Thesis: Clique-based Compression of Large Graphs
- Advisor: Prof. Kijung Shin

Hanyang University *Seoul, Korea*

Bachelor of Science in Computer Science, GPA: 4.14/4.5, Major GPA:4.21/4.5 (Summa Cum Laude) *February 2020*

- **National Science & Technology Scholarship, KOSAF** — *Full tuition exemptions for 8 semesters.*
- **Korea Advanced Institute of Science and Technology (KAIST)**, Daejeon, Korea — *Winter Session 2017, Summer Session 2018, Winter Session 2019*
- **University of California, Irvine**, Irvine, CA — *Summer Session 2017*

Publications

Accepted Papers

[C7] MARIOH: Multiplicity-Aware Hypergraph Reconstruction
In IEEE ICDE 2025
Kyuhan Lee, Geon Lee, and Kijung Shin

[J2] Inductive Influence Estimation and Maximization over Unseen Social Networks under Two Diffusion Models
In Data Mining and Knowledge Discovery
Jihoon Ko*, Seojeong Kim*, Kyuhan Lee, Shinhwan Kang, Dongyeong Hwang, Kijung Shin, and Noseong Park

[W1] Deep-Learning-Based Precipitation Nowcasting with Ground Weather Station Data and Radar Data
In IEEE ICDMW 2022
Jihoon Ko*, Kyuhan Lee*, Hyunjin Hwang, and Kijung Shin

[C6] Personalized Graph Summarization: Formulation, Scalable Algorithms, and Applications
In IEEE ICDE 2022
Shinwhan Kang, Kyuhan Lee, and Kijung Shin

[J1] Effective Training Strategies for Deep Learning-Based Precipitation Nowcasting and Estimation
In Computers & Geosciences
Jihoon Ko*, Kyuhan Lee*, Hyunjin Hwang*, Seok-Geun Oh, Seok-Woo Son, and Kijung Shin

[C5] Are Edge Weights in Summary Graphs Useful? - A Comparative Study
In PAKDD 2022
Shinwhan Kang, Kyuhan Lee, and Kijung Shin

[C4] SLUGGER: Lossless Hierarchical Summarization of Massive Graphs
In IEEE ICDE 2022
Kyuhan Lee*, Jihoon Ko*, and Kijung Shin

[C3] DPGS: Degree-Preserving Graph Summarization
In SIAM SDM 2021
Houquan Zhou, Shenghua Liu, Kyuhan Lee, Kijung Shin, Huawei Shen, and Xueqi Cheng

[C2] MONSTOR: An Inductive Approach for Estimating and Maximizing Influence over Unseen Social Networks
In IEEE/ACM ASONAM 2020
Jihoon Ko, Kyuhan Lee, Kijung Shin, and Noseong Park

[C1] SSumM: Sparse Summarization of Massive Graphs
In ACM KDD 2020
Kyuhan Lee*, Hyeonsoo Jo*, Jihoon Ko, Sungsu Lim, and Kijung Shin

Patents

Patents

[1] Method and System for Sparse Summarization of Massive Graphs
Korean Patent 10-2429040
Kyuhan Lee, Hyeonsoo Jo, Jihoon Ko, Sungsu Lim, and Kijung Shin

[2] Method and Apparatus for Effective Training for Deep Learning-based Precipitation Nowcasting and Estimation
Korean Patent 10-2767119
Jihoon Ko, Kyuhan Lee, Hyunjin Hwang, and Kijung Shin

[3] Method Computer Device, and Computer Program for Deep-Learning-Based Precipitation Nowcasting with Ground Weather Station Data and Radar Data
Korean Patent 10-2858175
Jihoon Ko, Kyuhan Lee, Hyunjin Hwang, and Kijung Shin

Pending Patents

[1] Method and System for Personalized Summarization Of Graphs
Korean Patent Application 10-2023-0037867
Shinwhan Kang, Kyuhan Lee, and Kijung Shin

Work Experience

GraphAI

Seoul, Korea

Principal Software Engineer — *Mar. 2025 – Current*

- Developed **OmniRAG**, a Plan-and-Execute–oriented RAG system combining hybrid search (Vector, BM25, Text-to-SQL) with self-reflective multi-step reasoning to support enterprise-scale decision intelligence.
- Architected **on-premise LLM serving pipelines** with vLLM, optimized for low latency (TTFT) and high throughput (QPS), and deployed monitoring dashboards using Prometheus/Grafana.
- Integrated **Vision-Language Models (VLMs)** to achieve state-of-the-art document parsing accuracy, demonstrating clear technical superiority in competitive PoC evaluations (e.g., Hanwha Ocean).
- Owned the entire product lifecycle: preprocessing pipelines, scalable RAG backend, and Vercel-based UI integration, establishing GraphAI's flagship AI solution.
- Business Achievements:
  - Secured **Hanwha Ocean PoC contract** (AI chatbot for process risk prediction) by leading demo and presentation; currently sole developer of production PoC.
  - Contributed to **Agency for Defense Development (ADD) project** with Hanwha Systems consortium, designing on-premise RAG systems for defense intelligence.
  - Won the **KT LLM Challenge** (Ministry of SMEs) with an RDB-aware agent for visualization report generation.
  - Initiated and leading ongoing collaboration with **Samsung SAIT** on a large-scale scientific RAG project (10M+ papers).

Research Experience

KAIST Data Mining Lab

Seoul, Korea

M.S. & Ph.D. Student, advised by Prof. Kijung Shin — *Mar. 2020 - Feb. 2025*

- Researched graph mining (graph summarization, hypergraph modeling, influence maximization) and precipitation nowcasting using spatiotemporal weather data
- Proposed SLUGGER and SSUMM, lossless and sparse graph summarization methods, published in top-tier conferences (e.g., ICDE, KDD)
- Designed MARIOH, a multiplicity-aware hypergraph reconstruction method, published in top-tier conference (e.g., ICDE)
- Co-developed DPGS and personalized graph summarization frameworks, with patented user-adaptive compression techniques
- Led nowcasting research using radar and station data, resulting in publications (e.g., ICDMW, Computers & Geosciences) and patents
- Co-authored 10+ papers and contributed to 4 patents (3 granted, 1 pending) in graph mining, influence modeling, and AI-based weather forecasting

Hanyang University

Seoul, Korea

Culminating Project, advised by Prof. Taehyun Kim — *Jan. 2019 - Nov. 2019*

- Developed a program that detects Fracture neck of femur by modifying DenseNet architecture

KAIST CS496(MAD Camp)

Daejeon, Korea

Camp Participant — *Dec. 2017 - Jan. 2018*

- Developed Android applications using Java
- Developed Web-pages using Node.js, and MongoDB
- Applied deep reinforcement learning to our own developed game
- Developed games using Unity and C#

Dutt Research Group *Irvine, CA*

Undergraduate Research Intern, advised by Prof. Bryan Donyanavard *Jun. 2017 - Aug. 2017*

- Evaluated NVIDIA Jetson TX2 board and Parallella board by modifying the operating speed
- Designed a benchmarking program that compares matrix multiplication between normal CPU(Zynq) and Parallella board
- Manipulated a matrix multiplication algorithm that highly supports parallel computing

Teaching Experience

KAIST AI503 Mathematics for AI *Seoul, Korea*

Teaching Assistant *FALL 2023*

KAIST AI617 Machine Learning for Robotics *Seoul, Korea*

Teaching Assistant *Spring 2022*

KAIST AI506 Data Mining and Search *Seoul, Korea*

Teaching Assistant *Spring 2021, 2023*

KAIST AI607 Graph Mining and Social Network Analysis *Seoul, Korea*

Teaching Assistant *Fall 2021, 2022, 2024*

Hanyang University GEN1031(Creative Computing for Engineers) *Seoul, Korea*

Teaching Assistant *Mar. 2019 - Jun. 2019*

- Undergraduate T.A

KAIST CS496(MAD Camp) *Daejeon, Korea*

Teaching Assistant *Jun. 2018 - July. 2018*

- Undergraduate T.A

Skills

Programming	Python, Java, C/C++, R, SQL, Bash
Machine Learning	PyTorch, TensorFlow, Hugging Face Transformers, vLLM, Fine-tuning (LoRA/PEFT, Continual Pre-training)
LLM & RAG	LangChain, Hybrid Retrieval (Vector DB, BM25, Text-to-SQL), Chroma, Milvus, Prompt Engineering, Agentic Design, VLMs
Data & Infra	Prometheus, Grafana, Docker, Kubernetes, MongoDB, Vercel, AWS, On-premise deployment
Other	Git/GitHub, LaTeX, Korean (mother tongue)

Additional Information

YEHS (Young Engineers Honor Society, The National Academy of Engineering of Korea)

Vice President *Dec. 2018 - Dec. 2019*

- Managed YEHS Strategy & Planning 3 Dpt