Kyuhan Lee

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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

[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

Pending Patents

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

[2] Method Computer Device, and Computer Program for Deep-Learning-Based Precipitation Nowcasting with Ground Weather Station Data and Radar Data
Korean Patent Application 10-2022-0136274
Jihoon Ko, Kyuhan Lee, Hyunjin Hwang, and Kijung Shin

Research Experience

KAIST Data Mining Lab — *Seoul, Korea*
M.S. & Ph.D. Student, advised by Prof. Kijung Shin — *Mar. 2020 - Current*
- Developing scalable algorithms for analyzing large-scale graphs
- Developing deep-learning based precipitation nowcasting algorithms funded by National Institute of Meteorological Sciences, Republic of Korea

KAIST Data Mining Lab — *Daejeon, Korea*
Undergraduate Research Intern, advised by Prof. Kijung Shin — *Jun. 2019 - Feb. 2020*
- Developed lossy graph summarization algorithm, SSumM
- Developed an inductive approach for estimating and maximizing influence over unseen social networks, MONSTOR

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

Languages Korean (mother tongue), English (fluent) - TOEIC 965

Computer Skills Working knowledge of various computer languages such as Python, Java, R, and C/C++
Proficient with Pytorch and Tensorflow

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