GEON LEE

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RESEARCH INTERESTS

Data Mining, Graph Neural Networks, Recommender Systems, Time Series Analysis, and More

EDUCATION

Korea Advanced Institute of Science and Technology (KAIST)　　Seoul, South Korea
M.S. & Ph.D. in Artificial Intelligence　　Sep. 2020 –
Advisor: Kijung Shin

Sungkyunkwan University (SKKU)　　Suwon, South Korea
B.S. in Computer Science and Engineering　　Mar. 2016 – Aug. 2019
GPA: 4.41/4.50; C.S.: 4.45/4.50 (Ranked 1st in the College of CSE)

WORK EXPERIENCE

Snap Research　　Bellevue, WA, USA
Research Intern　　April 2025 – June 2025
Mentors: Liam Collins, Clark Ju, Bhuvesh Kumar, Tong Zhao / Manager: Neil Shah

NEC Labs America　　Princeton, NJ, USA
Research Intern　　May 2023 – Aug. 2023
Mentor: Wenchao Yu / Manager: Haifeng Chen

Amazon　　San Francisco, CA, USA
Applied Scientist Intern　　Sep. 2022 – Dec. 2022
Mentor: Zhonghao Luo / Manager: Tao Ye

AWARDS AND HONORS

Best Survey Paper of PAKDD 2025	June 2025
Outstanding Reviewer of KDD 2025	Dec. 2024
KAIST Outstanding Paper Award	Nov. 2024
Best Short Paper Candidates of RecSys 2024	Oct. 2024
One of the Best-Ranked Papers of ICDM 2021	Dec. 2021
Sungkyunkwan Presidential Award	Aug. 2019
Sungkyunkwan Software Scholarship (Full tuition scholarship)	2016 – 2019

TUTORIALS

[1] Mining of Real-World Hypergraphs: Patterns, Tools, and Generators
<u>Geon Lee</u>, Jaemin Yoo, and Kijung Shin
KDD 2023 & **WWW 2023** & **ICDM 2022** & **CIKM 2022**

PUBLICATIONS

[1] Revisiting LightGCN: Unexpected Inflexibility, Inconsistency, and
A Remedy Towards Improved Recommendation
<u>Geon Lee</u>, Kyungho Kim, Fanchen Bu, Langzhang Liang, and Kijung Shin
Transactions on Recommender Systems (SCIE Journal, 2025)

[2] SkySearch: Satellite Video Search at Scale
Minyoung Choe*, <u>Geon Lee*</u>, Changhun Han*, Suji Kim, Woong Hu, Hyebeen Hwang, Park Geun-seok, Byeongyeon Kim, Hyesook Lee, Ha-Myung Park, Kijung Shin (* equal contribution)
KDD 2025 (Applied Data Science)

[3] KGMEL: Knowledge Graph-Enhanced Multimodal Entity Linking
Juyeon Kim, <u>Geon Lee</u>, Taeuk Kim, and Kijung Shin
SIGIR 2025 (Short Paper)

[4] MARIOH: Multiplicity-Aware Hypergraph Reconstruction
Kyuhan Lee, <u>Geon Lee</u>, and Kijung Shin
ICDE 2025

[5] A Survey on Hypergraph Mining: Patterns, Tools, and Generators
<u>Geon Lee*</u>, Fanchen Bu*, Tina Eliassi-Rad, and Kijung Shin (* equal contribution)
ACM Computing Surveys (SCI Journal, 2025)

[6] Multi-Behavior Recommender Systems: A Survey
Kyungho Kim, Sunwoo Kim, <u>Geon Lee</u>, Jinhong Jung, and Kijung Shin
PAKDD 2025 (Survey Paper)
Received the Best Survey Paper Award of PAKDD 2025

[7] Beyond Neighbors: Distance-Generalized Graphlets for Enhanced Graph Characterization
Yeongho Kim, Yuyeong Kim, <u>Geon Lee</u>, and Kijung Shin
WWW 2025

[8] TimeCAP: Learning to Contextualize, Augment, and Predict Time Series Events
with Large Language Model Agents
<u>Geon Lee</u>, Wenchao Yu, Kijung Shin, Wei Cheng, and Haifeng Chen
AAAI 2025

[9] Resource2Box: Learning to Rank Resources in Distributed Search Using Box Embedding
Ulugbek Ergashev, <u>Geon Lee</u>, Kijung Shin, Eduard Dragut, and Weiyi Meng
ICDM 2024

[10] Revisiting LightGCN: Unexpected Inflexibility, Inconsistency, and
A Remedy Towards Improved Recommendation
<u>Geon Lee</u>, Kyungho Kim, and Kijung Shin
RecSys 2024 (Short Paper)
Selected as One of the Best Short Paper Candidates of RecSys 2024

[11] Post-Training Embedding Enhancement for Long-Tail Recommendation
<u>Geon Lee</u>, Kyungho Kim, and Kijung Shin
CIKM 2024 (Short Paper)

[12] Towards Better Utilization of Multiple Views for Bundle Recommendation
Kyungho Kim, Sunwoo Kim, <u>Geon Lee</u>, and Kijung Shin
CIKM 2024 (Short Paper)

[13] Representative and Back-in-Time Sampling from Real-world Hypergraphs
Minyoung Choe, Jaemin Yoo, <u>Geon Lee</u>, Woonsung Baek, U Kang, and Kijung Shin

Transaction on Knowledge Discovery from Data (SCIE Journal, 2024)

[14] VilLain: Self-Supervised Learning on Homogeneous Hypergraphs without Features
via Virtual Label Propagation
<u>Geon Lee</u>, Soo Yong Lee, and Kijung Shin
WWW 2024

[15] Hypergraph Motifs and Their Extensions Beyond Binary
<u>Geon Lee</u>*, Seokbum Yoon*, Jihoon Ko, Hyunju Kim, and Kijung Shin (* equal contribution)
The VLDB Journal (SCI Journal, 2023)

[16] Random Walk with Restart on Hypergraphs:
Fast Computation and an Application to Anomaly Detection
Jaewan Chun, <u>Geon Lee</u>, Kijung Shin, and Jinhong Jung
Data Mining and Knowledge Discovery (SCI Journal, 2023)

[17] Hypercore Decomposition for Non-Fragile Hyperedges:
Concepts, Algorithms, Observations, and Applications
Fanchen Bu, <u>Geon Lee</u>, and Kijung Shin
Data Mining and Knowledge Discovery (SCI Journal, 2023)

[18] Temporal Hypergraph Motifs
<u>Geon Lee</u> and Kijung Shin
Knowledge and Information Systems (SCIE Journal, 2023)

[19] Set2Box: Similarity Preserving Representation Learning for Sets
<u>Geon Lee</u>, Chanyoung Park, and Kijung Shin
ICDM 2022

[20] HashNWalk: Hash and Random Walk Based Anomaly Detection in Hyperedge Streams
<u>Geon Lee</u>, Minyoung Choe, and Kijung Shin
IJCAI 2022

[21] MiDaS: Representative Sampling from Real-World Hypergraphs
Minyoung Choe, Jaemin Yoo, <u>Geon Lee</u>, Woonsung Baek, U Kang, and Kijung Shin
WWW 2022

[22] Simple Epidemic Models with Segmentation Can Be Better than Complex Ones
<u>Geon Lee</u>, Se-eun Yoon, and Kijung Shin
PLOS ONE (SCIE Journal, 2022)
Oral presentation at epiDAMIK workshop in KDD 2021

[23] THyMe+: Temporal Hypergraph Motifs and Fast Algorithms for Exact Counting
<u>Geon Lee</u> and Kijung Shin
ICDM 2021
Selected as One of the Best-Ranked Papers of ICDM 2021

[24] How Do Hyperedges Overlap in Real-World Hypergraphs? - Patterns, Measures, and Generators
<u>Geon Lee</u>*, Minyoung Choe*, and Kijung Shin (* equal contribution)
WWW 2021

[25] Hypergraph Motifs: Concepts, Algorithms, and Discoveries
<u>Geon Lee</u>, Jihoon Ko, and Kijung Shin
VLDB 2020

[26] MEGA: Multi-View Semi-Supervised Clustering of Hypergraphs
Joyce Jiyoung Whang, Rundong Du, Sangwon Jung, <u>Geon Lee</u>, Barry Drake, Qingqing Liu, Seonggoo

Kang, and Haesun Park
VLDB 2020

[27] Hyperlink Classification via Structured Graph Embedding
<u>Geon Lee</u>, Seonggoo Kang, and Joyce Jiyoung Whang
SIGIR 2019 (Short Paper)

ACADEMIC SERVICES

Program Committee/Conference Reviewer

- AAAI Conference on Artificial Intelligence (AAAI)   2024 - 2026
- The Web Conference (WWW)   2024 - 2025
- Conference on Neural Information Processing Systems (NeurIPS)   2024 - 2025
- ACM Conference on Knowledge Discovery and Data Mining (KDD)   2023 - 2026
- ACM International Conference on Information and Knowledge Management (CIKM)   2022 - 2025
- Learning on Graphs Conference (LoG)   2022 - 2024
- The ACM Conference on Recommender Systems (RecSys)   2025
- International Conference on Learning Representations (ICLR)   2025
- International Conference on Artificial Intelligence and Statistics (AISTATS)   2025
- International Conference on Machine Learning (ICML)   2025
- Asian Conference on Machine Learning (ACML)   2025
- SIAM International Conference on Data Mining (SDM)   2024

Journal Reviewer

- Information Sciences   2024 - 2025
- PLOS ONE   2024 - 2025
- Data Mining and Knowledge Discovery   2024 - 2025
- IEEE Transactions on Neural Networks and Learning Systems (TNNLS)   2023 - 2025
- The VLDB Journal   2023 - 2025
- IEEE Transactions on Knowledge and Data Engineering (TKDE)   2023 - 2024
- ACM Transactions on Information Systems (TOIS)   2025
- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)   2025
- Information Processing and Management   2025
- The Journal of Supercomputing   2025
- Machine Learning   2025
- IEEE Transactions on Network Science and Engineering (TNSE)   2024
- Big Data Research   2024

Session Chair

- ACM International Conference on Information and Knowledge Management (CIKM)   2024

PROJECTS

SW Star Lab	Feb. 2025 –
AI-based Weather Forecast Support Development	July 2021 – Dec. 2024
COVID-19 Task Force	Mar. 2020 – Sep. 2020

TEACHING

Teaching Assistant

- KAIST AI506 Data Mining and Search   Spring 2021, 2023
- KAIST AI607 Graph Mining and Social Network Analysis   Fall 2020, 2021, 2022, 2023
- KAIST AI617 Machine Learning for Robotics   Spring 2022
- SKKU CSE3036 Seminar in Computer Engineering   Fall 2019

Tutorial Tutor

- Mining of Real-World Hypergraphs: Patterns, Tools, and Generators
  CIKM 2022, ICDM 2022, WWW 2023, KDD 2023