

DAVID Y. KANG

Postdoctoral Researcher @ UMich

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RESEARCH INTERESTS

My primary research interests lie in data mining and machine learning applied to diverse graph data types (*e.g.*, *conventional*, *signed*, and *hypergraph* structures), with a particular emphasis on uncovering knowledge from real-world networks.

- **Conventional Graph:** Community detection (CIKM'20, KBS'22)
- **Signed Graph:** Community detection (ICDM'21, TKDE'23); Representation learning (TKDD'24°)
- **Hypergraph:** Representation learning (TKDE'23°); Hypergraph analysis (WWW'24) (°: *Under Review*)

EDUCATION

Hanyang University, Seoul, South Korea Sep. 2013 – Feb. 2022

- *Ph.D. in Computer Science*
 - Thesis: Graph Reinforcement for Accurate Community Detection and Embedding on Graphs and Hypergraphs
 - Advisor: Prof. Sang-Wook Kim
 - Received the **Outstanding Ph.D. Dissertation Award** from the Research Institute of Industrial Science, HYU

Hanyang University, Seoul, South Korea Mar. 2007 – Feb. 2013

- *B.S. in Computer Science*

RESEARCH EXPERIENCES

University of Michigan, Ann Arbor, MI, USA May. 2022 – Present

- *Postdoctoral Researcher, School of Information*
 - Topic: Data Mining on Large-Scale Hypergraph
 - Advisor: Prof. Qiaozhu Mei

The Pennsylvania State University, University Park, PA, USA Oct. 2019 – Feb. 2020

- *Visiting Scholar, College of Information Sciences and Technology*
 - Topic: Improving the Accuracy of Community Detection
 - Advisor: Prof. Dongwon Lee

AWARDS & HONORS

Received the **Best Paper Award in Samsung Research Project** 2022

- Samsung Electronics Co., Ltd.

Received the **Outstanding Ph.D. Dissertation Award** 2022

- Research Institute of Industrial Science, Hanyang University

Awarded the **NAVER Ph.D. Fellowship** 2021

- Naver Corporation

Received the **ACM SIGIR Student Travel Award** 2020

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

Received the **ACM SIGIR Student Travel Award** 2017

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

Received the **ACM SIGAPP Student Travel Award** 2016

- ACM Symposium on Applied Computing (ACM SAC)

Awarded the **NHN&HYU Ph.D. Fellowship** 2015

- NHN Corporation

Conference/Journal Awards

- **Best Paper Awards:** KIPS Spring Confernece (2021), IEEE IC-NIDC (2014)

Preprinted and On-going Papers (* indicates equal contributions)

- [2] Trustworthiness-Driven Graph Convolutional Networks for Signed Network Embedding
Min-Jeong Kim*, Yeon-Chang Lee*, David Y. Kang, and Sang-Wook Kim
arXiv:2309.00816, 2023
Under Review at the ACM Transactions on Knowledge Discovery from Data
- [1] STARGCN: Hypergraph Convolutional Networks on Star Expansion for Effective Representation Learning
David Y. Kang, Eujeanne Kim, Kyungsik Han, and Sang-Wook Kim
Under Review at the IEEE Transactions on Knowledge and Data Engineering

International Conference and Journal Papers

- [12] Low Mileage, High Fidelity: Evaluating Hypergraph Expansion Methods by Quantifying the Information Loss
David Y. Kang, Qiaozhu Mei, and Sang-Wook Kim
WWW 2024 (*The ACM Web Conference*)
Full Paper (Acceptance Rate $\approx 20\%$)
Selected for Oral Presentation
One of the BK21 CS Conferences (IF=4)
- [11] A Framework for Accurate Community Detection on Signed Networks Using Adversarial Learning
David Y. Kang, Woncheol Lee, Yeon-Chang Lee, Kyungsik Han, and Sang-Wook Kim
IEEE Transactions on Knowledge and Data Engineering (Top 5% SCIE Journal, 2023)
- [10] Community Reinforcement: An Effective and Efficient Preprocessing Method for Accurate Community Detection
Yoonsuk Kang, Jun-Seok Lee, Won-Yong Shin, and Sang-Wook Kim
Knowledge-Based Systems (Top 10% SCIE Journal, 2022)
- [9] Adversarial Learning of Balanced Triangles for Accurate Community Detection on Signed Networks
Yoonsuk Kang*, Woncheol Lee*, Yeon-Chang Lee, Kyungsik Han, and Sang-Wook Kim
ICDM 2021 (*The IEEE International Conference on Data Mining*)
Short Paper (Acceptance Rate $\approx 20\%$)
One of the BK21 CS Conferences (IF=3)
- [8] FORESEE: An Effective and Efficient Framework for Estimating the Execution Times of IO Traces on the SSD
Yoonsuk Kang, Yong-Yeon Jo, Jaehyuk Cha, Wan D. Bae, Wonjun Lee, and Sang-Wook Kim
IEEE Transactions on Computers (SCIE Journal, 2021)
- [7] CR-Graph: Community Reinforcement for Accurate Community Detection
Yoonsuk Kang, Jun-Seok Lee, Won-Yong Shin, and Sang-Wook Kim
CIKM 2020 (*The ACM International Conference on Information and Knowledge Management*)
Short Paper (Acceptance Rate $\approx 25\%$)
One of the BK21 CS Conferences (IF=3)
- [6] A Framework for Estimating Execution Times of IO Traces on SSDs
Yoonsuk Kang, Yong-Yeon Jo, Jaehyuk Cha, Wan. D. Bae, and Sang-Wook Kim
CIKM 2017 (*The ACM International Conference on Information and Knowledge Management*)
Short Paper (Acceptance Rate $\approx 28\%$)
One of the BK21 CS Conferences (IF=3)
- [5] The uFLIP Benchmark Revisited for Evaluating SSDs
Yoonsuk Kang, Yong-Yeon Jo, Jaehyuk Cha, Sang-Wook Kim, and Young Kyun Shin
International Journal of Communication Systems (SCIE Journal, 2016)

- [4] A Methodology for Estimating Execution Times of IO Traces in SSDs
Yoonsuk Kang
SAC 2016 (*The ACM Symposium on Applied Computing*)
One of the BK21 CS Conferences (IF=1)
- [3] Exploiting the uFLIP Benchmark for Analyzing SSDs Performance
Yoonsuk Kang, Yong-Yeon Jo, Jaehyuk Cha, Sang-Wook Kim, and Young Kyun Shin
IC-NIDC 2014 (*IEEE International Conference on Network Infrastructure and Digital Content*)
Received the Best Paper Award
- [2] Running Data Mining Algorithms on SSDs
Yoonsuk Kang, Yong-Yeon Jo, Duck-Ho Bae, and Sang-Wook Kim
EDB 2013 (*International Conference on Emerging Databases-Technologies, Applications, and Theory*)
- [1] Selecting Similar Users in Collaborative Filtering
Sang-Chul Lee, Yoonsuk Kang, Seihyun Jeong, Min-Hee Jang, Young-Sup Hwang, and Sang-Wook Kim
ICGHIT 2013 (*International Conference on Green and Human Information Technology*)

Domestic Conference and Journal Papers

- [11] CoAID+: COVID-19 News Cascade Dataset for Social Context Based Fake News Detection
Soeun Han, Yoonsuk Kang, Yunyong Ko, Jiwon Ahn, Yusim Kim, Seongsu Oh, Heejin Park,
 and Sang-Wook Kim
KIPS Transactions on Software and Data Engineering (KCI Journal, 2022)
- [10] COVID-19 Cascade Dataset for Fake News Detection
Soeun Han, Yoonsuk Kang, Yunyong Ko, Jiwon Ahn, Yusim Kim, Seongsu Oh, Heejin Park,
 and Sang-Wook Kim
KIPS Spring Conference 2021 (*Received the Best Paper Award*)
- [9] A Preprocessing Method for Accurate Link Prediction on Social Networks
Seungbeom Son, Yeonsuk Choi, Yoonsuk Kang, and Sang-Wook Kim
KIPS Fall Conference 2020
- [8] Performance Comparison of Similarity-Based Link Prediction in Social Networks
Jun-Seok Lee, Yoonsuk Kang, and Sang-Wook Kim
KCC 2019 (*Korea Computer Congress*)
- [7] Performance Comparison of Community Detection Algorithms in Social Networks
Jun-Seok Lee, Yoonsuk Kang, and Sang-Wook Kim
KCC 2018 (*Korea Computer Congress*)
- [6] A Method for Analyzing Features that Affect the Performance of SSD
Yoonsuk Kang, Yong-Yeon Jo, and Sang-Wook Kim
KIPS Spring Conference 2018
- [5] Community Detection by Sub-Community and CScan
Chunghyeon Cho, Gunjoo Ahn, Yoonsuk Kang, Jiwon Hong, and Sang-Wook Kim
KDBC 2018 (*Korean DataBase Conference*)
- [4] A Methodology for Estimating Execution Times of IO Traces on SSDs
Yoonsuk Kang, Yong-Yeon Jo, Jaehyuk Cha, Wan D. Bae, and Sang-Wook Kim
KCC 2017 (*Korea Computer Congress*)

	<p>[3] Analyzing the Performance of SSDs in OLTP Environment Seoung-Hun Jeong, Jae-Sung Lee, <u>Yoonsuk Kang</u>, Yong-Yeon Jo, Duck-Ho Bae, Sang-Wook Kim, Juyoung Kang, and Jahyuk Cha KIISE Fall Conference 2013</p> <p>[2] Analysis on I/O Trace Replayer for SSD Performance Evaluation Inhyuk Yee, Kyuhwan Lee, <u>Yoonsuk Kang</u>, Yong-Yeon Jo, and Sang-Wook Kim KIPS Fall Conference 2013</p> <p>[2] Analysis on I/O Trace Replayer for SSD Performance Evaluation Inhyuk Yee, Kyuhwan Lee, <u>Yoonsuk Kang</u>, Yong-Yeon Jo, and Sang-Wook Kim KIPS Fall Conference 2013</p> <p>[1] A Method for Selecting Similar Users for Collaborative Filtering <u>Yoonsuk Kang</u>, Seihyun Jeong, Sang-Chul Lee, Min-Hee Jang, Sang-Wook Kim KIPS Fall Conference 2012</p>
INVITED TALKS	<p>Adversarial Learning of Balanced Triangles for Accurate Community Detection on Signed Networks</p> <ul style="list-style-type: none"> Invited Talk @ METU-HYU Joint Workshop, Dec. 2022 <p>FORESEE: An Effective and Efficient Framework for Estimating the Execution Times of IO Traces on SSDs</p> <ul style="list-style-type: none"> Invited Talk @ Waseda-UMS-Hanyang-UKM (WUHU) Joint Workshop, Dec. 2017
PROFESSIONAL SERVICES	<p>Program Committee Member</p> <ul style="list-style-type: none"> The ACM Symposium on Applied Computing (SAC) 2023, 2024 <p>Conference Reviewer</p> <ul style="list-style-type: none"> The ACM Conference on Research and Development in Information Retrieval (SIGIR) 2024 The ACM Web Conference (WWW) 2023, 2024 The ACM Conference on Knowledge Discovery and Data Mining (KDD) 2021 – 2024 The IEEE International Conference on Data Mining (ICDM) 2022, 2023 The IEEE International Conference on Information and Knowledge Management (CIKM) 2019, 2020 The ACM Symposium on Applied Computing (SAC) 2023, 2024 The International AAAI Conference on Web and Social Media (ICWSM) 2017 <p>Journal Reviewer</p> <ul style="list-style-type: none"> The Journal of Supercomputing 2023
PATENTS	<p>Granted Patents</p> <ul style="list-style-type: none"> Method for Reconfiguration of a Community in a Network Including a Plurality of Networks and an Electronic Device for the Method Registration Number: KR10-2409160 Jun. 2022 A Feature Extraction Apparatus and Method for Predicting the Execution time of the Query Input and Output Trace Registration Number: KR10-2249832 May 2021 A SSD Performance Evaluation Apparatus and Method for Predicting the Execution time of the Query Input and Output Trace Registration Number: KR10-1950801 Feb. 2019 Method for Selecting Similar Users for Collaborative Filtering Based on Earth Mover's Distance Registration Number: KR10-1620659 May 2016

Filed Patents

- Method and System for Measuring the Amount of Information Loss of a Graph Obtained Through a Hypergraph Expansion Method
Application Number: **KR10-2023-0109155** Aug. 2023
- Hypergraph Embedding Method and Systems Based on Graph Convolutional Networks Considering Relationships of Multiple-users
Application Number: **KR10-2023-0065477** May 2023
- Adversarial Learning of Balanced Triangles for Accurate Community Detection on Signed Networks
Application Number: **KR10-2021-0110736** Aug. 2021

REFERENCES

- Qiaozhu Mei**, *Professor* (Postdoc. Advisor) qmei@umich.edu
School of Information, University of Michigan
- Sang-Wook Kim**, *Professor* (Ph.D. Advisor) wook@hanyang.ac.kr
Department of Computer Science, Hanyang University
- Kyungsik Han**, *Associate Professor* (Collaborator) kyungsikhan@hanyang.ac.kr
Department of Data Science, Hanyang University
- Wan D. Bae**, *Professor* (Collaborator) baew@seattleu.edu
Department of Computer Science, Seattle University
- Dongwon Lee**, *Professor* (Visiting Scholar Advisor) dongwon@psu.edu
College of Information Sciences and Technology, The Pennsylvania State University