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)

PUBLICATIONS

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%)

[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%)

[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%)

[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%)

[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*)

[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*)

[3] Anaylzing the Performance of SSDs in OLTP Environment
Seoung-Hun Jeong, Jae-Sung Lee, Yoonsuk Kang, Yong-Yeon Jo, Duck-Ho Bae, Sang-Wook Kim, Juyoung Kang, and Jahyuk Cha
KIISE Fall Conference 2013

[2] Analysis on I/O Trace Replayer for SSD Performance Evaluation
Inhyuk Yee, Kyuhwan Lee, Yoonsuk Kang, Yong-Yeon Jo, and Sang-Wook Kim
KIPS Fall Conference 2013

[2] Analysis on I/O Trace Replayer for SSD Performance Evaluation
Inhyuk Yee, Kyuhwan Lee, Yoonsuk Kang, Yong-Yeon Jo, and Sang-Wook Kim
KIPS Fall Conference 2013

[1] A Method for Selecting Similar Users for Collaborative Filtering
Yoonsuk Kang, Seihyun Jeong, Sang-Chul Lee, Min-Hee Jang, Sang-Wook Kim
KIPS Fall Conference 2012

INVITED TALKS

Adversarial Learning of Balanced Triangles for Accurate Community Detection on Signed Networks
- Invited Talk @ METU-HYU Joint Workshop, Dec. 2022

FORESEE: An Effective and Efficient Framework for Estimating the Execution Times of IO Traces on the SSD
- Invited Talk @ Waseda-UMS-Hanyang-UKM (WUHU) Joint Workshop, Dec. 2017

PROFESSIONAL SERVICES

Program Committee Member
- The ACM Symposium on Applied Computing (**SAC**) 2023, 2024

Conference Reviewer
- 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, 2022, 2023
- 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

Journal Reviewer
- The Journal of Supercomputing 2023

PATENTS

Granted Patents
- 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 Convoluational Networks Considering Relationships of Multiple-users
  Application Number: **KR10-2023-0065477** May 2023

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

Dongwon Lee, *Professor* (Visiting Scholar Advisor) dongwon@psu.edu
College of Information Sciences and Technology, The Pennsylvania State University