

YUNYONG KO

Postdoctoral Research Fellow @ UIUC

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RESEARCH INTERESTS

My research interests lie in large-scale data mining and machine learning on various types of data (e.g., graph, hypergraph, text, and image), with a focus on developing AI/ML solutions for real-world problems.

- **Graph mining and learning:** Hypergraph learning, Graph engine, Influence maximization
- **Large-scale deep learning:** Large-batch optimization, Distributed data parallelism
- **AI/ML solutions for real-world problems:** Political polarization, Efficient recommender system

EDUCATION

Hanyang University, Seoul, Republic of Korea

Sep. 2013 – Aug. 2021

- *Ph.D. in Computer Science*
 - Thesis: Effective Approaches to Distributed Deep Learning: Methods, Analyses, and Evaluation
 - Advisor: Prof. Sang-Wook Kim
 - Received the **Outstanding Ph.D. Dissertation Award** from the Research Institute of Industrial Science, HYU

Hanyang University, Seoul, Republic of Korea

Mar. 2009 – Aug. 2013

- *B.S. in Computer Science*

RESEARCH EXPERIENCES

University of Illinois at Urbana-Champaign, Urbana, IL, USA

May. 2022 – Present

- *Postdoctoral Researcher, Department of Computer Science*
 - Topic: Large-Scale Hypergraph Learning for Real-World Applications
 - Advisor: Prof. Hanghang Tong

Hanyang University, Seoul, Republic of Korea

Sep. 2021 – April. 2022

- *Postdoctoral Researcher, Department of Computer Science*
 - Topic: Optimization Technique for Large-Batch DNN Training
 - Advisor: Prof. Sang-Wook Kim

The Pennsylvania State University, University Park, PA, USA

Oct. 2019 – Feb. 2020

- *Visiting Scholar, College of Information Sciences and Technology*
 - Topic: Data Parallelism Approach for Distributed Deep Learning
 - Advisor: Prof. Dongwon Lee

PUBLICATIONS

Refereed Conference and Journal Papers (* indicates equal contributions)

- [12] KHAN: Knowledge-Aware Hierarchical Attention Networks for Accurate Political Stance Prediction
Yunyong Ko, Seongeun Ryu, Soeun Han, Youngseung Jeon, Jaehoon Kim, Sohyun Park, Kyungsik Han, Hanghang Tong and Sang-Wook Kim
WWW 2023 (*The ACM Web Conference*)
Full Paper (Acceptance Rate \approx 19.2%)
- [11] RealGraph^{GPU}: A High-Performance GPU-Based Graph Engine Toward Large-Scale Real-World Network Analysis
Myung-Hwan Jang, Yunyong Ko, Dongkyu Jeong, Jeong-Min Park, and Sang-Wook Kim
CIKM 2022 (*The ACM International Conference on Information and Knowledge Management*)
Short Paper (Acceptance Rate \approx 28.3%)
- [10] Not All Layers Are Equal: A Layer-Wise Adaptive Approach Toward Large-Scale DNN Training
Yunyong Ko, Dongwon Lee, and Sang-Wook Kim
WWW 2022 (*The ACM Web Conference*)
Full Paper (Acceptance Rate \approx 17.7%)

- [9] D-FEND: A Diffusion-Based Fake News Detection Framework for News Articles Related to COVID-19
Soeun Han, Yunyong Ko, Yusim Kim, Heejin Park, Seongsu Oh, and Sang-Wook Kim
SAC 2022 (*The ACM Symposium on Applied Computing*)
Full Paper (Acceptance Rate $\approx 24\%$)
- [8] SHAT: A Novel Asynchronous Training Algorithm That Provides Fast Model Convergence in Distributed Deep Learning
Yunyong Ko, and Sang-Wook Kim
Applied Sciences (SCIE Journal, 2022)
- [7] MASCOT: A Quantization Framework for Efficient Matrix Factorization in Recommender Systems
{Yunyong Ko*, Jae-Seo Yu*}, Hong-Kyun Bae, Yongjun Park, Dongwon Lee, and Sang-Wook Kim
ICDM 2021 (*The IEEE International Conference on Data Mining*)
Full Paper (Acceptance Rate $\approx 9.9\%$)
Selected as One of the Best-ranked Papers of ICDM 2021 for Fast-track Journal Invitation
- [6] ALADDIN: Asymmetric Centralized Training for Distributed Deep Learning
Yunyong Ko, Kibong Choi, Hyunseung Jei, Dongwon Lee, and Sang-Wook Kim
CIKM 2021 (*The ACM International Conference on Information and Knowledge Management*)
Full Paper (Acceptance Rate $\approx 21.7\%$)
Selected as One of the Spotlight Presentations of CIKM 2021
- [5] An In-Depth Analysis of Distributed Training of Deep Neural Networks
Yunyong Ko, Kibong Choi, Jiwon Seo, and Sang-Wook Kim
IPDPS 2021 (*The IEEE International Parallel and Distributed Processing Symposium*)
Full Paper (Acceptance Rate $\approx 24.5\%$)
- [4] Influence Maximization for Effective Advertisement in Social Networks: Problem, Solution, and Evaluation
Suk-Jin Hong, Yunyong Ko, Moon-Jeung Joe, and Sang-Wook Kim
SAC 2019 (*The ACM Symposium on Applied Computing*)
Full Paper (Acceptance Rate $\approx 24.2\%$)
- [3] Efficient and Effective Influence Maximization in Social Networks: A Hybrid-Approach
{Yunyong Ko*, Kyung-Jae Cho*}, and Sang-Wook Kim
Information Sciences (SCIE Journal, 2018)
- [2] Influence Maximization in Social Networks: A Target-Oriented Estimation
Yunyong Ko, Dong-Kyu Chae, and Sang-Wook Kim
Journal of Information Science (SCIE Journal, 2018)
- [1] Accurate Path-Based Influence Maximization in Social Networks
Yunyong Ko, Dong-Kyu Chae, and Sang-Wook Kim
WWW 2016 (*The ACM Web Conference*)
Short Paper (Acceptance Rate $\approx 21\%$)

AWARDS
& HONORS

Selected as One of the Best-Ranked Papers of IEEE ICDM 2021	2021
• IEEE International Conference on Data Mining (IEEE ICDM)	
Selected as One of the Spotlight Presentations of ACM CIKM 2021	2021
• ACM International Conference on Information and Knowledge Management (ACM CIKM)	
Received the Outstanding Ph.D. Dissertation Award	2021
• Research Institute of Industrial Science, Hanyang University	
Received the Best Paper Award of KIPS 2021	2021

	<ul style="list-style-type: none"> • Korea Information Processing Society (KIPS) 	
	Received the ACM SIGAPP Student Travel Award	2019
	<ul style="list-style-type: none"> • ACM Symposium on Applied Computing (ACM SAC) 	
	Awarded the Naver Ph.D. Fellowship	2017
	<ul style="list-style-type: none"> • Naver Corporation 	
	Received the Best Presentation Award of KCC 2017	2017
	<ul style="list-style-type: none"> • Korea Computer Congress (KCC) 	
INVITED TALKS	METU-HYU Joint Workshop , Online	Dec. 2022
	<ul style="list-style-type: none"> • Topic: Not All Layers Are Equal: A Layer-Wise Approach Towards Large-Scale DNN Training 	
	Medical AI Korea , Seoul, Republic of Korea	Oct. 2021
	<ul style="list-style-type: none"> • Topic: Basic Concept of Distributed Deep Learning with PyTorch Tutorials 	
PROFESSIONAL SERVICES	Track Co-Chair	
	<ul style="list-style-type: none"> • The ACM Symposium on Applied Computing (SAC) 	2023
	Conference Reviewer	
	<ul style="list-style-type: none"> • The ACM Web Conference (WWW) 	2023
	<ul style="list-style-type: none"> • The ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD) 	2021, 2022
	<ul style="list-style-type: none"> • The IEEE International Conference on Data Mining (ICDM) 	2022
	<ul style="list-style-type: none"> • The AAAI International Conference on Artificial Intelligence (AAAI) 	2021
	<ul style="list-style-type: none"> • The ACM Symposium on Applied Computing (SAC) 	2022, 2023
PATENTS	International Patents	
	<ul style="list-style-type: none"> • Asymmetric Centralized training for Distributed Deep Learning (PCT application) Application number: PCT/KR2021/015014 	Oct. 2021
	Domestic Patents	
	<ul style="list-style-type: none"> • A Layer-Wise Adaptive Approach toward Large-Scale DNN Training Application number: 10-2022-0075800 	June. 2022
	<ul style="list-style-type: none"> • Multi-State Diffusion Model using Interest, Intimacy, and Share Tendency Registration number: 10-2332348 	Dec. 2020
	<ul style="list-style-type: none"> • Accurate Ad-Effect Estimation Method based on Relevance between User and Item Registration number: 10-2144122 	Aug. 2020
	<ul style="list-style-type: none"> • Influence Maximization in Social Networks: A Hybrid Approach Registration number: 10-1810864 	Dec. 2017
REFERENCES	Hanghang Tong , Associate Professor (Postdoc. Adviser)	htong@illinois.edu
	Department of Computer Science, University of Illinois at Urbana-Champaign (UIUC)	
	Sang-Wook Kim , Professor (Ph.D. Adviser)	wook@hanyang.ac.kr
	Department of Computer Science, Hanyang University	
	Dongwon Lee , Professor (Collaborator)	dongwon@psu.edu
	College of Information Sciences and Technology, The Pennsylvania State University (PSU)	
	Kyungsik Han , Associate Professor (Collaborator)	kyungsikhan@hanyang.ac.kr
	Department of Computer Science, Hanyang University	