Yunyong Ko

Contact Information

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Research Interest

My research interest lies in large-scale data mining and machine learning on various types of data (e.g., graph, text, image) for real-world applications to social networks analysis, recommender systems, solving social problems, etc.

Education

Hanyang University, Seoul, 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

Hanyang University, Seoul, Korea — Mar. 2009 – Aug. 2013
- B.S. in Computer Science

Work Experiences

University of Illionois at Urbana-Champaign, IL, USA — May. 2022 – Present
- Postdoctoral Researcher, Department of Computer Science
- Topic: Hypergraph Representation Learning for Link Prediction on Hypergraphs
- Advisor: Prof. Hanghang Tong

Hanyang University, Seoul, 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 Researcher, College of Information Sciences and Technology (IST)
- Topic: Asymmetric 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
ACM Web Conference (**WWW**), 2023
Full Paper (Acceptance Rate ≈ 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
ACM International Conference on Information and Knowledge Management (**ACM CIKM**), 2022
Short Paper (Acceptance Rate ≈ 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
ACM Web Conference (**WWW**), 2022
Full Paper (Acceptance Rate ≈ 17.7%)

[9] **D-FEND: A Diffusion-Based Fake News Detection Framework for News Articles Related to COVID-19**
So-Eun Han, Yunyong Ko, Yusim Kim, Heejin Park, Seongsu Oh, and Sang-Wook Kim
ACM Symposium on Applied Computing (**ACM SAC**), 2022
Full Paper (Acceptance Rate ≈ 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), 2022 (IF: 2.679)

[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
IEEE International Conference on Data Mining (**IEEE ICDM**) 2021
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
ACM International Conference on Information and Knowledge Management (**ACM CIKM**), 2021
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
IEEE International Parallel & Distributed Processing Symposium (**IEEE IPDPS**), 2021
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
ACM Symposium on Applied Computing (**ACM SAC**), 2019
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), 2018 (IF: 6.795, Category Top 5%)

[2] **Influence Maximization in Social Networks: A Target-Oriented Estimation**
Yunyong Ko, Dong-Kyu Chae, and Sang-Wook Kim
Journal of Information Science (SCIE), 2018 (IF: 3.282)

[1] **Accurate Path-Based Influence Maximization in Social Networks**
Yunyong Ko, Dong-Kyu Chae, and Sang-Wook Kim
ACM Web Conference (**WWW**), 2016
Short Paper (Acceptance Rate $\approx$ 21%)

Awards & Honors

Selected as One of the **Best-Ranked Papers of IEEE ICDM** 2021
• IEEE International Conference on Data Mining

Selected as One of the **Spotlight Presentations of ACM CIKM** 2021
• ACM International Conference on Information and Knowledge Management

Received the **Outstanding Ph.D. Dissertation Award** 2021
• Research Institute of Industrial Science, Hanyang University

Received the **Best Paper Award** 2021
• Korea Information Processing Society

Received the **ACM SIGAPP Student Travel Award** 2019
• ACM Symposium on Applied Computing

Awarded the **Naver Ph.D. Fellowship** 2017
• Naver Corporation

Received the **Best Presentation Award** 2017
- Korea Computer Congress

Professional Services

Track Co-Chair
- ACM Symposium on Applied Computing (ACM SAC) 2023

Conference Reviewer
- IEEE International Conference on Data Mining (ICDM) 2022
- ACM SIGKDD Conference on Knowledge Discovery and Data Mining (ACM KDD) 2021, 2022
- AAAI International Conference on Artificial Intelligence (AAAI) 2021
- ACM Symposium on Applied Computing (ACM SAC) 2022, 2023

Invited Talks

Not All Layers Are Equal: A Layer-Wise Approach Towards Large-Scale DNN Training
- Invited Talk @ METU-HANYANG Joint Workshop, Dec. 2022

Basic Concept of Distributed Deep Learning with PyTorch Tutorials
- Invited Talk @ Medical AI Korea, Oct. 2021

Patents

International Patents
- **Asymmetric Centralized training for Distributed Deep Learning** (PCT application)
  Application number: PCT/KR2021/015014, Date: Oct. 2021

Domestic Patents
- **A Layer-Wise Adaptive Approach toward Large-Scale DNN Training**
  Application number: 10-2022-0075800, Date: June. 2022
- **Multi-State Diffusion Model using Interest, Intimacy, and Share Tendency**
  Registration number: 10-2332348, Date: Dec. 2020
- **Accurate Ad-Effect Estimation Method based on Relevance between User and Item**
  Registration number: 10-2144122, Date: Aug. 2020
- **Influence Maximization in Social Networks: A Hybrid Approach to Solving Performance Issues in Micro and Macro Levels**
  Registration number: 10-1810864, Date: Dec. 2017