JAEMIN YOO

Postdoctoral Research Fellow @ Carnegie Mellon University
Email: jaeminyoo@cmu.edu ⋄ **Web:** jaeminyoo.github.io

POSITION

Carnegie Mellon University, Pittsburgh, PA, USA *Mar. 2022 - Present*
Postdoctoral Research Fellow, Heinz College of Information Systems and Public Policy
Advisor: *Prof. Leman Akoglu*

EDUCATION

Seoul National University, Seoul, South Korea *Mar. 2016 - Feb. 2022*
Ph.D. in Computer Science and Engineering
Advisor: *Prof. U Kang*
Thesis: *Probabilistic Approaches for Node and Graph Classification*

Seoul National University, Seoul, South Korea *Mar. 2012 - Feb. 2016*
B.S. in Computer Science and Engineering

RESEARCH INTERESTS

1. **Self-supervised Anomaly Detection:** Showed that the alignment between augmentation and anomalies is the key to the success of self-supervised learning for anomaly detection [arXiv-22a].
2. **Machine Learning on Graphs:** Designed inference-based approaches for node classification on edge-attributed graphs [ICDM-17], cold-start inductive learning [IJCAI-19], PU learning [ICDM-21], and missing feature estimation [KDD-22]. Proposed a way to modify the structure of a real-world graph for tractable inference [WSDM-20] or graph classification [WWW-22]. Improved the accuracy, interpretability, and robustness of graph neural networks via linearization [arXiv-22b].
3. **Multivariate time Series Forecasting:** Learned the relationships between time series variables by spatial attention [SDM-21]. Focused on the financial domain by utilizing data-axis Transformer [KDD-21] or self-supervised learning on sparse and noisy tweets [BigData-22].
4. **Interpretable ML:** Improved the learning capacity and interpretability of tree models by fusion with deep learning [ICDM-19, PAKDD-21]. Proposed a unified representation of deep tree models [SDM-22]. Understood the function of a deep neural network without data [NeurIPS-19].

AWARDS & HONORS

Best Ph.D. Thesis Award in SNU CSE . . . . . *Feb. 2022*
One of the Best-Ranked Papers of ICDM 2021 . . . . . *Dec. 2021*
SNU BK21 Outstanding Graduate Student Award . . . . . *Jul. 2021*
SIAM Student Travel Award (SDM 2021) . . . . . *Apr. 2021*
SNU BK21 Star Researcher Award . . . . . *Feb. 2021*
Qualcomm Innovation Fellowship . . . . . *Dec. 2020*
Yulchon AI Star Award . . . . . *Sep. 2020*
Google PhD Fellowship (Machine Learning) . . . . . *Sep. 2019*
Samsung HumanTech Paper Award (Honorable Mention) . . . . . *Feb. 2019*
Google Conference Scholarship (ICDM 2017) . . . . . *Nov. 2017*

PREPRINTS

[i2] SlenderGNN: Accurate, Robust, and Interpretable GNN, and the Reasons for its Success
Jaemin Yoo*, Meng-Chieh Lee*, Shubhranshu Shekhar, and Christos Faloutsos
arXiv Preprint (2022; *equal contribution)

[i1] Self-supervision is not magic: Understanding Data Augmentation in Image Anomaly Detection
Jaemin Yoo, Tiancheng Zhao, and Leman Akoglu
arXiv Preprint (2022)

TUTORIALS

[t1] Mining of Real-world Hypergraphs: Concepts, Patterns, and Generators
Geon Lee, Jaemin Yoo, and Kijung Shin
ICDM 2022 / CIKM 2022 / DSAA 2022

PUBLICATIONS

[c16] Accurate Stock Movement Prediction with Self-supervised Learning from Sparse Noisy Tweets
Yejun Soun*, Jaemin Yoo*, Minyong Cho, Jihyeong Jeon, and U Kang
BigData 2022 (acceptance rate 122/633 = 19.2%; *equal contribution)

[c15] Reciprocity in Directed Hypergraphs: Measures, Findings, and Generators
Sunwoo Kim, Minyoung Choe, Jaemin Yoo, and Kijung Shin
ICDM 2022 (acceptance rate 174/890 = 19.6%)

[j3] Graph-based PU Learning for Binary and Multiclass Classification without Class Prior
Jaemin Yoo*, Junghun Kim*, Hoyoung Yoon*, Geonsoo Kim, Changwon Jang, and U Kang
Knowledge and Information Systems (SCIE Journal, 2022; *equal contribution)

[c14] Accurate Node Feature Estimation with Structured Variational Graph Autoencoder
Jaemin Yoo, Hyunsik Jeon, Jinhong Jung, and U Kang
KDD 2022 (acceptance rate 254/1695 = 15.0%)

[j2] Signed Random Walk Diffusion for Effective Representation Learning in Signed Graphs
Jinhong Jung, Jaemin Yoo, and U Kang
PLOS ONE (SCIE Journal, 2022)

[d1] Probabilistic Approaches for Node and Graph Classification
Jaemin Yoo
Ph.D. Thesis, Seoul National University, 2022
Received the Best Ph.D. Thesis Award in SNU CSE

[c13] Model-Agnostic Augmentation for Accurate Graph Classification
Jaemin Yoo, Sooyeon Shim, and U Kang
WWW 2022 (acceptance rate 323/1822 = 17.7%)

[c12] MiDaS: Representative Sampling from Real-world Hypergraphs
Minyoung Choe, Jaemin Yoo, Geon Lee, Woonsung Baek, U Kang, and Kijung Shin
WWW 2022 (acceptance rate 323/1822 = 17.7%)

[c11] Transition Matrix Representation of Trees with Transposed Convolutions
Jaemin Yoo and Lee Sael
SDM 2022 (acceptance rate 83/298 = 27.8%)

[c10] Accurate Graph-Based PU Learning without Class Prior
Jaemin Yoo*, Junghun Kim*, Hoyoung Yoon*, Geonsoo Kim, Changwon Jang, and U Kang
ICDM 2021 (regular paper; top 98/990 = 9.9%; *equal contribution)
Selected as one of the best-ranked papers of ICDM 2021 for fast-track journal invitation

[c9] Accurate Multivariate Stock Movement Prediction via Data-Axis Transformer with Multi-Level Contexts
Jaemin Yoo, Yejun Soun, Yong-chan Park, and U Kang
KDD 2021 (acceptance rate 238/1541 = 15.4%)

[c8] Gaussian Soft Decision Trees for Interpretable Feature-Based Classification
Jaemin Yoo and Lee Sael
PAKDD 2021 (acceptance rate 157/768 = 20.4%)

[c7] Attention-Based Autoregression for Accurate and Efficient Multivariate Time Series Forecasting
Jaemin Yoo and U Kang
SDM 2021 (acceptance rate 85/400 = 21.3%)

[c6] Sampling Subgraphs with Guaranteed Treewidth for Accurate and Efficient Graphical Inference
Jaemin Yoo, U Kang, Mauro Scanagatta, Giorgio Corani, and Marco Zaffalon
WSDM 2020 (acceptance rate 91/615 = 14.8%)

[c5] Knowledge Extraction with No Observable Data
Jaemin Yoo, Minyong Cho, Taebum Kim, and U Kang
NeurIPS 2019 (acceptance rate 1428/6743 = 21.2%)

[c4] EDiT: Interpreting Ensemble Models via Compact Soft Decision Trees
Jaemin Yoo and Lee Sael
ICDM 2019 (acceptance rate 194/1046 = 18.5%)

[c3] Belief Propagation Network for Hard Inductive Semi-Supervised Learning
Jaemin Yoo, Hyunsik Jeon, and U Kang
IJCAI 2019 (acceptance rate 850/4752 = 17.9%)

[c2] Fast and Scalable Distributed Loopy Belief Propagation on Real-World Graphs
Saehan Jo, Jaemin Yoo, and U Kang
WSDM 2018 (acceptance rate 83/514 = 16.3%)

[j1] Efficient Learning of Bounded-Treewidth Bayesian Networks from Complete and Incomplete Data Sets
Mauro Scanagatta, Giorgio Corani, Marco Zaffalon, Jaemin Yoo, and U Kang
International Journal of Approximate Reasoning (SCIE Journal, 2018)

[c1] Supervised Belief Propagation: Scalable Supervised Inference on Attributed Networks
Jaemin Yoo, Saehan Jo, and U Kang
ICDM 2017 (regular paper; top 72/778 = 9.3%)

INVITED TALKS

SNU AI Summer School 2022, Online . . . . . *Aug. 2022*
SK C&C, Online . . . . . *Aug. 2022*
KAIST School of Computing, Online . . . . . *Jul. 2022*
AWS Deep Learning Group, Online . . . . . *Jul. 2022*
EIRIC Seminar, Online . . . . . *Apr. 2022*

KAIST School of Electrical Engineering, Daejeon, South Korea . . . . . *Feb. 2022*
LG AI Research Tech Talk, Seoul, South Korea . . . . . *Feb. 2022*
KAIST AI Student Colloquium, Online . . . . . *Oct. 2021*
SNU AI Summer School 2021, Online . . . . . *Aug. 2021*
SNU AI Institute (AIIS) Retreat 2021, Seoul, South Korea . . . . . *Apr. 2021*
NAVER Online Tech Talk, Online . . . . . *Dec. 2020*
SNU AI Summer School 2020, Seoul, South Korea . . . . . *Aug. 2020*
SNU Hospital, Seoul, South Korea . . . . . *Jul. 2020*
SNU AI Institute (AIIS) Retreat 2020, Seoul, South Korea . . . . . *Jun. 2020*
Kakao Enterprise, Seongnam, South Korea . . . . . *Jan. 2020*
Korea Software Congress (KSC) 2019, Pyeongchang, South Korea . . . . . *Dec. 2019*
SNU Center for AI (SCAI) Retreat 2019, Chuncheon . . . . . *Jul. 2019*
Samsung Electronics, Suwon, South Korea . . . . . *Mar. 2019*
IDSIA, Lugano, Switzerland . . . . . *Jul. 2018*
Korea Software Congress 2017, Busan, South Korea . . . . . *Dec. 2017*

TEACHING EXPERIENCE

Teaching Asssistant

- TA @ Mathematics for Machine Learning, LG Chem . . . . . *Dec. 2021 - Jan. 2022*
- TA @ Hyundai AI Master, Hyundai Motors . . . . . *Aug. 2021 - Oct. 2022*
- TA @ Samsung DS^2 (Deep Learning), Samsung Electronics . . . . . *Apr. 2018 - Feb. 2019*
- TA @ Deep Learning, SNU Fourth Industrial Revolution Academy . . *Oct. 2017 - Dec. 2018*
- TA @ Distributed Computing, SNU Big Data Academy . . . . . *Feb. 2017 - Dec. 2017*
- TA @ Distributed Computing, SNU Big Camp . . . . . *Aug. 2016 - Feb. 2017*
- TA @ Large Data Analysis (M1522.000900_002), SNU . . . . . *Fall 2017*
- TA @ Introduction to Data Mining (M1522.001400_001), SNU . . . . . *Spring 2017*
- TA @ Data Structures (M1522.001600_002), SNU . . . . . *Fall 2016*

Mentoring/Tutoring

- Student Mentor @ Undergraduate Research Program, SNU . . . . . *Feb. 2020 - Jun. 2020*
- Project Mentor @ DL-based Demand Forecasting, LG Electronics . . . *Mar. 2020 - May 2020*
- Writing Tutor @ Writing in Scientific and Technology (031.004_{002, 020}), SNU . . *Fall 2015*
- Writing Tutor @ Writing in Scientific and Technology (031.004_028), SNU . . . . *Spring 2015*
- Writing Tutor @ Writing in Scientific and Technology (031.004_{002, 023}), SNU . . *Fall 2014*

PROFESSIONAL SERVICES

- Session Chair @ KDD 2022
- PC Member @ AAAI 2021-2023, BigComp 2021-2023, KDD 2021-2022, SDM 2022
- Conference Reviewer @ ICLR 2023, LoG 2023
- Journal Reviewer @ Pattern Recognition (2021-2022)
- External Reviewer @ ICLR 2021-2022, NeurIPS 2020-2021, WWW 2018-2021, KDD 2018-2020, BigComp 2017-2020, CIKM 2017-2019, WSDM 2019, ICDM 2018, SAC 2018