

JAEMIN YOO

Postdoctoral Research Fellow @ Carnegie Mellon University

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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

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

MISCELLANEOUS

Professional Services

- Session Chair: KDD 2022
- Program Committee: AAAI 2021-2023, BigComp 2021-2023, KDD 2021-2022, SDM 2022
- 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

Developments

- Anomaly Detector System in MMORPG (w/ NCSOFT) *Sep. 2020 - Feb. 2021*
- Recommender System in E-commerce (w/ Wemakeprice) *Feb. 2019 - Dec. 2019*
- Statistical Learning and Inference Method with PGMs (w/ IDSIA) . . . *Jan. 2016 - Dec. 2018*
- Feature Selection Method for Recommender Systems (w/ SK Telecom) *Mar. 2018 - Nov. 2018*
- Temporal Stock Price Prediction System (w/ eMoney) *Aug. 2017 - Feb. 2018*
- Temporal Video Recommender System (w/ SK Broadband) *Nov. 2016 - Jun. 2017*
- Distributed ML Library on Apache Spark (w/ SK Telecom) *Mar. 2016 - Jan. 2017*

Teaching Assistant (Seoul National University)

- Large Data Analysis (M1522.000900, 002) *Fall 2017*
- Introduction to Data Mining (M1522.001400-001) *Spring 2017*
- Data Structures (M1522.001600-002) *Fall 2016*

Teaching Assistant (Other Organizations)

- Deep Learning, Samsung Electronics *Apr. 2018 - Feb. 2019*
- Deep Learning, SNU Fourth Industrial Revolution Academy *Oct. 2017 - Dec. 2018*
- Distributed Computing, SNU Big Data Academy *Feb. 2017 - Dec. 2017*
- Distributed Computing, SNU Big Camp *Aug. 2016 - Feb. 2017*