



Yoonhyuk Choi (Last update: May 2025)

Samsung SDS
Preceding AI Lab
Research Scientist

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RESEARCH INTEREST

My research interest lies in *Machine Learning* and *Data Mining*, especially in **Large Language Models**, **Retrieval Augmented Generation**, **Recommender Systems**, and **Graph Neural Networks**.

EDUCATION

•Seoul National University

Ph.D. & M.S., Computer Engineering

Mar. 2019 - Aug. 2023

Advisor: [Chong-Kwon Kim](#)

•University of Seoul

B.S., Computer Science

Mar. 2013 - Feb. 2019

Advisor: [Eui-Kyeong Hong](#)

WORK EXPERIENCE

•Research scientist

Samsung SDS, Seoul, South Korea
RAG on knowledge graph, low-rank optimization

Oct. 2024 - Current

•Postdoc. associate

Arizona State University, Tempe, United States (PI: [Selcuk Candan](#) and [Huan Liu](#))
Participating in solving water-related problems (e.g., water quality, storage, and so on)

Nov. 2023 - Sep. 2024

•Postdoc. associate

Korea Institute of Energy Technology, Naju, South Korea (PI: [Chong-Kwon Kim](#))
Applying machine learning to solve energy-related problems

Sep. 2023 - Nov. 2023

•Backend engineer

nTOPAZ, Seoul, South Korea
Front & Back-end development for blockchain service, Tech: 1) Django & jQuery, 2) Node js, 3) JS & CSS

Jun. 2018 - Sep. 2018

PUBLICATIONS ([GOOGLE SCHOLAR](#)) - C: CONFERENCE, J: JOURNAL

- (J14) Beyond Binary: Improving Signed Message Passing in Graph Neural Networks for Multi-Class Graphs
[Yoonhyuk Choi](#), Taewook Ko, Jiho Choi, Chong-Kwon Kim
IEEE TPAMI, 2025 (minor revision) / IF: 20.8
- (C13) Better Not to Propagate: Understanding Edge Uncertainty and Over-smoothing in Signed GNNs
[Yoonhyuk Choi](#), Taewook Ko, Jiho Choi, Chong-Kwon Kim
UAI, 2025 (to be published)
- (C12) Review-Based Hyperbolic Cross-Domain Recommendation
[Yoonhyuk Choi](#), Jiho Choi, Taewook Ko, Chong-Kwon Kim
WSDM, 2025
- (C11) Mitigating Overfitting in Graph Neural Networks via Feature and Hyperplane Perturbation
[Yoonhyuk Choi](#), Jiho Choi, Taewook Ko, Chong-Kwon Kim
WSDM, 2025

- (J10) Beyond Message-Passing: Generalization of Graph Neural Networks via Feature Perturbation for ...
Yoonhyuk Choi, Jiho Choi, Taewook Ko, Chong-Kwon Kim
IEEE TNNLS, 2024 / IF: 14.25
- (C9) Improving the Text Convolution Mechanism with Large Language Model for Review-Based Recommendation
Yoonhyuk Choi, Fahim Tasneema Azad
IEEE Big Data, 2024 (short)
- (C8) Prioritizing Potential Wetland Areas via Region-to-Region Knowledge Transfer and Adaptive Propagation
Yoonhyuk Choi, Reepal Shah, John Sabo, Selcuk Candan, Huan Liu
IEEE Big Data, 2024
- (C7) Introducing CausalBench: A Flexible Benchmark Framework for Causal Analysis and Machine Learning
Ahmet Kapkic, Pratanu Mandal, Shu Wan, Paras Sheth, Abhinav Gorantla, Yoonhyuk Choi, Huan Liu, K Selcuk Candan
CIKM, 2024 (benchmark)
- (C6) Universal Graph Contrastive Learning with a Novel Laplacian Perturbation
Taewook Ko, Yoonhyuk Choi, Chong-Kwon Kim
UAI, 2023
- (J5) A spectral graph convolution for signed directed graphs via magnetic laplacian
Taewook Ko, Yoonhyuk Choi, Chong-Kwon Kim
Neural Networks, 2023 (IF: 7.8)
- (J4) Aspect-oriented unsupervised social link inference on user trajectory data
Hyungho Byun, Yoonhyuk Choi, Chong-Kwon Kim
Information Sciences, 2023 (IF: 8.2)
- (C3) Review-Based Domain Disentanglement without Duplicate Users or Contexts for Cross-Domain ...
Yoonhyuk Choi, Jiho Choi, Taewook Ko, Hyungho Byun, Chong-Kwon Kim
CIKM, 2022
- (C2) Finding Heterophilic Neighbors via Confidence-based Subgraph Matching for Semi-supervised Node ...
Yoonhyuk Choi, Jiho Choi, Taewook Ko, Hyungho Byun, Chong-Kwon Kim
CIKM, 2022
- (J1) Dynamic graph convolutional networks with attention mechanism for rumor detection on social media
Jiho Choi, Taewook Ko, Yoonhyuk Choi, Hyungho Byun, Chong-Kwon Kim
PLOS ONE, 2021 (IF: 2.9)
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- (arXiv) SpecSphere: Dual-Band Spectral-Spatial Graph Neural Networks with Certified Robustness
Yoonhyuk Choi, Jiho Choi, Taewook Ko, Chong-Kwon Kim
Under Review (NeurIPS), 2025
- (arXiv) Hierarchical Uncertainty-Aware Graph Neural Networks
Yoonhyuk Choi, Jiho Choi, Taewook Ko, Chong-Kwon Kim
Under Review (CIKM), 2025

PROJECTS

- **Enhancing Large Language Model with RAG** 2025
Research project, Samsung SDS
 - Knowledge graph construction and RAG for chunk retrieval
 - Tiny-LLM (e.g., Llama 3B) distillation with huge-LLM (e.g., Llama 70B)
- **Can Large Language Model Improve the Text Convolution for Review-Based Recommendation?** 2024
Research project, Emit Lab
 - Integrated the large language model (e.g., Llama 2, GPT-4) with the text convolution algorithm

- Investigated whether applying summarization based on large language models first, instead of performing 2D convolution on the entire text, results in performance improvement
 - Used online shopping mall datasets like Amazon and Walmart
- Selection Criteria and Assigned Weightage for Identifying Potential Locations Wetland** 2024
Research project funded by NSF (in collaboration with Tulane University)
- Suggested knowledge transfer between different regions and adaptive propagation between grids
 - Demonstrated the effectiveness of the framework through real-world scenario
 - Used Natural Land Cover Dataset (NLCD), Soil Survey Geographic Database (SSURGO) datasets
- Causal Discovery of Agricultural Mgmt and Reservoir Op. Induced Water Quality Change** 2023
Research project funded by NSF (in collaboration with University of Arkansas)
- Developed causal discovery algorithm for water quality improvement and reservoir management
 - Considered spatial and temporal variations and validated the causal learning ability
 - Used Natural Land Cover Dataset (NLCD), Soil Survey Geographic Database (SSURGO) datasets
- Tracking footprints with graph neural networks for the reduction of virus spread** 2021 - 2022
Coursework project, R&D in AI industry
- Suggested spatial-temporal analysis for the next POI prediction to reduce virus spread
 - Selected as social contributing project
 - Used datasets are Coronamap of South Korea, Gowalla for POI prediction
- Personalized recommendation based on the user's purchasing histories and social network** 2020
Industry project funded by Samsung Research
- Introduced time series analysis of users' purchasing history for personalized advertising
 - Applied graph neural networks with binary recommendation techniques
 - Used customer datasets provided by Samsung Research
- Next POI prediction based on user movements collected through large-scale sensors** 2019
Research project funded by Samsung Electronics
- Recommending the next place based on where students visited within Seoul National University
 - Developed energy-saving and effective multi-hop transmission technologies for sensor
 - Collected datasets by attaching special stickers to participants

SKILLS

- Languages:** Python, C, HTML/CSS
- Tools / Frameworks:** PyTorch, torch-geometric, Scikit-learn, Git, Django, AWS, LaTeX

EXTRACURRICULAR ACTIVITIES

- Reviewer** 2025
 ICLR / IJCAI / ICML / KDD (Feb. track) / TheWebConf / WSDM / CIKM
- Reviewer** 2024
 LoG / CIKM / MM / Soft Computing (journal)
- Invited Talk (N-EWN Partner Symposium)** 2024
 Titled Identifying Potential Sites for Wetlands, St. Augustine in Florida
- Reviewer** 2023
 Journal of IEEE Multimedia / Plos one
- Research Assistant (RA), Graduate** Mar. 2019 - Jun. 2021
 Funded by Samsung Research

- Teaching Assistant (TA)** Mar. 2020 - Jun. 2020
Topic: Social Network Analysis and Anomaly Detection (Advisor: Chong-Kwon Kim)
- Research Assistant (RA), Undergrad** Jun. 2017 - Sep. 2017
Distributed Computing Lab (Supervisor: Jin-Suk Kim)

AWARDS & GRANTS

- Best Ph.D. Dissertation Award** 2023
Seoul National University
- Overseas Short-term Training Scholarship** 2023
Chonnam National University
- BK21 Colloquium Graduate Student Fellowship** 2023
Seoul National University
- BK21 Star Student Researcher Fellowship** 2023
Seoul National University
- SIGIR Travel Awards** 2022
For ACM Student Authors with Accepted Long Paper
- BK21 Scholarship** 2020
(Graduate) Seoul National University
- Merit-based Scholarship** 2018 - 2019
(Undergrad) University of Seoul

REFERENCES

- Selcuk K. Candan:** candan@asu.edu
- ChongKwon Kim:** ckim@kentech.ac.kr
- TaeKyung Kwon:** tkkwon98@gmail.com