



Yoonhyuk Choi (Last update: Mar. 2025)

Samsung SDS
AI Preceding Study 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: Dr. [Chong-Kwon Kim](#)

•University of Seoul

B.S., Computer Science

Mar. 2013 - Feb. 2019

Advisor: Dr. [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: Dr. [Selcuk Candan](#), co-PI: Dr. [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: Dr. [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

- (J13) 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 (IF: 20.8), 2025
- (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 Through Simple Feature and Hyperplane Shifting
[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 (IF: 14.25), 2024

- (C9) Improving the Text Convolution Mechanism with Large Language Model for Review-Based Recommendation
Yoonhyuk Choi, Fahim Tasneema Azad
IEEE Big Data (short), 2024
- (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 Selçuk Candan
CIKM (benchmark), 2024
- (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 (IF: 7.8), 2023
- (J4) Aspect-oriented unsupervised social link inference on user trajectory data
Hyungho Byun, Yoonhyuk Choi, Chong-Kwon Kim
Information Sciences (IF: 8.2), 2023
- (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 (IF: 2.9), 2021
.....
- (arXiv) Better Not to Propagate: Understanding Edge Uncertainty and Over-smoothing in Signed GNNs
Yoonhyuk Choi, Jiho Choi, Taewook Ko, Chong-Kwon Kim
Preprint, 2024

PROJECTS

- | | |
|--|------|
| •Enhancing Large Language Model with Graph RAG
<i>Research project, Samsung SDS</i>
– Graph RAG | 2025 |
| •Can Large Language Model Improve the Text Convolution for Review-Based Recommendation?
<i>Research project, Emit Lab</i>
– 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 | 2024 |
| •Selection Criteria and Assigned Weightage for Identifying Potential Locations Wetland
<i>Research project funded by NSF (in collaboration with Tulane University)</i>
– Suggested knowledge transfer between different regions and adaptive propagation between grids
– Demonstrated the effectiveness of the framework through real-world scenario | 2024 |

- 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 (KDD '25)** 2025
 Knowledge Discovery in Database (Feb. track)
- **Reviewer (IJCAI '25)** 2025
 International Joint Conferences on Artificial Intelligence
- **Reviewer (ICML '25)** 2025
 International Conference on Machine Learning
- **Reviewer (TheWebConf '25)** 2024
 International World Wide Web Conference
- **Reviewer (ICLR '25)** 2024
 International Conference on Learning Representations
- **Reviewer (WSDM '25)** 2024
 International Conference on Web Search and Data Mining
- **Reviewer (LoG '24)** 2024
 Learning on Graphs Conference
- **Reviewer (CIKM '24)** 2024
 Conference on Information and Knowledge Management

•Invited Talk (N-EWN Partner Symposium) Titled Identifying Potential Sites for Wetlands, St. Augustine in Florida	2024
•Reviewer (Soft Computing '24) Soft Computing Journal	2024
•Reviewer (ACM MM '24) ACM Multimedia Conference	2024
•Reviewer (IEEE Multimedia '24) Journal of IEEE Multimedia	2023
•Reviewer (Plos One '23) Journal of Plos One	2023
•Research Assistant (RA) Participating in 'Social Network-based Recommendation Project' funded by Samsung Research	Sep. 2020 - Jun. 2021
•Teaching Assistant (TA) Topic: Social Network Analysis and Anomaly Detection (Advisor: Chong-Kwon Kim)	Mar. 2020 - Jun. 2020
•Research Assistant (RA) Participating in 'Smart Campus Project' funded by Samsung	Mar. 2019 - Dec. 2020
•Research Assistant (RA), Undergrad Distributed Computing Lab (Supervisor: Jin-Suk Kim)	Jun. 2017 - Sep. 2017

AWARDS & GRANTS

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

REFERENCES

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