



# Yoonhyuk Choi (Last update: Nov. 2024)

Samsung SDS  
AI Research Lab  
Research Scientist

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## RESEARCH INTEREST

My research interest lies in *Machine Learning* and *Data Mining*, especially in **Retrieval Augmented Generation (RAG)**, **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 Researcher

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 Researcher

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, P: PREPRINT

- (C8) Review-Based Hyperbolic Cross-Domain Recommendation

[Yoonhyuk Choi](#), Jiho Choi, Taewook Ko, Chong-Kwon Kim

ACM International Conference on Web Search and Data Mining (WSDM), 2025

- (C7) Perturbing Initial Features Improves Generalization of Message-Passing Neural Networks

[Yoonhyuk Choi](#), Jiho Choi, Taewook Ko, Chong-Kwon Kim

ACM International Conference on Web Search and Data Mining (WSDM), 2025

- (C6) Improving the Text Convolution Mechanism with Large Language Model for Review-Based Recommendation

[Yoonhyuk Choi](#), Fahim Tasneema Azad

IEEE Big Data Conference, 2024

- (C5) 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 Conference, 2024

- (C4) 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  
**ACM Conference on Information and Knowledge Management (CIKM), Benchmark Track, 2024**
- (C3) Universal Graph Contrastive Learning with a Novel Laplacian Perturbation  
Taewook Ko, **Yoonhyuk Choi**, Chong-Kwon Kim  
**Uncertainty in AI (UAI), 2023**
- (C2) Review-Based Domain Disentanglement without Duplicate Users or Contexts for Cross-Domain ...  
**Yoonhyuk Choi**, Jiho Choi, Taewook Ko, Hyungho Byun, Chong-Kwon Kim  
**ACM Conference on Information and Knowledge Management (CIKM), 2022**
- (C1) Finding Heterophilic Neighbors via Confidence-based Subgraph Matching for Semi-supervised Node ...  
**Yoonhyuk Choi**, Jiho Choi, Taewook Ko, Hyungho Byun, Chong-Kwon Kim  
**ACM Conference on Information and Knowledge Management (CIKM), 2022**
- .....
- (J4) 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**
- (J3) A spectral graph convolution for signed directed graphs via magnetic laplacian  
Taewook Ko, **Yoonhyuk Choi**, Chong-Kwon Kim  
**Neural Networks (IF: 7.8), 2023**
- (J2) Aspect-oriented unsupervised social link inference on user trajectory data  
Hyungho Byun, **Yoonhyuk Choi**, Chong-Kwon Kim  
**Information Sciences (IF: 8.2), 2023**
- (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**
- .....
- (P2) Better Not to Propagate: Understanding Edge Uncertainty and Over-smoothing in Signed GNNs  
**Yoonhyuk Choi**, Jiho Choi, Taewook Ko, Chong-Kwon Kim  
**arXiv '24**
- (P1) Revisiting Signed Propagation of Graph Neural Networks for Multi-Class Datasets  
**Yoonhyuk Choi**, Jiho Choi, Taewook Ko, Chong-Kwon Kim  
**arXiv '23**

## PROJECTS

- **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

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

## EXTRACURRICULAR ACTIVITIES

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- 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)** 2024  
 Titled Identifying Potential Sites for Wetlands, St. Augustine in Florida
- Reviewer (Soft Computing '24)** 2024  
 Soft Computing Journal
- Reviewer (ACM MM '24)** 2024  
 ACM Multimedia Conference
- Reviewer (IEEE Multimedia '24)** 2023  
 Journal of IEEE Multimedia

<b>•Reviewer (Plos One '23)</b> Journal of Plos One	2023
<b>•Research Assistant (RA)</b> Participating in 'Social Network-based Recommendation Project' funded by Samsung Research	Sep. 2020 - Jun. 2021
<b>•Teaching Assistant (TA)</b> Topic: Social Network Analysis and Anomaly Detection (Advisor: Chong-Kwon Kim)	Mar. 2020 - Jun. 2020
<b>•Research Assistant (RA)</b> Participating in 'Smart Campus Project' funded by Samsung	Mar. 2019 - Dec. 2020
<b>•Research Assistant (RA), Undergrad</b> Distributed Computing Lab (Supervisor: Jin-Suk Kim)	Jun. 2017 - Sep. 2017

## AWARDS & GRANTS

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