Sukwon Yun

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RESEARCH INTEREST

Graph Neural Networks and their applications in biomedical domain (AI4Science)

- Addressing the inductive bias of Graph Neural Networks in real-world scenarios, with their application in the field of Medical and Computational Biology, particularly scRNA-seq and Tumor biology
- **Keywords**: Long-Tail Problem, Missing Features, Heterophily, Dropout, Tissue Phenotyping

EDUCATION

Korea Advanced Institute of Technology (KAIST), Daejeon, South Korea — Aug 2021 – Aug 2023

- M.S. in Industrial & Systems Engineering
  - Research Interest: Graph Neural Networks with their applications
  - Advisor: Prof. Chanyoung Park

Hanyang University, Seoul, South Korea — Mar 2015 – Aug 2021

- B.S. in Industrial Engineering
  - *Summa Cum Laude*, Period includes two years of military service

PUBLICATIONS
(*: Equal contribution)

CONFERENCES

[C4] MUSE: Music Recommender System with Shuffle Play Recommendation Enhancement
Yunhak Oh*, **Sukwon Yun***, Dongmin Hyun, Sein Kim, Chanyoung Park
ACM International Conference on Information and Knowledge Management (**CIKM 2023**)

[C3] S-Mixup: Structural Mixup for Graph Neural Networks
Junghurn Kim*, **Sukwon Yun***, Chanyoung Park
ACM International Conference on Information and Knowledge Management (**CIKM Short 2023**)

[C2] MELT: Mutual Enhancement of Long-Tailed User and Item for Sequential Recommendation
Kibum Kim, Dongmin Hyun, **Sukwon Yun**, Chanyoung Park
ACM SIGIR Conference on Research and Development in Information Retrieval (**SIGIR 2023**)

[C1] LTE4G: Long-Tail Experts for Graph Neural Networks
Sukwon Yun, Kibum Kim, Kanghoon Yoon, Chanyoung Park
ACM International Conference on Information and Knowledge Management (**CIKM 2022**)

WORKSHOPS

[W1] Single-cell RNA-seq data imputation using Feature Propagation
Sukwon Yun*, Junseok Lee*, Chanyoung Park
ICML Workshop on Computational Biology (**ICML WCB 2023** ***Best Paper Award***)

IN SUBMISSION
(*: Equal contribution)

CONFERENCES

[S3] DEGNN: Dual Experts Graph Neural Network Handling Both Edge and Node Feature Noise
Tai Hasegawa, **Sukwon Yun**, Xin Liu, Yin Jun Phua, Tsuyoshi Murata
Under Review

[S2] Multiplexed Immunofluorescence Image Analysis through an Efficient Multiplex Network
Sukwon Yun, Jie Peng, Chanyoung Park, Tianlong Chen
Under Review

[S1] Toward Generalizability of Graph-based Imputation on Bio-Medical Missing Data
Sukwon Yun, Yunhak Oh, Junseok Lee, Xin Liu, Tsuyoshi Murata, Dongmin Hyun, Sein Kim, Tianlong Chen, Chanyoung Park
Under Review

JOURNAL

[S4] Single-cell RNA sequencing data imputation using bi-level feature propagation
Junseok Lee*, **Sukwon Yun***, Yeongmin Kim, Tianlong Chen, Manolis Kellis, Chanyoung Park
Under Review

RESEARCH EXPERIENCES

Remote Research Internship Aug 2023 – Present
- Research Intern in UNITES Lab.
  - Mentor: Dr. Tianlong Chen (Postdoctoral Researcher at CSAIL@MIT and Incoming Assistant Professor at UNC)
  - Explored cellular heterogeneity in mpIF image using multi-layer scalable GNNs, submitted to CVPR 2024
  - Explored the generalizability of graph-based imputation in the bio-medical domain, submitted to ICLR 2024
  - Aimed at feature propagation in scRNA-seq, collaborating with Prof. Manolis Kellis, submitted to Nature Methods

Tokyo Institute of Technology (Tokyo Tech), Tokyo, Japan Oct 2022 – Feb 2023
- Visiting Researcher in Murata Lab.
  - Host: Prof. Tsuyoshi Murata
  - Explored weaknesses of structured-based and GNN-based methods in graphs with missing features
  - Proposed supervised contrastive learning that incorporates pseudo-labels in graph domains

Korea Advanced Institute of Technology (KAIST), Daejeon, South Korea Dec 2020 – Feb 2021
- Research Intern in Data Science & Artificial Intelligence Lab. (DSAIL)
  - Mentor: Prof. Chanyoung Park
  - Explored the theoretical basis and practical implementation of GNNs such as GCN and GAT (link)

Hanyang University, Seoul, South Korea Sep 2020 – Aug 2021
- Student Researcher in Intelligent Data Systems Lab. (IDSL)
  - Mentor: Prof. Kichun Lee
  - Proposed an advanced version of Neural Graph Collaborative Filtering using a heterogeneous graph
  - Implemented One-Class SVM on anomaly detection task using MNIST dataset

TEACHING EXPERIENCE

IE343: Statistical Machine Learning, KAIST Spring, 2022
- Gave a tutorial and hosted Kaggle Competition (Course Project) as a Teaching Assistant
  - Competition: Predicting a person's income using a demographic dataset under an imbalance situation

AWARDS & SCHOLARSHIPS

Best Paper Award 2023
- ICML Workshop on Computational Biology, Honolulu, Hawai'i, USA

Korea National Scholarship 2021 – 2023
- Awarded by the Ministry of Science and ICT, South Korea

Poster Competition Excellence Award 2022
- Awarded at Industrial/Social Problem Solving Session held by Department of ISysE, KAIST

SIGIR Student Travel Award 2022
- ACM International Conference on Information and Knowledge Management, Georgia, USA

Merit Based Scholarship 2021
- Awarded by the Department of Industrial Engineering, Hanyang University

Hanyang Academic Achievement Award 2021
- Awarded within the top 3% among the College of Engineering, Hanyang University

Certificate of Recognition 2018
- Awarded when serving military service as an auxiliary police by Seoul Metropolitan Police

PROFESSIONAL SERVICES

Event Organizations
- Session Chair, Knowledge Representation 3, CIKM 2023, Birmingham, UK

Conference Reviews
- International Conference on Machine Learning (ICML) 2024
- The International Conference on Learning Representations (ICLR) 2024
- Conference on Parsimony and Learning (CPAL) 2024
- Conference on Neural Information Processing Systems (NeurIPS) 2023

PROJECTS

Recommending Financial Products based on Graph Embeddings Feb 2021 – Feb 2022
- Collaboration with Hana Bank, South Korea
  - Generated financial networks via Jaccard similarity from user's data and enhanced user representation via GNN

REFERENCES

- **Prof. Chanyoung Park**, Assistant Professor, KAIST
  Email: cy.park@kaist.ac.kr
- **Prof. Tsuyoshi Murata**, Professor, Tokyo Tech
  Email: murata@c.titech.ac.jp
- **Dr. Tianlong Chen**, Incoming Assistant Professor, UNC
  Email: tianlong@mit.edu