Gyuseok Lee

AI Researcher
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Research Interests

Recommender System, Continual Learning, Knowledge Distillation, Generative Models (LLM and Diffusion)

Education

- **M.S., Graduate School of Artificial Intelligence, POSTECH** — Feb 2022 - Feb 2024
  Overall GPA: 3.77 / 4.30 — Pohang, South Korea
  Advisor: Hwanjo Yu
  Thesis: Collaborative Knowledge Distillation for Continual Learning in Recommender System
- **B.S., Computer Science, Mathematics & Statistics, Handong Global University (HGU)** — Feb 2015 - Feb 2022
  Overall GPA: 4.01 / 4.50 & Major GPA: 4.22 / 4.50 **(Magna Cum Laude)** — Pohang, South Korea
  Advisor: InJung Kim, Heonjoo Kim
  **Period includes 23 months of mandatory military service in the Republic of Korea Air Force.*

Research Experience

- **AI Researcher, POSTECH** — March 2024 - Present
  Topic 1: Continual Sequential Recommendation — Pohang, South Korea
  Topic 2: LLM-Generated Intent Guidance for Session-Based Recommendation
- **Visiting Researcher, University of Virginia (UVA)** — Sep 2023 - Feb 2024
  Topic: Collaborative Diffusion Model for Recommender System — Charlotteville, VA
  Advisor: Jundong Li
- **Visiting Researcher, Carnegie Mellon University (CMU)** — Aug 2022 - Feb 2023
  Coursework & Project: Deep Learning, Game Theory, NLP, Large-Scale Multimedia Analysis — Pittsburgh, PA
  IITP AI Intensive Program, Sponsored by the Korean Government
- **Graduate Research Assistant, POSTECH** — Feb 2022 - Feb 2024
  Topic 1: Continual Collaborative Distillation for Recommender System — Pohang, South Korea
  Topic 2: Calibrating Deep Learning Model for Medical AI Applications with Imbalanced Data
- **Medical AI Research Intern, AITRICS** — Dec 2021 - Feb 2022
  Topic 1: Two-Stage Process with CNN and XGBoost for Thyroid Cancer Prediction — Seoul, South Korea
  Topic 2: Self-supervision for Classification of Pathology Images with Limited Annotations
- **Undergraduate Research Intern, HGU** — Feb 2021 - Dec 2021
  Topic: Development of Deep Neural Network Partial Learning Algorithm for On-Device Learning — Pohang, South Korea
  Advisor: InJung Kim

Publications

1. **[CIKM'25] Gyuseok Lee**, Yaochen Zhu, Hwanjo Yu, Jundong Li
   LLM-Generated Intent Guidance for Session-Based Recommendation (To be submitted)
2. **[SIGIR'25] Gyuseok Lee**, SeongKu Kang, Junyoung Hwang, Hyunsik Yoo, Hwanjo Yu
   Capturing User Interests from Data Streams for Continual Sequential Recommendation (Under Review)
3. **[WWW'25 Short] Gyuseok Lee**, Yaochen Zhu, Hwanjo Yu, Yao Zhou, Jundong Li
   Collaborative Diffusion Model for Recommender System **(Accepted)**
4. **[KDD'24] Gyuseok Lee***, SeongKu Kang*, Wonbin Kweon, Hwanjo Yu
   Continual Collaborative Distillation for Recommender System **(Accepted)**
5. **[KICS'23] Gyuseok Lee**, Hwanjo Yu
   Calibrating Deep Learning Model for Medical AI Applications with Imbalanced Data **(Accepted)**

Updated: Tuesday 21st January, 2025

Research Projects

Recommender System

• LLM-generated Intent Guidance for Session Recommendation March 2024 - Present
This work leverages large language models (LLMs) to generate user intents from session data, aiming to capture users' hidden interests in a more interpretable way. The generated intents are seamlessly integrated into existing frameworks through mutual information maximization. POSTECH
Role: First Author to CIKM'25 (To be submitted)

• Capturing User Interests from Data Streams for Continual Sequential Recommendation March 2024 - Present
This work proposes a Transformer-based sequential recommendation model updated with non-stationary data streams. The goal of this model is to effectively preserve historical user interests while adapting to new user interests based on historical knowledge, enhancing the users' evolving preferences. POSTECH
Role: First Author to SIGIR'25 (Under Review)

• Collaborative Diffusion Model for Recommender System Sep 2023 - Present
To mitigate the loss of personalized information during diffusion process when applying diffusion model to RS, we effectively leverage item-side information as auxiliary data. UVA
Role: **First Author to WWW'25 Short (Accepted)**

• Continual Collaborative Distillation for Recommender System March 2023 - Aug 2024
This work addressed the challenge of applying existing teacher-student knowledge distillation (KD) to a dynamic environment characterized by continuously incoming user-item interactions that are non-stationary and numerous. We deployed a compact model that not only preserves high performance through KD but also adapts to dynamic data, successfully integrating CL and KD for practical RS. POSTECH
Role: **Co-first Author at KDD'24 (Accepted)**

• Effective Visual Clustering for Personalized Multimodal Fashion Recommendation Sep 2022 - Dec 2022
This work integrated multimodal knowledge—including recommendation, text, and image data—to enhance fashion recommendations by efficiently handling large-scale data through clustering techniques. CMU
Role: Project Leader - Led overall project progress from conceptualization to implementation.

Natural Language Processing

• MLM is All you need Sep 2022 - Dec 2022
This project developed Question Answering (QA) and Question Generation (QG) models using a simple yet effective masked language model (MLM). CMU
Role: Project Member - Problem Setting and Implementation.

• Automatic Paper Assessment Sep 2022 - Dec 2022
This project developed a generative language model to assist the paper review process by extracting strengths and weaknesses and assigning an acceptance score based on the paper's content. CMU
Role: Project Member - Problem Setting and implementation.

Computer Vision

• Calibrating Deep Learning Model for Medical AI Applications with Imbalanced Data July 2022 - Jun 2023
This work calibrated a deep learning model for cancer prediction from chest X-rays using temperature scaling from Bayesian hyperparameter search. Focal loss was applied to handle class imbalance and further enhance calibration. POSTECH
Role: **First Author to KICS'23 (Accepted)**

• Self-Supervision for Classification of Pathology Images with Limited Annotations Dec 2021 - Feb 2022
This work applied self-supervision to predict cancer from pathology images with limited annotations. Six pretext tasks were designed to improve performance on the downstream task (i.e., cancer prediction). AITRICS
Role: Intern – Problem Setting and Implementation.

• Two-Stage Process with CNN and XGBoost for Thyroid Cancer Prediction Dec 2021 - Feb 2022
This work proposed a two stage approach for extremely large image classification in thyroid cancer prediction, combining CNN for feature extraction and XGBoost for classification. The results demonstrated the potential for practical applications in real-world medical AI services. AITRICS
Role: Intern – Problem Setting and Implementation.

• Developing DNN Partial Learning Algorithm for On-Device Learning Feb 2021 - Dec 2021
This work applied partial learning to enable efficient on-device learning for face image classification. HGU
Role: Undergraduate Researcher – Problem Setting and Implementation.

Reinforcement Learning

- **Multi-Agent Reinforcement Learning for Taxi Repositioning with Attention Network** Sep 2022 - Dec 2022
  This project applied multi-agent reinforcement learning (MARL) to a ride-hailing system, aiming to optimize the balance between supply and demand through the use of attention networks. CMU
  Role: Project Leader - Led overall project progress from conceptualization to implementation.

Teaching Assistance

- **Artificial Intelligence** July 2024
  Assisted in implementing deep learning models (e.g., MLP, CNN, RNN, Transformer) using PyTorch. SK (Company)
- **Object Oriented Programming (OOP)** Feb 2023 - Jun 2023
  Assisted in teaching OOP concepts using C++. POSTECH
- **Big Data Analysis using R Programming** Sep 2021 Dec 2021
  Supported data analysis projects using R programming. HGU
- **Mathematical Statistics** July 2021
  Provided TA sessions on mathematical statistics. HGU
- **Statistical Methodology** Mar 2021 - Jun 2021
  Assisted in applying statistical techniques using R programming. HGU
- **Python Programming** Sep 2020 - Dec 2020
  Managed online discussion boards and provided feedback on coding assignments. KMOOC (Online Learning Platform)
- **Python Programming** Mar 2020 - Dec 2020
  Assisted in teaching basic Python syntax. HGU

Honors

- **Foundation Scholarship, GyeongWon Scholarship Foundation, South Korea** Nov 2021
- **Foundation Scholarship, GyeongWon Scholarship Foundation, South Korea** Mar 2021
- **Academic Excellence Scholarship, HGU, South Korea** Mar 2021
- **Academic Excellence Scholarship, HGU, South Korea** Sep 2020
- **Academic Excellence Scholarship, HGU, South Korea** Mar 2020

Skills

Python, PyTorch, TensorFlow, Linux, R programming, C++, C