Bonwoo Koo

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RESEARCH INTEREST

- **AI in Social Welfare**
- **Large Language Model**
- **Multi-Modal AI**

EDUCATION

Korea Advanced Institute of Science and Technology (KAIST) **Daejeon, Korea**
B.S. Candidate in School of Industrial & Systems Engineering (degree expected in Aug, 2025) Sep 2018 – Present

Greengates School **Mexico City, Mexico**
International Baccalaureate Diploma Aug 2014 – Jun 2018
Subjects: Mathematics, Chemistry, Biology, Business and Management, English, Korean

ACADEMIC PAPERS

Network-based Exploratory Data Analysis and Explainable Three-Stage Clustering for Financial Customer Profiling
Engineering Applications of Artificial Intelligence, SCIE Q1 *Dec 2023*
Insu Choi*, Woosung Koh*, Bonwoo Koo*, Woo Chang Kim

Enhancing Explainability and Forecasting Performance of Global Market Index Futures' Downside Risks through Information Flow Network-Based Communities
Submitted to Applied Soft Computing Present
Insu Choi*, Woosung Koh, Bonwoo Koo, Woo Chang Kim

EXPERIENCE

KAIST Data Science & Artificial Intelligence Lab **Daejeon, Korea**
Undergraduate Researcher *(advised by. Chanyoung Park)* Dec 2023 – Present

- ***Currently working on a project of designing Multi-modal LLM Recommender System to address cross-modality bottlenecks in LLM-based Recommendation Framework***
- *Investigated LLM-based Recommender Systems, encompassing both CF-based LLMRec and Multi-Modal LLMRec*
- *Explored advancements in Recommender Systems from Collaborative Filtering to Side Information-based Filtering*
  - *Studied and deployed several algorithms, including MF, PMF, OCCF, BPR, WD, VAE*
- *Explored advancements in Graph based Recommender Systems and Knowledge Graphs*
  - *Studied and deployed several algorithms, including GCN, GraphSAGE, Deepwalk, TransE*

KAIST Financial Engineering Lab **Daejeon, Korea**
Undergraduate Researcher *(advised by. Woo Chang Kim)* Sep 2022 – Oct 2023

- *Co-first authored a paper on deep clustering for financial customer profiling with Ph.D. and B.E candidates*
  - *Constructed a sophisticated two-stage dimension reduction technique employing Autoencoder, PCA and various Manifold Learning methods, integrated with advanced feature engineering of high-dimensional data*
  - *Led extensive experiments in clustering methodologies, including K-means and Hierarchical clustering*
  - *Implemented SHAP to enhance explainability of clusters and to design tailored financial portfolios*

- *Second authored a paper on predictive analysis of stock return risks using entropic value-at-risk and information-flow network of global financial market index futures with Ph.D. and B.E candidates*

Jun 2022 – Aug 2022

- *Explored the integration of the Optimal Liquidation Problem in Finance with Reinforcement Learning*
  - *Examined Almgren-Chriss model and time series volatility models such as ARCH, GARCH*
  - *Implemented an optimal stock trading strategy with DDPG Agent and compare with baseline strategies*

KAIST Manufacturing & Service Systems Lab **Daejeon, Korea**
Lab Individual Study *(advised by. Hyun-Jung Kim)* Jun 2020 – Aug 2020

- *Explored advancements in solving the Manufacturing Industry Scheduling Problem using Genetic Algorithm*

DOMESTIC CONFERENCE

Improving the Clustering Performance of National Survey of Tax and Benefit (NaSTaB) Data Using Autoencoder and Dimension Reduction Techniques
Korea Intelligent Information Systems Society (KIISS) Conference May 2023
Insu Choi*, Bonwoo Koo, Woosung Koh, Woo Chang Kim

Review of Reinforcement Learning and Recommender Systems in Finance
Korean Institute of Industrial Engineers (KIIE) Conference Nov 2022
Insu Choi*, Bonwoo Koo, Woosung Koh, Woo Chang Kim

HONORS AND AWARDS

2024 South Korea-US STEM Exchange Program Scholarship **Seoul, Korea**
Organization: Korea Institute for Advancement of Technology
Awarded with $9,000 scholarship for the Exchange Program in 2024 Fall at GeorgiaTech
Awarded to 90 students from universities across South Korea

2023 KimYoungHan Global Leader Scholarship **Daejeon, Korea**
Organization: KAIST Scholarship Organization
Awarded to only 2 students in the Dept. ISySE and 16 students across the College of Engineering at KAIST

2022 NH Investment & Securities Big Data Competition – 3rd Place **Seoul, Korea**
Title: Persona based Lifetime Portfolio Management via Autoencoders and Deep Clustering Sep 2022 – Dec 2022

SKILLS, ACTIVITIES & INTERESTS

Languages: Fluent in Korean and English; Conversational Proficiency in Spanish
Technical Skills: Python, Pytorch, Tensorflow

REFERENCE

Chanyoung Park
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Graduate School of Data Science

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Graduate School of Data Science