Junhyung Ahn

Homepage | Email: tonyahn96@gmail.com

Summary

Highly dedicated and motivated machine learning enthusiast with a passion for developing innovative solutions. Proficient in tackling complex data challenges and creating algorithms that address data scarcity and bias issues. Adept at translating theoretical models into practical, scalable solutions. Published papers in top-tier conferences and journals (*NeurIPS, ISIT, IEEE TIT*). Skilled in Python, PyTorch, and TensorFlow. Interested in graph machine learning and causal machine learning.

Research Interests

- Causal Machine Learning
- Recommender Systems
- Graph Machine Learning
- Information Theory

Education

Korea Advanced Institute of Science and Technology (KAIST) Mar. 2019 – Feb. 2022
M.S. in School of Electrical Engineering *Daejeon, Republic of Korea*

- Advisor: Prof. Changho Suh
- GPA: 3.91 / 4.3

Korea Advanced Institute of Science and Technology (KAIST) Mar. 2015 – Feb. 2019
B.S. in School of Electrical Engineering *Daejeon, Republic of Korea*

- GPA: 3.93 / 4.3

Selected Publications

1. **Junhyung Ahn**, "Counterfactual Label Generation for Conversion Rate Prediction", *Submitted to the Knowledge Discovery and Data Mining (KDD)*, 2025.

2. **Junhyung Ahn**, Adel Elmahdy, Changho Suh, and Soheil Mahajer, "On the Fundamental Limits of Matrix Completion: Leveraging Hierarchical Similarity Graphs", *IEEE Transactions on Information Theory*, 2024.

3. Adel Elmahdy*, **Junhyung Ahn***, Soheil Mahajer, and Changho Suh, "The Optimal Sample Complexity of Matrix Completion with Hierarchical Similarity Graphs", *IEEE International Symposium on Information Theory (ISIT)*, 2022. (*Equal contribution)

4. Adel Elmahdy*, **Junhyung Ahn***, Changho Suh, and Soheil Mahajer, "Matrix Completion with Hierarchical Graph Side Information", *Conference on Neural Information Processing Systems (NeurIPS)*, 2020. (*Equal contribution)

Work Experiences

Machine Learning Engineer at AI Team Mar. 2022 – Present
Dable *Seoul, Republic of Korea*

- Serving as a technical research personnel (an alternative military service)
- Designed machine learning recommender systems for click-through rate (CTR) and conversion rate (CVR) estimation
- Harnessed the concept of self-supervised learning (SSL) in training machine learning multi-task models to address the data scarcity challenge
- Applied causal inference techniques to enhance model robustness during model construction

Master's student at Information System Lab Mar. 2019 – Feb. 2022
Korea Advanced Institute of Science and Technology (KAIST) *Daejeon, Republic of Korea*

- Studied recommender systems, focusing on cold-start problem
- Developed a computationally efficient algorithm leveraging user social similarity graphs as side information to mitigate data scarcity issue
- Conducted theoretical analysis to characterize the information-theoretic limit regarding the minimum number of observed matrix entries required for perfect recovery
- Achieved the information-theoretic limit asymptotically and also outperformed state-of-the-art algorithms
- Published papers in top-tier conferences and journals (*NeurIPS, ISIT, IEEE TIT*)

Research Intern at ML Infra Lab Mar. 2018 – Aug. 2018
SK Telecom *Seongnam, Republic of Korea*

- Developed a learning rate schedule for a faster convergence
- Achieved comparable prediction erformance with other models in 3 times less epochs
- Reduced computational costs by 30%
- Developed a distributed training system of deep learning models

Honors & Awards

Magna Cum Laude Feb. 2019
Korea Advanced Institute of Science and Technology (KAIST) *Deajeon, Republic of Korea*

KAIST Support Scholarship Mar. 2019 – Dec. 2020
Korea Advanced Institute of Science and Technology (KAIST) *Deajeon, Republic of Korea*

- National full scholarship received by Korean government during Master Course in KAIST
- About $ 24,000 in total

National Science & Technology Scholarship Mar. 2015 – Dec. 2018
Korea Advanced Institute of Science and Technology (KAIST) *Deajeon, Republic of Korea*

- National full scholarship received by Korean government during Undergraduate Course in KAIST
- About $ 15,000 in total

KAIST Support Scholarship Mar. 2015 – Dec. 2018
Korea Advanced Institute of Science and Technology (KAIST) *Deajeon, Republic of Korea*

- Scholarship received for 8 semesters during Undergraduate Course in KAIST
- About $ 20,000 in total

Teaching Experiences

AI and Machine Learning Courses Aug. 2019 – Dec. 2021
Korea Advanced Institute of Science and Technology (KAIST) *Deajeon, Republic of Korea*

- Samsung Machine Learning Course
- SK-Hynix Machine Learning Course
- Seongnam-KAIST Machine Learning Course
- Hyundai Motor Machine Learning Course

Teaching Assistant (TA) Sep. 2019 – July 2020
Korea Advanced Institute of Science and Technology (KAIST) *Deajeon, Republic of Korea*

- Wireless Communication Systems (EE321) | Instructor: Changho Suh
- Introduction to Electronics Design Lab (EE305) | Instructor: Junkyun Choi

Projects

Resolving data scarcity issue in conversion rate (CVR) estimation task Sep. 2023 – Dec. 2023
Dable *Seoul, Republic of Korea*

- Employed multi-task learning paradigm during the training of ML models
- Implemented self-supervised learning concepts to optimizing the training of models
- Augmented embedding vectors of models and constructed contrastive loss with the vectors
- Improved online CVR estimation performance by 33%

Mitigating data bias in conversion rate (CVR) estimation task Oct. 2022 – May 2023
Dable *Seoul, Republic of Korea*

- Developed CVR estimation models using deep learning models and tree-based models
- Applied bias-alleviating methods in causal inference, e.g., Inverse Propensity Weighting and Doubly Robust
- Adopted casual machine learning model, called Delayed Feedback Model (DFM)
- Improved online CVR estimation performance by 24%

Improving click-through rate (CTR) prediction performance April 2022 – Sep. 2022
Dable *Seoul, Republic of Korea*

- Applied focal loss to increase prediction on hard examples
- Feature engineering by feature augmentation and employing text embedding vectors
- Increased online CTR estimation performance by 27%

Ensuring high AI learning performance with a small amount of data Feb. 2020 – Feb. 2022
Korea Advanced Institute of Science and Technology (KAIST) *Deajeon, Republic of Korea*

- Developed a matrix completion algorithm with an aid of data relationship graph
- Applied the algorithm in semi-supervised learning by labeling the unlabeled data
- Improved prediction performance by 20%

Medical Image-based Patient Search System June 2019 – June 2020
Korea Advanced Institute of Science and Technology (KAIST) *Deajeon, Republic of Korea*

- Developed a similar medial image search system based on deep learning with Pytorch
- Collaborated with Samsung Medical Center (SMC) to construct a database
- Achieved 85% test accuracy to predict 14 types of chest diseases
- Retrieved semantically similar medical images, verified by a specialist

Technical Skills

Programming Languages: Python, MATLAB, JavaScript, TypeScript, C/C++

Machine Learning Frameworks: Pytorch, Tensorflow, Scikit-learn

Data Analysis and Visualization: Pandas, NumPy, Matplotlib, Seaborn

Database & Cloud Platform: SQL, AWS, Ray, Spark, Hadoop

Other Skills: Git, Docker

English: Fluent (IBT TOEFL: 101)

Contacts & Homepages

- Email: tonyahn96@gmail.com
- Phone: +82) 10-xxxx-xxxx
- Notion: https://equatorial-newt-0f1.notion.site/Hi-it-s-Junhyung-s-Page-1fdbb954ef8a4b30bd97df64a1f0e6e2
- LinkedIn: https://www.linkedin.com/in/junhyung-ahn-41a114256
- Google sites: https://sites.google.com/view/junhyungahn