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Personal Profile

I am a Ph.D. student in the Optimization & Machine Learning (OptiML) Laboratory, advised by Prof. Chulhee Yun at Kim Jaechul Graduate School of AI (GSAI) in Korea Advanced Institute of Science and Technology (KAIST). Before this, I received my Bachelor's degree in Mathematical Sciences (major) and Computing Sciences (minor) at KAIST in 2022.

My primary research interests lie in optimization, machine learning, and deep learning, mainly focusing on theoretical analysis of them. Recently, I have been looking at topics on various constrained and/or multi-level optimization problems, including minimax optimization (*i.e.*, saddle point problem), fair machine learning, reinforcement learning, continual/incremental learning, and more, with particular interest.

Education

Korea Advanced Institute of Science and Technology (KAIST)

Ph.D. in Artificial Intelligence

• Advisor: Prof. Chulhee Yun (Optimization & Machine Learning (OptiML) Laboratory, Kim Jaechul Graduate School of AI (GSAI), KAIST)

Korea Advanced Institute of Science and Technology (KAIST)

M.Sc. in Artificial Intelligence

- Advisor: Prof. Chulhee Yun (Optimization & Machine Learning (OptiML) Laboratory, Kim Jaechul Graduate School of AI (GSAI), KAIST)
- Thesis: "Improved Convergence Rate of SGDA by Shuffling: Focusing on the Nonconvex-PŁ Minimax Problems" (Approved by Chulhee Yun, Se-Young Yun, & Donghwan Kim)

Korea Advanced Institute of Science and Technology (KAIST)

B.Sc. in Mathematical Sciences

• Minor in Computer Sciences

• Summa Cum Laude (GPA: 4.05/4.3)

University of Twente

Exchange Student Program

• Major in Applied Mathematics

Incheon Science High School

High School

• Early Graduation (two-year course)

Publications

INTERNATIONAL CONFERENCES/JOURNALS

- Lee, Junghyun*, <u>Hanseul Cho</u>*, Se-Young Yun, Chulhee Yun. "Fair Streaming Principal Component Analysis: Statistical and Algorithmic Viewpoint." **NeurIPS 2023.** [OpenReview]
- Lee, Hojoon*, <u>Hanseul Cho</u>*, Hyunseung Kim*, Daehoon Gwak, Joonkee Kim, Jaegul Choo, Se-Young Yun, Chulhee Yun. "PLASTIC: Improving Input and Label Plasticity for Sample Efficient Reinforcement Learning." NeurIPS 2023. [OpenReview] [arXiv]
- <u>Cho, Hanseul</u> and Chulhee Yun. "SGDA with shuffling: faster convergence for nonconvex-PŁ minimax optimization." **ICLR 2023**. [OpenReview] [arXiv]

DOMESTIC CONFERENCES/JOURNALS

• Cho, Hanseul and Chulhee Yun. SGDA with shuffling: faster convergence for nonconvex-PŁ minimax optimization. Short version in 2022 Korea Al Association + NAVER Autumnal Joint Conference (JKAIA 2022).

- NAVER Outstanding Theory Paper Award & Spotlight presentation.

- Cho, Hanseul*, Junghyun Lee*, Se-Young Yun, Chulhee Yun. Fair Streaming Principal Component Analysis: Statistical and Algorithmic Viewpoint. 2023 Korea Al Association Summer Conference (CKAIA 2023).
- Lee, Hojoon*, <u>Hanseul Cho</u>*, Hyunseung Kim*, Daehoon Gwak, Joonkee Kim, Jaegul Choo, Se-Young Yun, Chulhee Yun. Enhancing Generalization and Plasticity for Sample Efficient Reinforcement Learning. CKAIA 2023.

PREPRINTS

• Lee, Jaewook*, Hanseul Cho*, Chulhee Yun. Fundamental Benefit of Alternating Updates in Minimax Optimization. Under Review. [arXiv]

Seoul, Republic of Korea

Seoul, Republic of Korea

. Mar. 2022 - Aug. 2023

Sept. 2023 - Current

Daejeon, Republic of Korea Mar. 2017 - Feb. 2022

> Enschede, Netherlands Feb. 2020 – Jul. 2020

Incheon, Republic of Korea Mar. 2015 – Feb. 2017



Machine/Deep Learning Theory + Physics (MDLTP) Seminar

(Co-)Organizer

- Homepage: sites.google.com/view/mdlt-p
- Jointly organized by OSI Lab, OptiML, and CSSPL
- Topics: Learning theory, loss landscape, trajectory analysis, (stochastic) optimization, high-dimensional statistics, statistical/mathematical physics, scientific machine learning, and more.

KAIST 2021 Post-AI Research Project

Undergraduate Researcher

- Jointly advised by Prof. Sangyoon Yi (DS Lab, GSFS, KAIST) & Prof. Jinkyoo Park (Sys. Int. Lab, ISysE, KAIST)
- Project: Research on 'Al-augmented Organizations' of Collaborative Decision Making and Learning
- Contribution: (1) Devised a model-based randomized algorithm for a single-player finite-horizon NK landscape optimization game; (2) Conducted some experiments on human-AI cooperation based on the algorithm that I devised

Korea Advanced Institute of Science and Technology (KAIST)

Individual Study

- Advised by Prof. Jinwoo Shin (ALIN Lab, GSAI, KAIST)
- (1) gradient-based optimizers for large-batch setting (e.g., LARS & LAMB); (2) theoretical analysis on gradient clipping (paper reading)

Korea Advanced Institute of Science and Technology (KAIST)

Individual Study

- Advised by Prof. Jong-chul Ye (BISPL, BBE, KAIST)
- Assignment: Semantic Segmentation of Kidney Tumor with U-Net (with KiTS19 Challenge Dataset)

Korea Advanced Institute of Science and Technology (KAIST)

Individual Study

- Advised by Prof. Yeonseung Chung (MAS, KAIST)
- Statistical learning theory

Services_____

Reviewer

- ICLR 2024. (2 papers)
- NeurIPS 2023. (2 papers)

Awards_

2022	NAVER Outstanding Theory Paper Award, JKAIA 2022
2022	Summa Cum Laude, Bachelor's, KAIST
2017 - 2020	The National Scholarship for Science and Engineering, Korea Student Aid Foundation
2017 Fall	Dean's List, The School of Freshman, KAIST

Skills_____

Programming	Familiar: Python (PyTorch, NumPy, Scikit-learn, Jupyter,	Pandas, etc.), MATLAB.	Novice: C, C++, R, HTML/CSS, Scalar
Computer Misc.	Familiar: धाॅEX (Overleaf/VSCode), Git, Microsoft Office.	Novice: Adobe (Lightroo	m, Premiere Pro, After Effects, Photoshop)
Music	Playing the drums and percussions		

Languages ____

English	Sufficient for academic activities: TOEIC score 925 (LC 460, RC 465) (2021.04.11)
Korean	Native proficiency
Others	Had some introductory courses on French, German, Classical Latin, & Chinese.

Daejeon, Republic of Korea May 2021 – Dec. 2021

Daejeon, Republic of Korea

Mar. 2021 – Jun. 2021

Daejeon, Republic of Korea Sep. 2020 – Feb. 2021

Daejeon, Republic of Korea

Jun. 2020 – Aug. 2021

Republic of Korea Republic of Korea Republic of Korea Republic of Korea

2

Seoul, Republic of Korea Jul. 2022 – Feb. 2023