

KIJUNG JEON

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EDUCATION

Korea Advanced Institute of Science and Technology (KAIST) Daejeon, Republic of Korea
B.S in Electrical Engineering & Mathematical Science (Double major) *Mar. 2018 ~
GPA: 4.26/4.30 (Overall), 4.30/4.30 (EE/Math major)
(* Left for mandatory military service: Jan. 2020 ~ Aug. 2021)

UC Berkeley (Exchange program) Berkeley, CA, USA
GPA: 4.0/4.0, Period: May. 2018 ~ Aug. 2018 (Summer Session)

Selected courseworks

EE : Information theory, Signal processing, Linear system theory, Programming structure

Math : Statistical inference (Classical, Bayesian), Probability theory, Real analysis (+ Measure theory), Linear algebra, Numerical analysis, Convex optimization, Differential geometry, Differential equations (PDE/ODE), Machine learning theory, Scientific machine learning (SciML)

RESEARCH INTERESTS

- High-dimensional statistics, probability theory (+ SDE), information theory and statistical learning theory, optimization in ML
- Theoretical aspects of machine learning and its applications to improve algorithm efficiency
 - Current interested applications: Bayesian deep learning, Data valuation for efficient deep learning, Contrastive learning.

RESEARCH EXPERIENCE

Inference and Information for Data Science (IIDS) Lab Dec. 2021 ~
Advisor : Prof. Hye won Chung

- Efficient crowdsourcing algorithms
 - Studied spectral methods for data science via a statistical perspective and efficient crowdsourcing algorithms for multi-class labeling.
- Mix-up training based on data valuation scores
 - Studied various data valuation scores for efficient training of neural networks.
 - Implemented mix-up based on data-valuation scores and verified the characteristics of efficient mixup samples to accelerate transfer learning.

Algorithmic Intelligence Laboratory (ALIN-LAB) Dec. 2022 ~ Aug. 2023
Advisor : Prof. Jinwoo Shin

- Information theory views of contrastive losses
 - Studied variational bounds of mutual information, Renyi-mutual information.
 - Compared mutual information estimation performance via neural network under correlated gaussian distribution.
- Analysis of mix-up in contrastive learning and its domain-agnostic application [\[pdf\]](#)

- Proved mix-up contrastive learning with InfoNCE loss contributes to regularization of input directional derivatives and verified its empirical evidence under supervised contrastive learning.
- Proposed domain-agnostic contrastive learning algorithm based on discrete patch mix-up exploiting transformer architecture.

Statistical Inference and Machine Learning (SIML) Lab

Jun. 2023 ~

Advisor : Prof. Juho Lee

- Understanding the cold posterior effect in bayesian deep learning
 - Studied the theoretical framework of SGMCMC algorithms and their variations for efficient sampling.
 - Verified the under/over-damping behaviors of SGHMC with respect to hyperparameters and asymptotic behavior of SGHMC when decayed momentum is periodically re-sampled.
 - Verified the constant weight norm behavior during training as a sampling from the typical set in SGHMC with iso-tropic gaussian prior assumption via analysis of Fokker-Planck equations.

IN-CLASS PROJECTS

Visualization of electric fields via PINNs (Physics-Informed Neural Networks) [\[pdf\]](#)

- Visualized the two-dimensioal electric field by solving differential form of Gauss's law via PINNs.
- Proposed an efficient method to stabilize training of PINNs based on data valuation scores.

An efficient clustering algorithm for mixtures of high-dimensional iso-tropic gaussians

- Clustered mixtures of high-dimensional iso-tropic gaussians using PCA followed by GM algorithm, verifying that iso-tropic gaussian is invariant under PCA.

ACTIVITIES & WORK EXPERIENCE

Freshman mentoring (Calculus 1) at KAIST

Mar. 2019 ~ Jun. 2019

Republic of Korea Army (ROK)

Jan. 2020 ~ Aug. 2021

- Work place : 102nd Signal Brigade - ROK II Corps

SKILLS

Programming Languages and Frameworks

Python (+ Pytorch), Matlab, R, C, Latex, HTML

Languages

Korean : Native, English : Fluent

AWARDS AND SCHOLARSHIPS

KAIST Presidential award, KAIST

Feb. 2018

Awarded to students with high entrance scores

KAIST Presidential Fellowship (KPF), KAIST

Feb. 2018 ~

National Excellence Scholarship for Science & Engineering, KOSAF

Feb. 2018 ~

Dean's List, School of Freshman, KAIST

Fall 2018

Dean's List, College of Engineering, KAIST

Spring 2019, 2023, Fall 2020, 2021, 2022

Department Honors Scholarship, KAIST

Fall 2019, Spring 2022, 2023

Awarded to Top 4 highest GPA students in EE department for each semester