Seohyeon Cha

kaitjgus@kaist.ac.kr | seohyeon-cha.github.io

Education

Korea Advanced Institute of Science and Technology (KAIST)

Master's Degree in Electrical Engineering — *Mar 2022 – Feb 2024*

- *Advisor: Prof. Joonhyuk Kang*
- Focus: Conformal prediction, Bayesian learning, graph learning
- Cumulative GPA: 4.17 / 4.3 (98.5 / 100)

Bachelor's Degree in Electrical Engineering — *Mar 2017 – Feb 2022*

- *Summa Cum Laude*
- Cumulative GPA: 4.03 / 4.3 (97 / 100)
- Major GPA: 4.10 / 4.3

Research Experience

On the Temperature of Bayesian GNNs for Conformal Prediction — *Jan 2023 — Sep 2023*

- Showed existence of temperatures of Bayesian GNNs that make efficient prediction sets through CP
- Analyzed the relationship between CP performance and model calibration

Generalized Federated Learning — *Jan 2023 — Sep 2023*

- Devised adaptive model scaling framework in FL to address system heterogeneity
- Participated in setting up of theoretical background, result interpretation, and writing
- Provided interpretation on performance of pre-trained models in proposed federated learning framework

Undergraduate Research Program (URP) *(PI: Prof.Hyewon Chung)*

Study on data valuation and learning algorithm using data value — *Dec 2020 – Jun 2021*

- Figured out relation between memorization and forgetting events
- Implemented experiments on data mapping with training dynamics to differentiate outliers and noisy-labeled data

Publications

Working Paper

[W1] Honggu Kang, **Seohyeon Cha**[2], Jiwan Seo, and Joonhyuk Kang, "GeFL: Generative model-aided Federated Learning for Heterogeneous Clients."

Preprint

[P1] **Seohyeon Cha**[1], Honggu Kang, and Joonhyuk Kang, "On the Temperature of Bayesian Graph Neural Networks for Conformal Prediction," in submission.

[P2] Honggu Kang, **Seohyeon Cha**[2], Jinwoo Shin, Jongmyeong Lee, and Joonhyuk Kang, "NeFL: Nested Federated Learning for Heterogeneous Clients," in submission. [pdf] [code]

Conference

[C1] **Seohyeon Cha**[1], Sanghyuk Kim, Jiwan Seo, and Joonhyuk Kang, "Intelligent Surface-aided Transmit-array Antenna in mmWave Communication System with Historical Channel Observation," in *IEEE International Conference on Consumer Electronics-Asia (ICCE-Asia)*, 2022. [pdf] [code]

Honors and Awards

National Sciences and Engineering Scholarship, Korea Student Aid Foundation — *2018 – 2020*

Korean Governmental Scholarship — *2017 – 2018*

Korean Governmental Scholarship (Graduate) — *2022 – Present*

Teaching Experience

Research Assistant *Mar 2023 – Present*

- Covered machine learning theory and implementation using PyTorch

Teaching Assistant

- EE205 Data Structures and Algorithms for Electrical Engineering *Fall 2022*
- EE966 M.S. Seminar <Colloquium> *Spring/Fall 2023*

Counseling Assistant *Sep 2022 – Feb 2023*

- Counseled 32 undergraduate/graduate students
- Helped them with course work, career decision, relationships

Tutor for freshman students *2018 – 2019*

- Courses: MAS101 Calculus 1, MAS102 Calculus 2
- Taught calculus and problem solving, met once a week during semester

Projects

Optimization using historical channel observation *Jul 2022 – Oct 2022*

- Formulated optimization problem of phase shift matrix of intelligent transmitting surface and implemented SGD-based algorithm using historical channel observations
- Published paper based on work and gave presentation at ICCE-ASIA 2022

Detecting defects on surface of airplane using object detection *Jul 2023 – Present*

- Implemented object detection algorithm to detect surface defects with PyTorch

Detecting shared spectrum and signal type in 6GHz band *Sep 2021 – Present*

- Implemented shared spectrum model in 6GHz band using MATLAB
- Devised signal classification algorithm using CNN with additional regularization for signal protection

Relevant Coursework

EE528 Engineering Random Process
EE534 Pattern Recognition
EE623 Information Theory
EE837 Advances in Convolutional Neural Networks
AI501 Machine Learning for AI
AI599 Deep learning and real-world applications
AI706 Bayesian Nonparametric Methods for Machine Learning

Languages & Technical Skills

Fluent in **English** and Native in **Korean**
IBT TOEFL 105 (Reading: 30, Listening: 29, Speaking: 23, Writing, 23)
Proficient in Python, Pytorch, MATLAB, Novice in C, C++, Julia

References

Joonhyuk Kang
Professor
School of Electrical Engineering
Korea Advanced Institute of Science and Technology (KAIST)
Email : jkang@kaist.ac.kr, Tel: +82.042.350.7422