Seohyeon Cha

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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, federated learning
- Cumulative GPA: 4.17 / 4.3

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

- *Summa Cum Laude*
- Cumulative GPA: 4.03 / 4.3
- Major GPA: 4.10 / 4.3

Research Experience

Trustworthy Graph Learning via Conformal Prediction (CP) *Jan 2023 — Sep 2023*

- Showed existence of temperature in Bayesian GNNs that improves informativeness of CP set predictor
- Analyzed the relationship between informativeness of CP set predictor and model calibration

Generative Model-aided Federated Learning for Heterogeneous Clients *Sep 2023 — Present*

- Proposed algorithm in which models with heterogeneous architectures utilize feature-generative models
- Demonstrated compatibility of generative models in terms of accuracy, model heterogeneity, and privacy

Model Scaling in Federated Learning for Heterogeneous Clients *Jan 2023 — Sep 2023*

- Devised an adaptive model scaling method in federated learning to address system heterogeneity
- Provided interpretation of pre-trained models and statistical heterogeneity within the proposed framework

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

Data Valuation for Robust Learning *Dec 2020 – Jun 2021*

- Figured out the relationship between memorization and forgetting events
- Proposed data mapping approach using training dynamics to distinguish outliers from noisy labeled data

Publications

Working Paper

[W1] Honggu Kang*, **Seohyeon Cha***, Jiwan Seo, and Joonhyuk Kang, "GeFL: Generative Model-aided Federated Learning for Heterogeneous Clients." (* Equal contribution)

Preprint

[P1] 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], Honggu Kang, and Joonhyuk Kang, "On the Temperature of Bayesian Graph Neural Networks for Conformal Prediction," In *NeurIPS 2023 Workshop: New Frontiers in Graph Learning*, 2023. [pdf]

[C2] **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 Science and Engineering Scholarship (Academic Excellence) *2019 – 2021*
Korean Governmental Scholarship (Graduate) *2022 – Present*
Korean Governmental Scholarship *2017 – 2018*

Teaching Experience

Research Assistant
- Covered machine learning theory and implementation using PyTorch *Spring 2023*
- Studied fundamental concepts of federated learning and its implementations using PyTorch *Fall 2023*

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 coursework, career decisions, and 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 for phase shift matrix of intelligent transmitting surface and proposed SGD-based algorithm using historical channel observations
- Published paper based on work and delivered presentation at ICCE-ASIA 2022

Detecting Defects on Surface of Airplane Using Object Detection *Jul 2023 – Present*
- Implemented object detection algorithm for surface defect detection using PyTorch

Detecting Shared Spectrum and Signal Type in 6GHz Band *Sep 2021 – Present*
- Implemented shared spectrum model in 6 GHz band using MATLAB
- Devised signal classification and detection algorithm for spectrum sharing and signal protection

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

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