Taehun Cha

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Taehun Cha is a Ph.D. candidate at the Department of Mathematics, Korea University. His main research area is Natural Language Processing, sequential decision-making, and mathematically analyzing the current success of AI.

Education

Ph.D. Candidate in Mathematics – Korea University (Advisor: Donghun Lee) Mar. 2022 —

- Funded by National Research Foundation (NSF) of Korea

M.F.E. in Financial Engineering – Korea University (Advisor: Donghun Lee) Mar. 2020 — Feb. 2022

- Fully funded student
- Academic Excellence Scholarship for 2021 Spring Semester
- Thesis: Understanding the Yield Curve Shift with FOMC Statements: NLP Perspective

B.A. in Sociology and Cultural Critics – Yonsei University Mar. 2012 — Aug. 2019

- Minor in Applied Statistics

Work Experience

KT Corp., Ph.D. Student Researcher, Jul. 2023. - Aug. 2023.

- Researched the hallucination problem in large language models (LLM). Built an automatized pipeline to construct a hallucination dataset using ChatGPT and a reward model to train LLM with RL.
- Selected as an outstanding intern.

Publication

Taehun Cha and Donghun Lee. 2025. "Curse of Smoothness in Functional Neural Networks." **IEEE Signal Processing Letters**, vol. 32, pp. 4229-4233, 2025, doi: 10.1109/LSP.2025.3624683.

Taehun Cha and Donghun Lee. 2025. "Feature Learning as a Virtual Covariance Learning." Optimization for Machine Learning Workshop at Neurips 2025 **(OPT@Neurips 2025)**.

Chandler Smith, Marwa Abdulhai, (...), Taehun Cha, (...). 2025. "Evaluating Generalization Capabilities of LLM-Based Agents in Mixed-Motive Scenarios Using Concordia." The Thirty-ninth Annual Conference on Neural Information Processing Systems Datasets and Benchmarks Track, **(Neurips 2025)**.

Taehun Cha and Donghun Lee. 2025. "Emergent Linear Separability of Unseen Data Points in Last-Layer Feature Space." Workshop on High-dimensional Learning Dynamics at ICML 2025 **(HiLD@ICML 2025)**.

Taehun Cha and Donghun Lee. 2025. "ABC3: Active Bayesian Causal Inference with Cohn Criteria in Randomized Experiments." In The 39th Annual AAAI Conference on Artificial Intelligence **(AAAI 2025, Oral)**.

Taehun Cha and Donghun Lee. 2024. "Pre-trained Language Models Return Distinguishable Probability Distributions to Unfaithfully Hallucinated Texts." Findings of the Association for Computational Linguistics: EMNLP 2024 **(EMNLP 2024 Findings)**.

Taehun Cha and Donghun Lee. 2024. "Evaluating Extrapolation Ability of Large Language Model in Chemical Domain." Language + Molecules Workshop at ACL 2024. **(Lang+Moles@ACL 2024)**

Taehun Cha and Donghun Lee. 2024. "SentenceLDA: Discriminative and Robust Document Representation with Sentence Level Topic Model." In Proceedings of the 18th Conference of the European Chapter of the Association for Computational Linguistics (**EACL 2024, Oral**).

Taehun Cha and Donghun Lee. 2023. "Predicting U.S. Treasury Yield Curve Shifts with FOMC Statements Using BERT." In Proceedings of the 50th Korea Computer Congress (**KCC 2023**).

Taehun Cha*, Jaeheun Jung*, and Donghun Lee. 2022. "Noun-MWP: Math Word Problems Meet Noun Answers." In Proceedings of the 29th International Conference on Computational Linguistics (**COLING 2022**).

Working Paper

"Consequence-Guided Information Extraction for Predicting Central Bank Communication's Effect." Under Review.

Grant

Ph.D. Fellowship. 2025. National Research Foundation of Korea (NRF). 25,000,000 KRW (~ 20,000 USD)

- Financial support for research on DNN feature space linear separability.

Junior Fellow-Research Grant. 2023. Korea University. 2,000,000 KRW (~ 1,500 USD)

- Financial support for research on sentence-level topic modeling.

AI Grand Challenge. 2021. Ministry of Science and ICT. 237,500,000 KRW (~ 167,000 USD)

- Serving as a team leader in the AI Grand Challenge, secured a follow-up project to develop an AI algorithm for solving math word problems.

Awards

Concordia Contest @ Neruips 2024 - First Place out of 197 participants. 2024. Cooperative AI Foundation, Google DeepMind, MIT, UC Berkeley, and UCL.

- Designed and developed an LLM-based AI agent that maximizes expected reward while maintaining a cooperative stance.

AI Grand Challenge - 7nd Place. 2023. Ministry of Science and ICT.

- Designed and led the development of an open-domain, multi-hop, multi-modal, document-based report-generating system (team leader).

AI Grand Challenge Open Track - 2nd Place. 2023. Ministry of Science and ICT.

- Developed an open-domain, multi-hop, multi-modal document QA system and achieved 2nd place out of 12 teams.

Korean AI Competition - 4th Place. 2022. Ministry of Science and ICT.

- Developed an Automatic Speech Recognition model for the Korean language and achieved 4th place out of 103 teams (team leader).

AI Grand Challenge. 2021. Ministry of Science and ICT.

- Developed an NLP model to solve elementary math word problems based on KLUE-RoBERTa, and we were selected for follow-up research (team leader).

HAAFOR NLP Challenge 2020 - 3rd place. 2020. HAAFOR.

- Achieved 3rd place(70.27% accuracy) on text order prediction task with ALBERT model.

K-Cyber Security Challenge 2019 - final round. 2019. KISA.

- Developed a random forest algorithm to predict and detect a cyber attack on automobiles.

Invited Talks

Understanding Feature Learning: AGOP, RFM, and Virtual Covariance Learning, Korean Mathematical Society Fall Symposium, Korean Mathematical Society, October 22, 2025.

Cooperative AI: Focusing on the Concordia Contest, Cooperative AI Talk, AI Safety Asia, Online, April 10, 2025. `https://www.youtube.com/watch?v=c4bSITHm6Ms`

Extracting Financial Knowledge from FOMC Communications with Reinforcement Learning and Natural Language Processing, The Artificial Intelligence Symposium, Natural Science Research Institute, Gangneung-Wonju National University, June 9, 2023.

Teaching Experience

Korea University

- Mathematics for Artificial Intelligence (2025 Fall), Teaching Fellow

Academic Service

- Reviewer for TMLR (2025~)
- Reviewer for Neurips (2025~)
- Reviewer for ACL Rolling Review (2024~)
- Reviewer for Neural Computing and Applications (2024~)