Changhun Kim

Contact Information

Position: M.S. Student @ KAIST AI, Machine Learning Researcher @ AITRICS
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Links: Homepage, Google Scholar, GitHub, LinkedIn, X

Research Interests

My research interests lie in developing scalable and provable machine learning algorithms for various applications with some emphasis on theoretical aspects. Currently, I am particularly intrigued by the following topics:

Generalizable Deep Learning: Test-Time Adaptation, Meta-Learning, Zero-Shot Learning
Generative Models: Generative Adversarial Networks, Diffusion Models
Bayesian Machine Learning: Bayesian Deep Learning, Bayesian Nonparametrics

Education

Korea Advanced Institute of Science and Technology (KAIST) Daejeon, South Korea

M.S. in Artificial Intelligence — Mar 2022 - Present

- Thesis: Test-Time Adaptation for Automatic Speech Recognition via Sequential-Level Generalized Entropy Minimization
- Lab: Machine Learning and Intelligence Laboratory
- Advisor: Eunho Yang
- GPA: 4.25/4.3, 4.0/4.0, 99.5%

B.S. in Computer Science and Mathematics (Double Major) — Mar 2017 - Feb 2022

- Magna Cum Laude with Honors in Engineering
- GPA: 3.92/4.3, 3.81/4.0, 96.2%

Research Experience

Medical AI Division, AITRICS Seoul, South Korea

Machine Learning Researcher — Nov 2023 - Present

- Research large language models and test-time adaptation for time series analysis, with specific focus on biomedical signal analysis in collaboration with Eunho Yang.

Machine Learning and Intelligence Laboratory, KAIST Daejeon, South Korea

Research Intern — Jun 2021 - Feb 2022

- Research on style matching denoiser for automatic speech recognition under the supervision of Eunho Yang.

Vehicular Intelligence Laboratory, KAIST Daejeon, South Korea

Research and Development Intern — Oct 2019 - Aug 2020

- Research a deep reinforcement learning system for AI soccer, and develop rule-based and deep learning AI soccer code generators under the guidance of Dongsoo Har.

Publications

*: Equal contribution

CloudFixer: Test-Time Adaptation for 3D Point Clouds via Diffusion-Guided Domain Translation

Hajin Shim*, **Changhun Kim*** and Eunho Yang
Under Review

AdapTable: Test-Time Adaptation for Tabular Data via Shift-Aware Uncertainty Calibrator and Label Distribution Handler

Changhun Kim*, Taewon Kim*, Seungyeon Woo, June Yong Yang and Eunho Yang
Under Review

SGEM: Test-Time Adaptation for Automatic Speech Recognition via Sequential-Level Generalized Entropy Minimization [paper][code]

Changhun Kim, Joonhyung Park, Hajin Shim and Eunho Yang
Conference of the International Speech Communication Association (INTERSPEECH), 2023
Oral Presentation, 348/2293=15.18%

Professional Experience

MLOps Squad, DeepNatural AI — Seoul, South Korea
Machine Learning Engineer Intern — Sep 2020 - Feb 2021

- Develop diverse machine learning systems, including speaker verification and diarization framework, Duchenne smile classifier, and medical product recommender.

Big Data Center, Netmarble — Seoul, South Korea
Data Engineer Intern — Jun 2019 - Aug 2019

- Develop log-based real-time OLAP service for Seven Knights mobile game.

Honors and Awards

Best MLILAB Member for 2022 - 2023, KAIST — Jul 2023
Dongwon Scholarship (Full M.S.), KAIST — 2022 - 2023
Magna Cum Laude, College of Engineering, KAIST — Feb 2022
Silver Prize, Korean Undergraduate Mathematics Competition — Jan 2022
Overseas Exchange Scholarship, Mirae Asset — Dec 2019
Representative of Student Exchange Ambassador, KAIST — Nov 2019
Honor Student, College of Engineering, KAIST — Sep 2019
Convergence AMP Scholarship, KAIST — Mar 2019
Winner, Science Quiz, KAIST-POSTECH Science War — Sep 2018
Participation Prize, Urban Design Competition, CEE, KAIST — Dec 2017
National Scholarship (Full B.S.), KAIST — 2017 - 2021

Projects

Confidence Interval Estimation and Performance Relationship Analysis in Tire Performance Prediction Model

Research Project, Funded by Hankook Tire & Technology — Nov 2023 - Present

- Conduct research project on confidence interval estimation, performance relationship analysis, and performance/rank prediction for tire performance prediction models, along with tire pattern image generation using diffusion models.

Integrated Tire Performance Prediction Model Exploiting Tire Pattern Characteristics

Research Project, Funded by Hankook Tire & Technology — Mar 2022 - April 2023

- Conduct research project on feature extraction of tire pattern images using self-supervised learning and integrated prediction through multi-task learning for tire performance prediction models.

Convergence Analysis of Deep Learning Optimizers Under Generalized Smoothness

Research Project, Conducted in AI616, KAIST — Sep 2023 - Dec 2023

- Conduct a convergence analysis of established optimizers and extend the study to emerging optimizers, under generalized smoothness assumption.

How Many Times are We Going to Collaborate?

Research Project, Conducted in AI607, KAIST — Sep 2022 - Dec 2022

- Propose feature engineering and hypergraph neural networks strategies for collaboration frequency estimation and collaboration support prediction tasks on social networks.

Theoretical and Empirical Analysis on Perceptual Adversarial Robustness

Research Project, Conducted in AI602, KAIST — Mar 2022 - Jun 2022

- Analyze the limitations of Perceptual Adversarial Training, and propose strategies to overcome such challenges.

Few-Shot Font Generation for Korean

Research Project, Conducted in AI604, KAIST — Mar 2022 - Jun 2022

- Customize existing font generation methods outlined in MX-Font and DG-Font for Korean, and propose additional components to achieve performance improvements.

Issue Trend Analysis and Issue Tracking Analysis

Research Project, Conducted in CS474, KAIST — Mar 2021 - Jun 2021

- Construct a text mining framework to conduct issue trend analysis, on-issue event tracking, and related-issue event tracking using crawled news articles from Korea Herald.

Immersion Camp: Intensive Programming and Startup

Development Project, Conducted in CS496, KAIST — Dec 2019 - Jan 2020

- Execute four weekly development projects centered around the themes of restaurant recommendation [code] and travel place recommendation [code] applications, facial expression recognition rhythm game [code][code], and AI composition platform [code][code].

Skills

Programming Skills

Advanced: C/C++, Java, Python, SQL, PyTorch
Moderate: HTML/CSS/JavaScript, TensorFlow
Novice: Android Studio, Node.js

Languages

English: Upper-intermediate
Korean: Native