## Changhun Kim


**Contact Information**

**Position**: Master'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. Currently, I am particularly intrigued by the following topics:

**Generalizable Deep Learning**: Test-Time Adaptation, Meta-Learning, Zero-Shot Learning
**Generative Models**: Diffusion Models, Generative Adversarial Networks
**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 – Feb. 2024

- Thesis: Test-Time Adaptation for Automatic Speech Recognition via Sequential-Level Generalized Entropy Minimization
- 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% (Top 9% in the Department)

**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%**

**Research Experience**

**Medical AI Division, AITRICS** Seoul, South Korea

Machine Learning Researcher Nov. 2023 – Feb. 2024

- Conduct research on large language model and test-time adaptation for time series analysis, with a particular emphasis on biomedical signal analysis, in collaboration with Professor Eunho Yang.

**Machine Learning and Intelligence Laboratory, KAIST** Daejeon, South Korea

Master's Student Mar. 2022 – Feb. 2024

- Explore modality-specific test-time adaptation strategies on diverse tasks, such as 3D point cloud classification, zero-shot transfer of vision-language models, automatic speech recog-

nition, and tabular classification under Professor Eunho Yang.

Research Intern — Jun. 2021 – Feb. 2022

- Investigate a style matching denoiser for automatic speech recognition under the supervision of Professor Eunho Yang.

**Vehicular Intelligence Laboratory, KAIST** — Daejeon, South Korea

Research 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 Professor Dongsoo Har.

## Work Experience

**MLOps Squad, DeepNatural AI** — Seoul, South Korea

Machine Learning Engineer — Sep. 2020 – Feb. 2021

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

**Big Data Center, Netmarble** — Seoul, South Korea

Data Engineer — 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

**Integrated Tire Performance Prediction Model Exploiting Tire Pattern Characteristics**

Research Project, Funded by Hankook Tire & Technology — Mar. 2022 – Apr. 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 and travel place recommendation applications, facial expression recognition rhythm game, and AI composition platform.

## Skills

**Programming Skills**

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

**Languages**

Advanced in **English** and Native in **Korean**