



Taehyeon Kim

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Born 10 June 1995

RESEARCH INTERESTS

- Optimization for training deep neural networks
- AutoML: automating the tasks of applying machine learning to real-world problems.
- Trustworthy and real-world AI/ML challenges
- Federated Learning: train an algorithm across multiple decentralized edge devices

EDUCATION

2020 – Present

Ph.D., Graduate School of AI

Korea Advanced Institute of Science and Technology (KAIST) - Seoul, Korea

- **Advisor: Prof. Se-Young Yun**

2018 – 2020

M.S., Graduate School of Data Science

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

- **Advisor: Prof. Se-Young Yun**

• Thesis: *Orthogonal Feature Regularization: A Novel Approach for Training Robust Models*

2013 – 2018

B.S., Mathematical Sciences

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

- **Minor, Intellectual Property Minor Program**

WORK EXPERIENCES

Qualcomm

Jun 2021 – Dec 2021

Qualcomm AI ADAS

- CV & ML Ph.D. Internship for Autonomous Drivingreport
- Designing resource-efficient and accurate backbone for ADAS
- Paper: Revisiting Architecture-aware Knowledge Distillation: Smaller Models and Faster Search
- US Patent: Trust-Region Aware Architecture Distillation for Sample-Efficient Neural Architecture Search.
- Subjects: Knowledge Distillation, Neural Architecture Search, Bayesian Optimization.

PUBLICATIONS

ICML22W

[C6] **Kim, T.** & Yun, S.. (2022). Supernet Training for Federated Image Classification under System Heterogeneity, ICML 2022 Workshop on Dynamic Neural Networks, Oral.

IEEE Access

[J1] **Kim, T.** & Yun, S.. (2022). Revisiting Orthogonality Regularization: A Study for Convolutional Neural Networks in Image Classification, IEEE Access, Jun. 2022.

ICML22W

[C5] **Kim, T.**, Myeong, H. & Yun, S.. (2022). Revisiting Architecture-aware Knowledge Distillation: Smaller Models and Faster Search, ICML 2022 Hardware Aware Efficient Training (HAET) Workshop, July 2022.

NeurIPS21

[C4] **Kim, T.***, Ko, J.*, Cho, S., Choi, J. & Yun, S.. (2021). FINE Samples for Learning with Noisy Labels., *Advances in Neural Information Processing Systems 34 (NeurIPS 2021)*, Dec. 2021.

IJCAI21

[C3] **Kim, T.***, Oh, J.*, Kim, N., Cho, S., & Yun, S. Y. (2021). Comparing Kullback-Leibler Divergence and Mean Squared Error Loss in Knowledge Distillation. *In the 30th International Joint Conference on Artificial Intelligence (IJCAI)*, Aug. 2021 (acceptance rate: 13.9%)

NeurIPS20W

[C2] **Kim, T.***, Ahn, J.*, Kim, N.* & Yun, S. (2020). Adaptive Local Bayesian Optimization Over Multiple Discrete Variables. Workshop at NeurIPS 2020 Competition Track on Black-Box Optimization Challenge, Dec. 2020.

NeurIPSCD19

[C1] **Kim, T.**, Kim, J. & Yun, S. (2019). Efficient Model for Image Classification With Regularization Tricks. Proceedings of the NeurIPS 2019 Competition and Demonstration Track, in Proceedings of Machine Learning Research 123:13-26.

M.S. Thesis 20 [T] **Kim, T.**. Orthogonal feature regularization : a novel approach for training robust models, Korea Advanced Institute of Science and Technology (KAIST)

UNDER REVIEW & WORKING PAPERS

[U3] **Kim, T.***, Ho, N.*, Kim, D. & Yun, S.. (2022). Benchmark Dataset for Precipitation Forecasting by Post-Processing the Numerical Weather Prediction, Under review.

[U2] Shin, J., **Kim, T.**, Kim, D. & Yun, S.. (2022). A Bag of Tricks for Federated Learning in Image Classification, Under review.

[U1] Ahn, J., **Kim, T.** & Yun, S.. (2022). Mold into a Graph: Efficient Bayesian Optimization over Mixed-Spaces, Under review.

[W1] Cha, S., **Kim, T.**, Lee, H. & Yun, S.. (2022). SuperNet in Neural Architecture Search: A Taxonomic Survey., Working in Progress.

PATENTS

US PATENT

[P1] **Kim, T.**, Myeon, H. (2021). Trust-Region Aware Architecture Distillation for Sample-Efficient Neural Architecture Search. Provisioning, To be Filed, Qualcomm Inc..

RESEARCH EXPERIENCE

Feb 2022 – Present

General Manager, Precipitation Nowcasting

- Collaboration with National Institute of Meteorological Sciences (NIMS)
- Post-processing the estimated precipitation from NWP (Numerical Weather Prediction) model, in particular Global Data Assimilation and Prediction System (GDAPS), in Korea area using CNN-, RNN-, and attention-based model.
- Improving generative models to mitigate the data imbalance problem.

Apr 2021 – Jun 2021

Project Manager, Federated Learning

- Collaboration with Electronics and Telecommunications Research Institute (ETRI)
- **Efficient AI** for the deployment of edge devices

Oct 2020 – Dec 2020

Project Manager, Object Detection

- Collaboration with Electronics and Telecommunications Research Institute (ETRI)
- **Storage- and computation-efficient object detection models**

Sep 2020 – Nov 2020

Project Manager, Edge AI

- Collaboration with Electronics and Telecommunications Research Institute (ETRI)
- Efficient AI for the **deployment to test-bed (Nvidia-Jetson)**

Apr 2020 – Dec 2020

Assistant, AutoML

- Venture Research Program for Graduate and Ph. D students, KAIST
- AutoML for **user & task aware dynamic control of exoskeleton suit dimensions**

Jan 2020 – Dec 2020

Project Manager, Hyperparameter Search

- Collaboration with Electronics and Telecommunications Research Institute (ETRI)
- **Automated hyperparameter search algorithm** for ML algorithms.

Apr 2018 – Dec 2019

Assistant, Edge AI

- Collaboration with Electronics and Telecommunications Research Institute (ETRI)
- Efficient models and training algorithms for **Edge Device**

AWARDS & ACHIEVEMENTS

Jan 2022

Best Poster Awards, KAIST AI 21/22 Workshop

1. FINE Samples for Learning with Noisy Labels.
2. Comparing Kullback-Leibler Divergence and Mean Squared Error Loss in Knowledge Distillation

Dec 2020

8th Award in NeurIPS 2020 Black-Box Optimization Challenge

- BBO-challenge homepage: <https://bbochallenge.com/>
- Subjects: Auto-ML, Bayesian Learning, Hyperparameter Optimization.

Dec 2019 **2nd & 3rd Awards in NeurIPS 2019 MicroNet Challenge, CIFAR-100 Track.**

- MicroNet-challenge homepage: <https://micronet-challenge.github.io/>
- Subjects: Image Classification, Model Compression.

Dec 2014 **1st Award in 2015 Gwangju Universiade - University Student U Cheering Festival**

- 2015 Gwangju Summer Universiade
- Subjects: Cheerleading.

LEADERSHIP

Mar 2021 – Feb 2022 **Representative of doctoral students**

- Graduate School of AI, KAIST, Korea.
- Construct organizations
- Being an intermediary between the professors and the students

Mar 2020 – Feb 2021 **Lab master**

- Optimization and Statistical Inference Laboratory (OSI LAB), KAIST, Korea.
- Advisor: Prof. Se-Young Yun
- Construct organizations
- Being an intermediary between the advisor and the students
- Project team building

Oct 2014 – Nov 2015 **Vice Captain**

- KAIST Representative Cheerleading Group, KAIST, Korea.
- Group name: Encouraging Leaders of KAIST (ELKA)
- KAIST festival planning and promotion
- 2015 Gwangju Summer Universiade - University Student U Cheering Festival **1st prize**
- Team building, Funding, Management.

INVITED TALKS

Jan 2022 **KAIST AI 21/22 Workshop**

- FINE Samples for Learning with Noisy Labels
- Comparing Kullback-Leibler Divergence and Mean Squared Error Loss in Knowledge Distillation

Dec 2021 **ML in Korea @ NeurIPS2021**

FINE Samples for Learning with Noisy Labels

Jun 2019 **NAVER CLOVA AI x KAIST Joint AI Workshop**

Orthogonal Feature Regularization: A Novel Approach for training robust model

SKILLS & OTHERS

Conference Reviewer NeurIPS 2022, ICML 2022, AutoML-Conf 2022, ECCV 2022, Pattern Recognition.

Coding Python, PyTorch, \LaTeX , ...

AI in Art Surplus human, Vania Oh, Junbeom Shin, **Taehyeon Kim**, 2022.

- AI with Weird Wonderland, 22.03.10 - 22.03.16, CELINE PARK GALLERY, Organized by Next interface lab.

TEACHING EXPERIENCES

Jan 2022 – Feb 2022 **AI Lecturer, Mathematics in ML**

- Teaching the mathematics for gradient descent in ML (4 lectures, theory and code quiz, exams)
- Attendee: LG Employees (hosted by ELICE).

Jun 2021 – Jul 2021 **AI Mentor, Introduction to Deep Learning**

- Teaching the overview of deep learning in Curinc, Seoul, Korea (70 hours during 7 weeks)
- Attendee: Undergraduate at UC Berkeley, Boston University, and Florida International University.

Oct 2020 – Nov 2020 **TA, Computer Vision & Deep Learning**

- Theories & practices for deep learning
- Attendee: LG Employees in the LG AI CAMP Module(3), LG, Academy, Korea
- Image classification and semantic segmentation using public COVID dataset in Kaggle.

- Mar 2020 – Oct 2020* **Advisory Committee, Deep Learning**
- AI Exploration Program, National Science Museum, Korea.
 - Attendee: Advanced students (Science High School)
 - Subjects: reinforcement learning, object detection, image classification, evolutionary algorithm.
- Mar 2019 – Jul 2019* **TA, Introduction to Deep Learning**
- Dept. Knowledge Service Engineering, KAIST, Korea.
 - Attendee: Graduate Students
- Jan 2019 – Jan 2019* **TA, Computer Vision & Deep Learning**
- Theories and practices for deep learning in the LG AIB Intermediate CAMP, LG Academy, Korea.
- Jan 2019 – Jan 2019* **Lecturer, Python Basics**
- Python code implementation in the Samsung SW Academy Start CAMP, Samsung SW Academy, Korea.
 - Subjects: Chatbot, basic python (e.g., for loop, condition)
- Mar 2017 – Dec 2017* **Lecturer, KAIST Regular Course**
- KAIST Lecture: Personality/Leadership 3 - Liberal Arts Required (2017 Spring & 2017 Fall)
 - Subjects: Sports leadership, Team leadership.
 - Students: undergraduate freshman in KAIST

Scholarship & Fellowship

- Mar 2020 – Present* **Graduate School of AI, KAIST Funding**
\$ 20,000 per year
- Mar 2018 – Feb 2020* **National scholarship for graduate studies, Korea Student Aid Foundation**
\$ 16,000 per year
- Mar 2013 – Aug 2017* **Full Academic scholarship, KAIST**
\$ 3,000 per year