Minkyoung Cho

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https://minkyoungcho.github.io

Research Interests

Multi-Modal, Efficient AI, Robust AI, Autonomous Driving, Inference and Fine-Tuning Optimization

Education

- **The University of Michigan** — Ann Arbor, MI, USA
  Ph.D. Candidate in Computer Science and Engineering — Aug 2022 – Present
  Advisor: Prof. Z. Morley Mao
- **Korea Advanced Institute of Science and Technology (KAIST)** — Daejeon, Republic of Korea
  M.Sc. in Computer Science — Mar 2015 – Feb 2017
  Advisor: Prof. Younghee Lee
- **Ewha Womans University** — Seoul, Republic of Korea
  B.Sc. in Computer Science and Engineering — Mar 2011 – Feb 2015
  Summa Cum Laude

Publications

1. **Scalable Crowd-sourced Global HD Map Construction via Collaborative Map Perception and Sparse Graph Fusion**
   Ruiyang Zhu*, **Minkyoung Cho***, Shuqing Zeng, Fan Bai, Xiang Gao, and Z. Morley Mao
   T4V @ CVPR 2025 (***Equal Contribution**)
2. **Cocoon: Robust Multi-Modal Perception with Uncertainty-Aware Sensor Fusion**
   Minkyoung Cho, Yulong Cao, Jiachen Sun, Qingzhao Zhang, Marco Pavone, Jeong Joon Park, Heng Yang, and Z. Morley Mao
   ICLR 2025
3. **Achieving the Safety and Security of the End-to-End AV Pipeline**
   Noah T. Curran, **Minkyoung Cho**, Ryan Feng, Liangkai Liu, Brian Jay Tang, Pedram MohajerAnsari, Alkim Domeke, Mert D. Pesé, and Kang G. Shin
   ACM CSCS @ CCS 2024
4. **ADoPT: LiDAR Spoofing Attack Detection based on Point-Level Temporal Consistency**
   Minkyoung Cho, Yulong Cao, Zixiang Zhou, and Z. Morley Mao
   BMVC 2023
5. **DynaMIX: Resource Optimization for DNN-Based Real-Time Applications on a Multi-Tasking System**
   Minkyoung Cho and Kang G. Shin
   arXiv 2023
6. **A Novel Sensitivity Metric For Mixed-Precision Quantization With Synthetic Data Generation**
   Donghyun Lee*, **Minkyoung Cho***, Seungwon Lee, Joonho Song, and Changkyu Choi
   ICIP 2021 (***Equal Contribution**)
7. **Contextual Relationship-based Activity Segmentation on an Event Stream in the IoT Environment with Multi-user Activities**
   Minkyoung Cho, Younggi Kim, and Younghee Lee
   ACM M4IoT @ Middleware 2016
8. **Proactive Patrol Dispatch Surveillance System by Inferring Mobile Trajectories of Multiple Intruders using Binary Proximity Sensors**
   Dahee Jung, **Minkyoung Cho**, Omprakash Gnawali, and HyungJune Lee
   IEEE INFOCOM 2016

Patents

1. **Apparatus and Method for Channelwise Neural Network Compression**
   Wonjo Lee, Youngmin Oh, and **Minkyoung Cho**
   US20220114453A1. Published Apr. 14, 2022.
2. **Method for Zero-shot Pruning without Retraining**
   Minkyoung Cho, Searom Choi, and Seungwon Lee
   US20220108180A1. Published Apr. 7, 2022.
3. **Method of replacing Bilinear Interpolation with Depthwise Transposed Convolution**
   Donghyeok Kwon and **Minkyoung Cho**
   US20220067429A1. Published Mar. 3, 2022.
4. **A Method and An Apparatus for Performing Convolution Operations**
   Songyi Han, **Minkyoung Cho**, and Seungwon Lee
   US20210201132A1. Published Jul. 1, 2021.
5. **Method and Apparatus for Performing Pruning of Neural Network**
   Minkyoung Cho, Wonjo Lee, and Seungwon Lee
   US20210081798A1. Published Mar. 18, 2021. *__Mounted on Samsung Galaxy S11__.

Academic Research Experience

- **Graduate Student Research Assistant (GSRA)** — Ann Arbor, MI, USA
  The University of Michigan (Advisor: Prof. Z. Morley Mao) — Aug 2022 – Present
  - **Efficent Fine-Tuning for Multi-Modal Models**: Developing an efficient and robust fine-tuning framework.
  - **Multi-Modal Perception**: Developed a robust multi-modal perception framework to guarantee reliability and accuracy in diverse driving scenarios.
  - **Anomaly Detection**: Developed a solution by checking temporal consistency at 3D point cloud level.
  - **Collaborative Perception**: Developed robust collaborative perception system across connected and automated vehicles.
- **Research Intern** — Ann Arbor, MI, USA
  The University of Michigan (Advisor: Prof. Kang G. Shin) — Feb 2021 – Aug 2022
  - **Resource Allocation**: Identified a problem in running multiple real-time vision apps on autonomous vehicle. Designed a resource optimization/allocation algorithm to satisfy apps' timing requirements.
  - **Neural Network Optimization**: Reduced resource and computational costs of NN models via mixed-precision quantization.
- **Graduate Research Assistant** — Daejeon, Republic of Korea
  Computer Networks Lab, KAIST (Advisor: Prof. Younghee Lee) — Mar 2015 – Feb 2017
  - **Activity Segmentation**: Designed and implemented an automated activity segmentation system using LSTM model.
  - **Wireless Sensor Network**: Implemented smart home/office environment using MQTT and TCP protocols, set up testbed on KAIST campus building, and managed IoT data stream from user activities.
- **Undergraduate Research Assistant** — Seoul, Republic of Korea
  Intelligent Networked Systems Lab, Ewha Womans Univ. (Advisor: Prof. HyungJune Lee) — Nov 2013 – Dec 2014
  - **Proactive Patrol Dispatch Surveillance System**: Worked on two core algorithms: 1) inferring future trajectories of multiple intruders in a building and 2) maximizing the detection probability of multiple intruders while minimizing the moving distance of the patrol officers.
  - **Wireless Sensor Network**: Implemented TinyOS-based ZigBee network consisting of TelosB motes (binary proximity sensors) and set up testbed on Ewha campus building.

- **Undergraduate Research Assistant** Seoul, Republic of Korea
  Security and Theory of Computing Lab, Ewha Womans Univ. (Advisor: Prof. Sang-Ho Lee) Dec 2012 – Feb 2013
  - **Visual Cryptography**: Developed joint account management algorithm in mobile banking system based on visual cryptography.

Industrial Experience

- **Deep Learning Software Intern** Santa Clara, CA, USA
  NVIDIA May 2025 – Aug 2025
  - **Conditioning for Generative AI**: Research on optimal conditioning for generative AI models (e.g., diffusion models).
- **Deep Learning Software Intern** Santa Clara, CA, USA
  NVIDIA Jun 2024 – Aug 2024
  - **Fine-Tuning Optimization**: Worked on parameter-efficient fine-tuning techniques for vision and multi-modal models.
- **Artificial Intelligence Researcher** Suwon, Republic of Korea
  Samsung Advanced Institute of Technology @ Samsung Electronics Mar 2018 – Apr 2021
  - **Neural Network Optimization**: Designed and implemented hardware-efficient model optimization algorithms for Samsung Exynos NPU & released on Samsung AI SDK.
  - **Software/hardware Co-design**: Designed and implemented a new number system for the next-generation NPU architecture.

Honors and Awards

- **Korea National Scholarship** Mar 2015
  KAIST and Korea Ministry of Science and ICT
- **Dean's List Award** Apr 2012, Oct 2012, Apr 2013, Oct 2013, Apr 2014, Oct 2014
  Ewha Womans University
- **Academic Scholarship** Apr 2012, Oct 2012, Apr 2013, Oct 2013, Apr 2014, Oct 2014
  Ewha Womans University
- **Han-su Scholarship** Apr 2013
  Han-su Foundation

Teaching Experience

- **Teaching**: Main TA, Introduction to Computer Networks @ KAIST, Mar 2016 - Aug 2016
- **Counseling**: Counseling Assistant for CS Students @ KAIST, Sep 2015 - Aug 2016
- **Tutoring**: Data Structure, Operating Systems, and Java Programming @ Ewha Womans University

Services

- **Reading Group Organizer**: Organize Systems Reading Group @ UMich, Sep 2023 - Present
- **Conference Reviewer**: BMVC'24, NeurIPSW-Compression'24, ICLR'25, ICLRW-SCOPE'25

Skills

- **Languages**: Python, C, Java, Markdown, LaTeX
- **Frameworks**: PyTorch, Caffe, MATLAB, Linux, TinyOS, LLVM, OpenCOOD