Minkyoung Cho

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https://minkyoungcho.github.io

Research Interests

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

Education

- **The University of Michigan** — Ann Arbor, MI, USA
  Ph.D. Student 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
  Master of Science in Computer Science — Mar 2015 – Feb 2017
  Advisor: Prof. Younghee Lee
- **Ewha Womans University** — Seoul, Republic of Korea
  Bachelor of Science in Computer Science and Engineering — Mar 2011 – Feb 2015
  Summa Cum Laude

Publications

1. **Minkyoung Cho**, Yulong Cao, Jiachen Sun, Qingzhao Zhang, Marco Pavone, Jeong Joon Park, Heng Yang, Z. Morley Mao. **"Cocoon: Robust Multi-Modal Perception with Uncertainty-Aware Sensor Fusion."** *The Thirteenth International Conference on Learning Representations (**ICLR**)*, April 2025.
2. Noah T. Curran, **Minkyoung Cho**, Ryan Feng, Liangkai Liu, Brian Jay Tang, Pedram MohajerAnsari, Alkim Domeke, Mert D. Pesé, Kang G. Shin. **"Achieving the Safety and Security of the End-to-End AV Pipeline."** *The 1st Cyber Security in Cars Workshop Co-located with ACM CCS (**CSCS**)*, August 2024.
3. **Minkyoung Cho**, Yulong Cao, Zixiang Zhou, and Z. Morley Mao. **"ADoPT: LiDAR Spoofing Attack Detection based on Point-Level Temporal Consistency."** *The 34th British Machine Vision Conference (**BMVC**)*, November 2023.
4. **Minkyoung Cho** and Kang G. Shin. **"DynaMIX: Resource Optimization for DNN-Based Real-Time Applications on a Multi-Tasking System."** *arXiv*, February 2023.
5. Donghyun Lee*, **Minkyoung Cho***, Seungwon Lee, Joonho Song, and Changkyu Choi. **"A Novel Sensitivity Metric For Mixed-Precision Quantization With Synthetic Data Generation."** *IEEE International Conference on Image Processing (**ICIP**)*, September 2021, ***Equal contribution**.
6. **Minkyoung Cho**, Younggi Kim, and Younghee Lee. **"Contextual Relationship-based Activity Segmentation on an Event Stream in the IoT Environment with Multi-user Activities."** *The 3rd Workshop on Middleware for Context-Aware Applications in the IoT Co-located with ACM/IFIP Middleware (**M4IoT**)*, December 2016.
7. Dahee Jung, **Minkyoung Cho**, Omprakash Gnawali, and HyungJune Lee. **"Proactive Patrol Dispatch Surveillance System by Inferring Mobile Trajectories of Multiple Intruders using Binary Proximity Sensors."** *The 35th Annual IEEE International Conference on Computer Communication (**INFOCOM**)*, April 2016.

Patents

1. Wonjo Lee, Youngmin Oh, and **Minkyoung Cho**. **"Apparatus and Method for Channelwise Neural Network Compression."** *US20220114453A1*. Published Apr. 14, 2022.
2. **Minkyoung Cho**, Searom Choi, and Seungwon Lee. **"Method for Zero-shot Pruning without Retraining."** *US20220108180A1*. Published Apr. 7, 2022.

3. Donghyeok Kwon and **Minkyoung Cho**. **"Method of replacing Bilinear Interpolation with Depthwise Transposed Convolution."** *US20220067429A1*. Published Mar. 3, 2022.
4. Songyi Han, **Minkyoung Cho**, and Seungwon Lee. **"A Method and An Apparatus for Performing Convolution Operations."** *US20210201132A1*. Published Jul. 1, 2021.
5. **Minkyoung Cho**, Wonjo Lee, and Seungwon Lee. **"Method and Apparatus for Performing Pruning of Neural Network."** *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
  - **Multi-Modal Perception**: Developing 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 network bandwidth-aware 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 — Jun 2024 – Aug 2024
  - **Large DNN Optimization**: Working on finetuning and inference optimization techniques.
- **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
- **3rd Prize, 2014 Ewha Engineering Capstone Design Contest** Dec 2014
  Ewha Womans University
- **2nd Prize, 2014 Ewha Engineering Student Portfolio Contest** Dec 2014
  Ewha Womans University
- **Han-su Scholarship** Apr 2013
  Han-su Foundation
- **2nd Prize, 2013 Ewha Programming Contest (JAVA)** Mar 2013
  Ewha Womans University

Teaching and Technical Skills

- **Teaching**: Main TA, Introduction to Computer Networks @ KAIST
- **Counseling**: Counseling Assistant for CS Students @ KAIST, Sep 2015 - Aug 2016
- **Tutoring**: Data Structure, Operating Systems, and Java Programming @ Ewha Womans University
- **Languages**: Python, C, Java, Markdown, LaTeX
- **Frameworks**: PyTorch, Caffe, MATLAB, Linux, TinyOS, LLVM, OpenCOOD