

Minkyung Cho

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<https://minkyungcho.github.io>

RESEARCH INTERESTS

Robust AI, Efficient AI, DNN Optimization, 3D Perception, Autonomous Driving, Anomaly Detection

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. **Minkyung 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.**” *In Submission*, May 2024.
2. Noah T. Curran, **Minkyung 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)*, Aug 2024.
3. **Minkyung 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. **Minkyung 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*, **Minkyung 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. **Minkyung 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, **Minkyung 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.
8. Mijin Kim, **Minkyung Cho**, Aeyoung Kim, and Sang-Ho Lee. “**A VC-based Joint Account Operation Scheme for Mobile Banking.**” *Proceedings of the Korea Computer Congress (KCC)*, August 2013.

PATENTS

1. Wonjo Lee, Youngmin Oh, and **Minkyung Cho**. “**Apparatus and Method for Channelwise Neural Network Compression.**” *US20220114453A1*. Published Apr. 14, 2022.

2. **Minkyung Cho**, Searom Choi, and Seungwon Lee. “**Method for Zero-shot Pruning without Retraining.**” *US20220108180A1*. Published Apr. 7, 2022.
3. Donghyeok Kwon and **Minkyung Cho**. “**Method of replacing Bilinear Interpolation with Depthwise Transposed Convolution.**” *US20220067429A1*. Published Mar. 3, 2022.
4. Songyi Han, **Minkyung Cho**, and Seungwon Lee. “**A Method and An Apparatus for Performing Convolution Operations.**” *US20210201132A1*. Published Jul. 1, 2021.
5. **Minkyung 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