# Minkyoung Cho

4917 BBB, 2260 Hayward Street, Ann Arbor, MI 48109

minkycho@umich.edu

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. **SCORPION: Robust Spatial-Temporal Collaborative Perception Model on Lossy Wireless Network**
   Ruiyang Zhu, **Minkyoung Cho**, Shuqing Zeng, Fan Bai, and Z. Morley Mao
   IROS 2025
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. **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__)
4. **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
5. **ADoPT: LiDAR Spoofing Attack Detection based on Point-Level Temporal Consistency**
   **Minkyoung Cho**, Yulong Cao, Zixiang Zhou, and Z. Morley Mao
   BMVC 2023
6. **DynaMIX: Resource Optimization for DNN-Based Real-Time Applications on a Multi-Tasking System**
   **Minkyoung Cho** and Kang G. Shin
   arXiv 2023
7. **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__)
8. **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

9. **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.
  - **Collaborative Perception & HD Map Construction**: Developed robust collaborative perception and HD map construction system across connected and automated vehicles.
  - **Anomaly Detection**: Developed a solution by checking temporal consistency at 3D point cloud level.
- **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
  - **Advanced Conditioning for Diffusion Models**: Research on optimal conditioning algorithm for generative AI models (e.g., diffusion models). Aim to achive a better conditional guidance compared to standard methods (e.g., ControlNet).
- **Deep Learning Software Intern** Santa Clara, CA, USA
  *NVIDIA* Jun 2024 – Aug 2024
  - **Fine-Tuning Optimization**: Worked on parameter-efficient fine-tuning techniques (e.g., LoRA) 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