Minkyoung Cho

Curriculum Vitae

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https://minkyoungcho.github.io

Research Interests

Systems for Machine Learning, Machine Learning for Systems, Neural Network Optimization for Real-time Systems, On-device AI, Hardware-efficient Machine Learning Algorithms

Education

- **Korea Advanced Institute of Science and Technology (KAIST)** — Daejeon, Republic of Korea
  Master of Science in Computer Science — Mar 2015 – Feb 2017
  Advisor: Dr. 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. 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__.
2. **Minkyoung Cho**, Younggi Kim, and Younghee Lee. **"Contextual Relationship-based Activity Segmentation on an Event Stream in the IoT Environment with Multi-user Activities."** *Proceedings of the 3rd Workshop on Middleware for Context-Aware Applications in the IoT (**M4IoT**)*, December 2016.
3. 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.
4. Mijin Kim, **Minkyoung 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. **Minkyoung Cho**, Wonjo Lee, and Seungwon Lee. **"Method and Apparatus for Performing Pruning of Neural Network."** *US20210081798A1.* Issued Mar 18, 2021. *Mounted on Samsung Galaxy S11.*
2. Songyi Han, **Minkyoung Cho**, and Seungwon Lee. **"A Method and An Apparatus for Performing Convolution Operations."** *US20210201132A1.* Issued Jul 1, 2021.
3. Wonjo Lee, Youngmin Oh, and **Minkyoung Cho**. **"Apparatus and Method for Channelwise Neural Network Compression."** *Republic of Korea Patent Application No. 20200132151.* Filed Oct 13, 2020.
4. **Minkyoung Cho**, Searom Choi, and Seungwon Lee. **"Method for Zero-shot Pruning without Retraining."** *Republic of Korea Patent Application No. 20200128136.* Filed Oct 5, 2020.
5. Donghyeok Kwon, and **Minkyoung Cho**. **"Method of replacing Bilinear Interpolation with Depthwise Transposed Convolution."** *Republic of Korea Patent Application No. 20200111842.* Filed Apr 29, 2020.

Industrial Research Experience

- **Artificial Intelligence Researcher** — Suwon, Republic of Korea
  Samsung Advanced Institute of Technology @ Samsung Electronics — Mar 2018 – Present
  - **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 next-generation hardware architecture.

Academic Research Experience

- **Research Intern** Remote @ Suwon, Republic of Korea
  The University of Michigan (Advisor: Dr. Kang G. Shin) Feb 2021 – Present
  - **Resource allocation on embedded systems**: Found a problem in running vision apps on multi-tenant systems. Designed a resouce allocation algorithm to satisfy apps' timing requirements.
  - **Neural Network Optimization**: Reduced resource and computational cost of NN models via mixed-precision quantization.
- **Graduate Research Assistant** Daejeon, Republic of Korea
  Computer Networks Lab, KAIST (Advisor: Dr. Younghee Lee) Mar 2015 – Feb 2017
  - **Automated Activity Segmentation System (*M4IoT'16*)**: Found a research topic in IoT environment, designed and implemented automated activity segmentation system, and led to paper submission.
  - **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: Dr. HyungJune Lee) Nov 2013 – Dec 2014
  - **Proactive Patrol Dispatch Surveillance System (*INFOCOM'16*)**: 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 moving distance 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: Dr. Sang-Ho Lee) Dec 2012 – Feb 2013
  - **Visual Cryptography**: Developed joint account management algorithm in mobile banking system based on visual cryptography.

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
- **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
- **Choice Award, University Student ICT Vision Contest** Jul 2014
  SK Telecom
- **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