Minkyoung Cho

Curriculum Vitae

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https://minkyoungcho.github.io

Research Interests

Machine Learning, Artificial Intelligence, Wireless Sensor Network, Internet of Things, ML Model Optimization, Neural Network Compression for Edge Devices, Data Generation, Pattern Recognition

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
  Thesis: Contextual Relationship-based Activity Segmentation on an Event Stream in the IoT Environment with Multi-user Activities
- **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. 2021. **"A Novel Sensitivity Metric For Mixed-Precision Quantization With Synthetic Data Generation"**. *IEEE International Conference on Image Processing (**IEEE ICIP**)*. *Equal contribution.
2. **Minkyoung Cho**, Younggi Kim, and Younghee Lee. 2016. **"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. 2016. **"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 (**IEEE INFOCOM**)*, April 2016.
4. Mijin Kim, **Minkyoung Cho**, Aeyoung Kim, and Sang-Ho Lee. 2013. **"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 **Minkyoung Cho**. **"Appratus and Method for Channelwise Neural Network Compression"**. *Republic of Korea Patent Application No. 20200132151*. Filed Oct 13, 2020. Patent Pending.
2. **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. Patent Pending.
3. Donghyeok Kwon, and **Minkyoung Cho**. 2020. **"Method of replacing Bilinear Interpolation with Depthwise Transposed Convolution"**. *Republic of Korea Patent Application No. 20200111842*. Filed Apr 29, 2020. Patent Pending.
4. Songyi Han, **Minkyoung Cho**, and Seungwon Lee. **"A Method and An Apparatus for Performing Convolution Operations"**. *U.S. Patent Application No. 16/897461*. Filed Jun 10, 2020.
5. **Minkyoung Cho**, Wonjo Lee, and Seungwon Lee. 2020. **"Method and Apparatus for Performing Pruning of Neural Network"**. *U.S. Patent Application No. 16/835532*. Filed Mar 31, 2020.

Research and Work Experience

- **Samsung Advanced Institute of Technology (SAIT)** — Suwon, Republic of Korea
  Researcher — Mar 2018 – Current
  - **Pruning**: Worked on studying and developing pruning algorithms in unstructured/structured ways.

- **Quantization**: Worked on studying and implementing training-based/post-training/mixed-precision quantization algorithms.
- **Data Generation**: Worked on studying and developing zero-shot learning or data-free model compression approaches based on synthetic data generation method.
- **Number System**: Worked on studying various number systems such as bfloat, TF32, and Posits.
- **Deep Learning Frameworks**: Worked on implementing and evaluating algorithms based on PyTorch, C++ Extension of PyTorch, and Caffe.

- **Computer Networks Lab, KAIST** Daejeon, Republic of Korea
  Graduate Research Assistant (Advisor: Dr. Younghee Lee) Mar 2015 – Feb 2017
  - **Activity Segmentation**: Activity Segmentation is segmenting the entire event stream at the precise boundary of each activity, which is high priority task to realize the activity recognition. Worked on studying and developing segmentation algorithm by using Long Short-Term Memory models (LSTM).
  - **Smart Home Community Service**: Smart Home Community Service is to develop social matching and communication service technology in IoT-based smart home community. Worked on constructing smart home system based on MQTT, TCP protocol and analyzing IoT data collected in MongoDB.
  - **Machine Learning**: Worked on defining the problems in IoT event data stream and studying machine learning technique to discover the intrinsic relationships between the events in a stream.
- **Teaching Assistant and Tutoring**
  - **Teaching Assistant**: Introduction to Computer Networks. KAIST
  - **Counseling Assistant**: KAIST
  - **Tutoring**: Data Structure, Operating Systems, and Java Programming. Ewha Womans University
- **Intelligent Networked Systems Lab, Ewha Womans University** Seoul, Republic of Korea
  Undergraduate Research Assistant (Advisor: Dr. HyungJune Lee) Nov 2013 – Dec 2014
  - **Wireless Sensor Network**: Worked on implementing TinyOS-based ZigBee network consisting of TelosB motes which are binary proximity sensors and developing Android application.
  - **Proactive Patrol Dispatch Surveillance System**: This system is distributing patrol officers inside a building to maximize the probability of catching multiple intruders while minimizing the distance the patrol officers travel to reach the locations of the intruders. Worked on studying and implementing algorithms for inferring future trajectories and dispatching patrol to optimal location.
- **Security and Theory of Computing Lab, Ewha Womans University** Seoul, Republic of Korea
  Undergraduate Research Assistant (Advisor: Dr. Sang-Ho Lee) Dec 2012 – Feb 2013
  - **Visual Cryptography**: Worked on studying visual cryptography and developing joint account management system which is more convenient in mobile banking based on visual cryptography.

Honors and Awards

- **Dean's List** Feb 2012 – Dec 2014
  Ewha Womans University
- **Participation Award, 2014 Ewha Engineering Capstone Design Contest** Dec 2014
  Ewha Womans University
- **Excellence Award, 2014 Ewha Engineering Student Portfolio Contest** Dec 2014
  Ewha Womans University
- **Choice Award, University Student ICT Vision Contest** Jul 2014
  SK Telecom
- **Excellence Award, 2013 Ewha Programming Contest (JAVA)** Mar 2013
  Ewha Womans University

Technical Skills

- **Languages**: C, Python, Java, Markdown, LaTeX
- **Frameworks**: Pytorch, Caffe, MATLAB, Linux, TinyOS