

April 14th, 2022

Kazuki Osawa

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Google Scholar: <https://scholar.google.com/citations?user=IHdZHh8AAAAJ&hl=en>

EDUCATION

March 2021

Tokyo Institute of Technology, Ph.D. in Computer Science

Advisor: [Prof. Rio Yokota](#)

Thesis: “Second-Order Optimization for Large-Scale Deep Learning”

March 2018

Tokyo Institute of Technology, M.S. in Computer Science

Advisor: [Prof. Rio Yokota](#)

Thesis: “Training Deep Neural Networks Using Natural Gradient Descent Method”

March 2016

Tokyo Institute of Technology, B.S. in Computer Science

Advisor: [Prof. Isao Yamada](#)

Thesis: “Spline Smoothing to Achieve Total Variation Minimization and Its Applications”

EXPERIENCE

Apr. 2021 – present

ETH Zurich Postdoctoral Fellow

[Scalable Parallel Computing Laboratory \(SPCL\)](#)

Advisor: [Prof. Torsten Hoefler](#)

Apr. 2019 – Mar. 2021

Research Fellow of Japan Society for the Promotion of Science (JSPS) DC2

Jan. – Mar. 2020

Student trainee at the Machine Learning Research Team, AIRC, AIST, Japan

Advisor: [Dr. Ryo Karakida](#)

Nov. 2019 – Feb. 2020

Student trainee at the Approximate Bayesian Inference Team, RIKEN AIP, Japan

Advisor: [Dr. Emtiyaz Khan](#)

Nov. – Dec. 2019

Research Intern at the DENSO IT Laboratory, Japan

Advisor: [Dr. Ikuro Sato](#)

Oct. 2018 – Mar. 2019

Research Assistant at the I²R, A*STAR, Singapore

Advisor: [Dr. Chuan-Sheng Foo](#)

PUBLICATIONS (REFEREED)

1. Shigang Li, **Kazuki Osawa**, and Torsten Hoefler. “Efficient Quantized Sparse Matrix Operations on Tensor Cores”, *In Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis, 2022 (SC22)* (best paper finalist).

2. **Kazuki Osawa**, Yohei Tsuji, Yuichiro Ueno, Akira Naruse, Chuan-Sheng Foo, and Rio Yokota. “Scalable and Practical Natural Gradient for Large-Scale Deep Learning”, *In IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, vol. 44, no. 1, pp. 404-415, 1 Jan. 2022, doi: 10.1109/TPAMI.2020.3004354.
3. Ryo Karakida and **Kazuki Osawa**. “Understanding Approximate Fisher Information for Fast Convergence of Natural Gradient Descent in Wide Neural Networks,” *In Advances in Neural Information Processing Systems (NeurIPS)*, 2020 (oral presentation).
4. Yuichiro Ueno, **Kazuki Osawa**, Yohei Tsuji, Akira Naruse, and Rio Yokota. “Rich Information is Affordable: A Systematic Performance Analysis of Second-order Optimization Using K-FAC”, *In Proceedings of 26th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)*, 2020.
5. **Kazuki Osawa**, Siddharth Swaroop, Anirudh Jain, Runa Eschenhagen, Richard E. Turner, Rio Yokota, and Mohammad Emtiyaz Khan, “Practical Deep Learning with Bayesian Principles”, *In Advances in Neural Information Processing Systems (NeurIPS)*, 2019.
6. **Kazuki Osawa**, Yohei Tsuji, Yuichiro Ueno, Akira Naruse, Rio Yokota, and Satoshi Matsuoka. “Large-Scale Distributed Second-Order Optimization Using Kronecker-Factored Approximate Curvature for Deep Convolutional Neural Networks”, *In Proceedings of IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019.
7. Yohei Tsuji, **Kazuki Osawa**, Yuichiro Ueno, Akira Naruse, Rio Yokota, and Satoshi Matsuoka. “Performance Optimizations and Analysis of Distributed Deep Learning with Approximated Second-Order Optimization Method”, *The 48th International Conference on Parallel Processing (ICPP): Workshops*, 2019.
8. **Kazuki Osawa** and Rio Yokota. “Evaluating the Compression Efficiency of the Filters in Convolutional Neural Networks”, *Artificial Neural Networks and Machine Learning – ICANN 2017*, pp 459-466, Springer 2017.
9. **Kazuki Osawa**, Akira Sekiya, Hiroki Naganuma, Rio Yokota. “Accelerating Matrix Multiplication in Deep Learning by Using Low-Rank Approximation”, *2017 International Conference on High Performance Computing & Simulation (HPCS)*, pp 186-192, IEEE 2017.

SERVICE

Served as a reviewer at Neural Networks (2021), NeurIPS 2021, ICLR 2022, TMLR, and NeurIPS 2022

Selected as a [Highlighted Reviewer](#) at ICLR 2022 (top ~8%)

FELLOWSHIPS, SCHOLARSHIPS & GRANT-IN-AIDS

ETH Zurich Postdoctoral Fellowships	(2021-2023, CHF 181,650)
JSPS KAKENHI Grant Number JP19J13477	(2019-2021, 1,700,000 JPY)
Research Fellowship for Young Scientists (DC2), JSPS	(2019-2021, 4,800,000 JPY)
A*STAR Research Attachment Programme, Singapore	(2018-2019, 17,500 SGD)
The Nakajima Foundation, Ph.D. Scholarship (declined)	(2018-2023, tuition and living expenses)
Japan Student Services Organization, Master's Scholarship	(2016-2018, 2,112,000 JPY)
International Information Science Foundation, Overseas Dispatch of Researchers	(2017, 180,000 JPY)