Kei Ishikawa

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Education

ETH Zurich, Switzerland September 2020 – November 2022
Master of Science in Statistics (Distinction)
GPA: 5.93/6, Overall GPA: 5.58/6 (incl. non-mandatory courses)

Tokyo Institute of Technology, Japan April 2020 – March 2024 (expected)[1]
Master of Science, Mathematical and Computing Science
GPA: 4.06/4.5, Currently pursuing the degree while working full-time.

ETH Zurich, Switzerland September 2018 – August 2019
Exchange Program, Department of Computer Science
GPA: 5.55/6

University of Tokyo, Japan April 2015 – March 2020
Bachelor of Engineering in Systems Innovation (Dean's Award)
GPA: 3.72/4

Work Experience

Machine Learning Engineer, G-Research, London, UK November 2022 -
Mainly using Pytorch and PyData stack. The details cannot be disclosed due to confidentiality.

Intern (Quant Analyst), G-Research, London, UK June 2021 - September 2021
PoC of a new algorithm for risk modeling of a financial market. Mainly used Pyspark, Pandas, Pytorch, Numpy, and Scipy.

Intern, Preferred Networks Co., Ltd., Tokyo, Japan August 2020 - September 2020
I worked on open-source software for hyperparameter optimization (**Optuna**) in Python. I improved the performance of its core optimization algorithm, as introduced in this blog post: **here**.

Publications and Preprints

Kei Ishikawa. On the parallel complexity of multilevel monte carlo in stochastic gradient descent. *OPT 2023: Optimization for Machine Learning (NeurIPS workshop)*, 2023

I developed a novel method for integrating the multilevel Monte Carlo method into the stochastic gradient descent that better utilizes the multilevel structure than the conventional approach.

Kei Ishikawa, Naio He, and Takafumi Kanamori. A convex framework for confounding robust inference. *Preprint under review*, 2023

An extension of the AISTATS paper below, which introduces a more general convergence analysis, asymptotic normality, and model selection with information criterion.

Kei Ishikawa and Niao He. Kernel conditional moment constraints for confounding robust inference. In *AISTATS*, 2023

In my master's thesis, I developed a causally-robust policy evaluation (e.g. treatment effect estimation) method for offline contextual bandits that strictly generalizes the existing methods.

[1] Took a leave of absence while at ETH Zurich for two years.

Kei Ishikawa and Takashi Goda. Efficient debiased evidence estimation by multilevel monte carlo sampling. In *UAI*, 2021

In my bachelor's thesis, I developed a fast algorithm for debiased Bayesian computation using a technique called the multilevel Monte Carlo method.

Awards and Funding

Heiwa Nakajima Foundation

Scholarship for the master's study at ETH Zurich. 45K USD.

Dean's Award (Faculty of Engineering, University of Tokyo)

Awarded for academic excellence. About 20/1000 graduating students receive this award.

Tobitate Young Ambassador Program

Scholarship for the exchange study at ETH Zurich. 18K USD.

Miscellaneous Skills and Experience

Languages Japanese (Native), English (IELTS: 7.5), Chinese (Elementary)

Programming

Advanced:	Python (Pytorch, Jax, etc.)
Intermediate:	SQL, R, Linux, Vim, Tmux
Elementary:	C, C++

Coursework

Applied Mathematics:
Mathematical Optimization, Discrete Mathematics, Algorithms and Data Structures, Convex Optimization, Numerical Analysis
Statistics:
Mathematical Statistics, Time Series Analysis, Causal Inference
Machine Learning:
Reinforcement Learning, Probabilistic machine learning, Natural Language Processing, Computer Vision
Computer Systems:
Computer Architecture, Operating Systems, Computer Networks, Relational Databases, Compiler, High-performance Computing
Miscellaneous:
Optimal Control, Signal Processing, Microeconomics, Game Theory

OSS Contribution

Bug fixes:
Kernel PCA (scikit-learn #19732), Latin hypercube (Scipy #13654)
New features:
Multivariate tree-structured Parzen estimator (Optuna #1762), Quasi Monte Carlo sampling (Optuna #2423), Batched Bayesian optimization (Optuna #4591)