JUNPEI KOMIYAMA

Contact Information

- Address: KMC 8-89, 44 West 4th Street #4, New York, NY 10012.

- Phone: 317-689-9277 (mobile)

- EMail: junpei.komiyama@stern.nyu.edu / junpei@komiyama.info / junpeikomiyama@gmail.com

- Medium (my thoughts on LLMs, research, etc.): https://medium.com/@junpeikomiyama

- Github (coding): https://github.com/jkomiyama/

Current Position

- **New York University Stern School of Business**—New York, United States
  Assistant Professor: September 2019 - present.

  - **Research interests:** Machine Learning Methodology, Multi-armed Bandits, Stochastic search and reasoning (Monte Carlo tree search), and Algorithmic Bias.

Selected Publications with Summary

- Junpei Komiyama, Taira Tsuchiya, and Junya Honda. Minimax Optimal Algorithms for Fixed-Budget Best Arm Identification. In *Advances in Neural Information Processing Systems (NeurIPS 2022)*. We characterized the optimal algorithm and performance bound in the fixed-budget best arm identification, which had been open since its modern formulation in 2010.

- Abe Kenshi, Junpei Komiyama, and Atsushi Iwasaki. Anytime Capacity Expansion in Medical Residency Match by Monte Carlo Tree Search. In *Proceedings of the Thirty-First International Joint Conference on Artificial Intelligence (IJCAI 2022)*. We applied Monte Carlo tree search for a flexible-capacity mechanism design of matching doctors to hospitals, which is NP-Complete to solve exactly.

- J. Komiyama, J. Honda, and H. Nakagawa. Copeland Dueling Bandit Problem: Regret Lower Bound, Optimal Algorithm, and Computationally Efficient Algorithm. In *Proceedings of the 33rd Intl. Conf. on Machine Learning (ICML 2016)*, 1235-1244. We show optimality of posterior sampling, a heuristic proposed in 1930s, in the context of online advertisement selection.

Working Papers

- Hakuei Yamada, Junpei Komiyama, Kenshi Abe and Atsushi Iwasaki. Learning Fair Division from Bandit Feedback. *Submitted to Journal of Artificial Intelligence Research (JAIR).*

- Kohei Kawaguchi, Junpei Komiyama, and Shunya Noda. Miner's Reward Elasticity and Stability of Competing Proof-of-Work Cryptocurrencies. `https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3974376` Revise and Resubmit at International Economic Review (decision at Dec 2024).

- Junpei Komiyama, Shinji Ito, Yuichi Yoshida, and Souta Koshino. Replicability is Asymptotically Free in Multi-armed Bandits. `https://www.arxiv.org/abs/2402.07391` Under Review (JASA).

- Junpei Komiyama. Suboptimal Performance of the Bayes Optimal Algorithm in Frequentist Best Arm Identification. `https://arxiv.org/abs/2202.05193`, Preparing for resubmission

- Kaito Ariu, Masahiro Kato, Junpei Komiyama, Kenichiro McAlinn, and Chao Qin. Policy Choice and Best Arm Identification: Asymptotic Analysis of Exploration Sampling. `https://arxiv.org/abs/2109.08229` To appear in Econometrica (corrigendum).

- Junpei Komiyama and Shunya Noda. Deviation-Based Learning. `https://arxiv.org/abs/2109.09816`. Presented at Causal Inference Challenges (NeurIPS2022 workshop, refereed).

- Junpei Komiyama, Masaya Abe, Kei Nakagawa, and Kenichiro McAlinn. Controlling False Discovery Rates Among Portfolios. `https://arxiv.org/abs/2102.07826`.

Journals (refereed)

- Junpei Komiyama and Shunya Noda. On Statistical Discrimination as a Failure of Social Learning: A Multi-Armed Bandit Approach. `https://arxiv.org/abs/2010.01079`. To appear in Management Science.

- Junpei Komiyama, Edouard Fouche, Junya Honda. Finite-time Analysis of Globally Nonstationary Multi-Armed Bandits. `https://arxiv.org/abs/2107.11419` Journal of Machine Learning (JMLR). Vol. 25 (No. 112), 1-56.

- Katherine Hoffmann Pham and Junpei Komiyama. Strategic Choices of Migrants and Smugglers in the Central Mediterranean Sea. PLoS ONE Vol. 19 (No. 4) e0300553.

- Junpei Komiyama, Kaito Ariu, Masahiro Kato, and Chao Qin. Rate-Optimal Bayesian Simple Regret in Best Arm Identification. Math. of Oper. Res. Vol. 49 (No.3), 1629-1646.

- Junpei Komiyama, Gustavo Malkomes, Bolong Cheng, and Michael McCourt. Bridging Offline and Online Experimentation: Constraint Active Search for Deployed Performance Optimization. *Transactions of Machine Learning Research*, 2022.

- Ryo Watanabe, Junpei Komiyama, Atsuyoshi Nakamura, and Mineichi Kudo. UCB-SC: A Fast Variant of KL-UCB-SC for Budgeted Multi-Armed Bandit Problem. *IEICE Transactions*, Vol 101-A(3): 662-667, 2018.

- Ryo Watanabe, Junpei Komiyama, Atsuyoshi Nakamura, and Mineichi Kudo. KL-UCB-Based Policy for Budgeted Multi-Armed Bandits with Stochastic Action Costs. *IEICE Transactions*, Vol 100-A (No.11), 2470-2486, 2017.

- J. Komiyama, I. Sato, and H. Nakagawa. Multi-armed bandit problem with lock-up periods. *Transactions on Mathematical Modeling and its Applications*, Vol 6 (No.3), 11-22, 2013 (in Japanese).

International Conferences (refereed)

- Kyoungseok Jang, Junpei Komiyama, and Kazutoshi Yamazaki. Fixed Confidence Best Arm Identification in the Bayesian Setting. `https://arxiv.org/abs/2402.10429`, In *Advances in Neural Information Processing Systems (NeurIPS 2024)*.

- Hakuei Yamada, Junpei Komiyama, Kenshi Abe and Atsushi Iwasaki. Learning Fair Division from Bandit Feedback. In *International Conference on Artificial Intelligence and Statistics (AISTATS 2024)*.

- Junpei Komiyama and Masaaki Imaizumi. High-dimensional Contextual Bandit Problem without Sparsity. In *Advances in Neural Information Processing Systems (NeurIPS 2023, acceptance rate: 26.1%)*.

- Nishant Mehta, Junpei Komiyama, Andrea Nguyen, Vamsi Potluru, and Mica Grant-Hagen. Thresholded Linear Bandits. In *International Conference on Artificial Intelligence and Statistics (AISTATS 2023, acceptance rate: 29.2%)*.

- Koji Tabata, Junpei Komiyama, Atsuyoshi Nakamura, Tamiki Komatsuzaki. Posterior Tracking Algorithm for Classification Bandits. In *International Conference on Artificial Intelligence and Statistics (AISTATS 2023, acceptance rate: 29.2%)*.

- Junpei Komiyama, Taira Tsuchiya, and Junya Honda. Minimax Optimal Algorithms for Fixed-Budget Best Arm Identification. In *Advances in Neural Information Processing Systems (NeurIPS 2022, acceptance rate: 25.6%)*.

- Abe Kenshi, Junpei Komiyama, and Atsushi Iwasaki. Anytime Capacity Expansion in Medical Residency Match by Monte Carlo Tree Search. In *Proceedings of the Thirty-First International Joint Conference on Artificial Intelligence (IJCAI, acceptance rate: 14.9%)*, 2022.

- Kei Nakagawa, Masaya Abe and Junpei Komiyama. RIC-NN: A Robust Transferable Deep Learning Framework for Cross-sectional Investment Strategy. In *Proceedings of the 7th IEEE International Conference on Data Science and Advanced Analytics (DSAA 2020, acceptance rate: 26.5%)*, 2020.

- Edouard Fouche and Junpei Komiyama and Klemens Bohm. Scaling Multi-Armed Bandit Algorithms. In *Proceedings of the 25th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD 2019, acceptance rate: 14.2%)*, Anchorage, United States, August 2019.

- J. Komiyama, A. Takeda, J. Honda, and H. Shimao. Nonconvex Optimization for Regression with Fairness Constraints. In *Proceedings of the 35th International Conference on Machine Learning (ICML 2018, acceptance rate: 25.1%)*, Stockholm, Sweden, June 2018.

- J. Komiyama, J. Honda, and A. Takeda. Position-based Multiple-play Bandit Problem with Unknown Position Bias. In *Advances in Neural Information Processing Systems 30 (NIPS 2017, acceptance rate: 20.9%)*, Long Beach, United States, December 2017, 5005-5015.

- Junpei Komiyama, Masakazu Ishihata, Hiroki Arimura, Takashi Nishibayashi, Shin-Ichi Minato. Statistical Emerging Pattern Mining with Multiple Testing Correction. In Proceedings of the 23rd ACM SIGKDD Intl. Conf. on Knowledge Discovery and Data Mining (KDD 2017, acceptance rate: 17.4%), Research Track, Halifax, Canada, August 13-17, 2017, 897-906.

- J. Komiyama, J. Honda, and H. Nakagawa. Copeland Dueling Bandit Problem: Regret Lower Bound, Optimal Algorithm, and Computationally Efficient Algorithm. In *Proceedings of the 33rd Intl. Conf. on Machine Learning (ICML 2016, acceptance rate: 24.0%)*, New York City, United States, July 2016, 1235-1244.

- J. Komiyama, J. Honda, and H. Nakagawa. Regret Lower Bound and Optimal Algorithm in Finite Stochastic Partial Monitoring. In *Advances in Neural Information Processing Systems 28 (NIPS 2015, acceptance rate: 21.9%)*, Montreal, Canada, December 2015, 1792-1800.

- J. Komiyama, J. Honda, H. Kashima, and H. Nakagawa. Regret Lower Bound and Optimal Algorithm in Dueling Bandit Problem. In *Proceedings of the 28th Annual Conf. on Learning Theory (COLT 2015, acceptance rate: 34.8%)*, 1141-1154, Paris, France, July 2015.

- J. Komiyama, J. Honda, and H. Nakagawa. Optimal Regret Analysis of Thompson Sampling in Stochastic Multi-armed Bandit Problem with Multiple Plays. In *Proceedings of the 32nd Intl. Conf. on Machine Learning (ICML 2015, acceptance rate: 26.0%)*, 1152-1161,Lille, France, July 2015.

- J. Komiyama and T. Qin. Time-Decaying Bandits for Non-stationary Systems. In *Proceedings of the 10th Conf. on Web and Internet Economics (WINE 2014)*, 460-466, Beijing, China, December 2014.

- J. Komiyama, H. Oiwa, and H. Nakagawa. Robust Distributed Training of Linear Classifiers Based on Divergence Minimization Principle. In *Proceedings of the 7th Euro. Conf. on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML/PKDD 2014, acceptance rate: 25.0%)*, 1-17, Nancy, France, September 2014.

- J. Komiyama, I. Sato, and H. Nakagawa. Multi-armed bandit problem with lock-up periods. In *Proceedings of the 5th Asian Conf. on Machine Learning (ACML 2013, acceptance rate: 31.1%)*, 116-132, Canberra, Australia, November 2013.

Awards

- IEICE TC-IBISML Research Award (2015): One of the three best papers in Japanese machine learning society.

- The Award of Excellence, by Microsoft Research Asia (2014), in recognition of my participation in the Microsoft Research Asia Internship Program.

- Japanese Society for Artificial Intelligence, Annual Conference Award 2014 (Oral).

- Japanese Society for Artificial Intelligence, Annual Conference Award 2014 (Poster).

Professional Activities

- Reviewer: Management Science (2024), IEEE TIST (2021, 2024), ISR (2020), IEEE Trans. Info. Theo. (2020), ICLR2023, AAAI2022, NIPS2021 (top-8% outstanding reviewer), ICML2021 and NIPS2020 (top-10% outstanding reviewer), FAT*2020, ICML2017-2023, NIPS2016-2023, Neural Networks (2015), Annals of the Institute of Statistical Mathematics (AISM, 2015).

- Editor / Area Chair: AISTATS 2023-2025, AAAI 2024-2025, NeurIPS 2024, ICML2025.

- Action Editor: TMLR (2024-).

- Program Committee: Japanese Society for Artificial Intelligence (2018-2020).

- Ph.D. thesis committee (Edouard Fouché, Karlsruhe Institute of Technology, 2020).

Software Libraries

- Banditlib - a multi-armed bandit library: https://github.com/jkomiyama/banditlib

- Banditlib (multi-play ver): https://github.com/jkomiyama/multiplaybanditlib

- DuelingBanditlib - a dueling bandit library:
  https://github.com/jkomiyama/duelingbanditlib

Education

- **The University of Tokyo**—Hongo, Tokyo, Japan
  Ph.D. course, Major in Machine Learning, Dept. of Mathematical Informatics.

  - October 2012 - March 2016.
  - **Ph.D. thesis title:** Asymptotically Optimal Multi-armed Bandit Algorithms Aimed at Online Contents Selection.
  - **Supervisor:** Hiroshi Nakagawa.

- **The University of Tokyo**—Hongo, Tokyo, Japan
  Master course, Major in Applied Physics, Dept. of Engineering.

  - April 2007 - March 2009.
  - **Master's thesis title:** Computer simulation of Lennard-Jones many particles system (written in Japanese).
  - **Supervisor:** Nobuyasu Ito.

Grants / Fellowships

- Grant-in-Aid for Young Scientists (JSPS Kakenhi Wakate, approximately 20,000 dollars) April 2019–August 2019, Japan.

- Scientific Research Grant (JSPS Kakenhi Kiban B, collaborator, approximately 10,000 dollars for my part/ total 200,000 dollars) April 2017–March 2020, Japan.

- Grant-in-Aid for Young Scientists (JSPS Kakenhi Wakate B, approximately 40,000 dollars) April 2017–March 2019, Japan.

- Research Grant, Inamori Foundation (approximately 10,000 dollars) April 2017–March 2018, Japan.

- Research Fellowships for Young Scientists (JSPS DC2, approximately 65,000 dollars) April 2015–March 2016, Japan.

Past Positions

- **Center for Socio-Global Informatics, Institute of Industrial Science, the University of Tokyo**—Komaba, Tokyo, Japan
  Research Associate: April 2016 - August 2019.

– Research Associate, Electronics and Information Department.

- **DWANGO Co., Ltd.**—Hamacho, Tokyo, Japan
  Software Engineer: April 2009 - June 2012.

    – Developer team member of a large-scale live streaming website in Japan.