Naoto Ohsaka

Personal and Contact Information

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Education

March 2018 **Doctor of Information Science and Technology**
Graduate School of Information Science and Technology, the University of Tokyo, Japan
Title: Efficient and Effective Identification of Influential Vertices in Social Networks

March 2015 **Master of Information Science and Technology**
Graduate School of Information Science and Technology, the University of Tokyo, Japan
Title: Estimating and Maximizing the Spread of Influence in Social Networks: Pruned Monte-Carlo Simulations and Fully-Dynamic Indices

March 2013 **Bachelor of Engineering**
Department of Computer Science, the University of Electro-Communications, Japan
Title: Study on Improving the Performance of a Streaming Algorithm for the k-means Problem

Professional Experience

April 2013–March 2016 Research assistant of the Complex Network and Map Graph Group, JST, ERATO, Kawarabayashi Large Graph Project

April 2016–March 2018 Research Fellowship for Young Scientists (DC2)

April 2018–November 2021 NEC Corporation

December 2021–Present CyberAgent, Inc.

Publications

1. A Reinforcement Learning Method to Improve the Sweeping Efficiency for an Agent.
   Naoto Ohsaka, Daisuke Kitakoshi, and Masato Suzuki.
   *Proceedings of the 2011 IEEE International Conference on Granular Computing (**GrC**)*, pp. 515–520, 2011.
   https://doi.org/10.1109/GRC.2011.6122650
2. Fast and Accurate Influence Maximization on Large Networks with Pruned Monte-Carlo Simulations.
   Naoto Ohsaka, Takuya Akiba, Yuichi Yoshida, and Ken-ichi Kawarabayashi.
   *Proceedings of the 28th AAAI Conference on Artificial Intelligence (**AAAI**)*, pp. 138–144, 2014.
   http://www.aaai.org/ocs/index.php/AAAI/AAAI14/paper/view/8455
3. Efficient PageRank Tracking in Evolving Networks.
   Naoto Ohsaka, Takanori Maehara, and Ken-ichi Kawarabayashi.
   *Proceedings of the 21st ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD**)*, pp. 875–884, 2015.
   https://doi.org/10.1145/2783258.2783297
4. Monotone *k*-Submodular Function Maximization with Size Constraints.
   Naoto Ohsaka and Yuichi Yoshida.
   *Proceedings of the 29th Annual Conference on Neural Information Processing Systems (**NIPS**)*, pp. 694–702, 2015.
   http://papers.nips.cc/paper/5709-monotone-k-submodular-function-maximization-with-size-constraints
5. Dynamic Influence Analysis in Evolving Networks.
   Naoto Ohsaka, Takuya Akiba, Yuichi Yoshida, and Ken-ichi Kawarabayashi.
   *Proceedings of the VLDB Endowment, (**PVLDB**)*, 9(12), pp. 1077–1088, 2016.
   http://www.vldb.org/pvldb/vol9/p1077-ohsaka.pdf
6. Maximizing Time-Decaying Influence in Social Networks.
   Naoto Ohsaka, Yutaro Yamaguchi, Naonori Kakimura, and Ken-ichi Kawarabayashi.
   *Proceedings of the 15th European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (**ECML PKDD**)*, pp. 132–147, 2016.
   https://doi.org/10.1007/978-3-319-46128-1_9
7. Portfolio Optimization for Influence Spread.
   Naoto Ohsaka and Yuichi Yoshida.
   *Proceedings of the 26th International Conference on World Wide Web (**WWW**)*, pp. 977–985, 2017.
   https://doi.org/10.1145/3038912.3052628

8. Coarsening Massive Influence Networks for Scalable Diffusion Analysis.
   Naoto Ohsaka, Tomohiro Sonobe, Sumio Fujita, and Ken-ichi Kawarabayashi.
   *Proceedings of the 2017 ACM SIGMOD International Conference on Management of Data (**SIGMOD**)*, pp. 635–650, 2017.
   https://doi.org/10.1145/3035918.3064045
9. Yoichi Iwata, Tomoaki Ogasawara, and Naoto Ohsaka. On the Power of Tree-Depth for Fully Polynomial FPT Algorithms. *Proceedings of the 35th International Symposium on Theoretical Aspects of Computer Science (**STACS**)*, pp. 41:1–41:14, 2018.
   https://doi.org/10.4230/LIPIcs.STACS.2018.41
10. NoSingles: A Space-Efficient Algorithm for Influence Maximization.
    Diana Popova, Naoto Ohsaka, Ken-ichi Kawarabayashi, and Alex Thomo.
    *Proceedings of the 30th International Conference on Scientific and Statistical Database Management (**SSDBM**)*, pp. 18:1–18:12, 2018.
    https://doi.org/10.1145/3221269.3221291
11. Boosting PageRank Scores by Optimizing Internal Link Structure.
    Naoto Ohsaka, Tomohiro Sonobe, Naonori Kakimura, Takuro Fukunaga, Sumio Fujita, and Ken-ichi Kawarabayashi.
    *Proceedings of the 29th International Conference on Database and Expert Systems Applications (**DEXA**)*, pp. 424–439, 2018.
    https://doi.org/10.1007/978-3-319-98809-2_26
12. A Predictive Optimization Framework for Hierarchical Demand Matching.
    Naoto Ohsaka, Tomoya Sakai, and Akihiro Yabe.
    *Proceedings of the 2020 SIAM International Conference on Data Mining (**SDM**)*, pp. 172–180, 2020.
    https://doi.org/10.1137/1.9781611976236.20
13. The Solution Distribution of Influence Maximization: A High-level Experimental Study on Three Algorithmic Approaches.
    Naoto Ohsaka.
    *Proceedings of the 2020 ACM SIGMOD International Conference on Management of Data (**SIGMOD**)*, pp. 2151–2166, 2020.
    https://doi.org/10.1145/3318464.3380564
14. On the (In)tractability of Computing Normalizing Constants for the Product of Determinantal Point Processes.
    Naoto Ohsaka and Tatsuya Matsuoka.
    *Proceedings of the 37th International Conference on Machine Learning (**ICML**)*, pp. 7414–7423, 2020.
    http://proceedings.mlr.press/v119/ohsaka20a.html

15. Predictive Optimization with Zero-Shot Domain Adaptation.
    Tomoya Sakai and Naoto Ohsaka.
    *Proceedings of the 2021 SIAM International Conference on Data Mining (**SDM**)*, pp. 369–377, 2021.
    https://doi.org/10.1137/1.9781611976700.42
16. Unconstrained MAP Inference, Exponentiated Determinantal Point Processes, and Exponential Inapproximability.
    Naoto Ohsaka.
    *Proceedings of the 24th International Conference on Artificial Intelligence and Statistics (**AISTATS**)*, pp. 154–162, 2021.
    http://proceedings.mlr.press/v130/ohsaka21a.html
17. Tracking Regret Bounds for Online Submodular Optimization
    Tatsuya Matsuoka, Shinji Ito, and Naoto Ohsaka.
    *Proceedings of the 24th International Conference on Artificial Intelligence and Statistics (**AISTATS**)*, pp. 3421–3429, 2021.
    http://proceedings.mlr.press/v130/matsuoka21a.html
18. Spanning Tree Constrained Determinantal Point Processes are Hard to (Approximately) Evaluate.
    Tatsuya Matsuoka and Naoto Ohsaka.
    Operations Research Letters, 49(3), pp. 304–309, 2021.
    https://doi.org/10.1016/j.orl.2021.02.004
19. A Fully Polynomial Parameterized Algorithm for Counting the Number of Reachable Vertices in a Digraph.
    Naoto Ohsaka.
    Information Processing Letters, 171, pp. 106137, 2021.
    https://doi.org/10.1016/j.ipl.2021.106137
20. Approximation Algorithm for Submodular Maximization under Submodular Cover.
    Naoto Ohsaka and Tatsuya Matsuoka.
    *Proceedings of the 37th Conference on Uncertainty in Artificial Intelligence (**UAI**)*, pp. 792–801, 2021.
    https://proceedings.mlr.press/v161/ohsaka21a.html
21. On the Convex Combination of Determinantal Point Processes.
    Tatsuya Matsuoka, Naoto Ohsaka, and Akihiro Yabe.
    *Proceedings of the 13th Asian Conference on Machine Learning (**ACML**)*, pp. 158–173, 2021.
    https://proceedings.mlr.press/v157/matsuoka21a.html
22. Maximization of Monotone k-Submodular Functions with Bounded Curvature and Non-k-Submodular Functions.
    Tatsuya Matsuoka and Naoto Ohsaka.

*Proceedings of the 13th Asian Conference on Machine Learning (**ACML**)*, pp. 1707–1722, 2021.
https://proceedings.mlr.press/v157/matsuoka21b.html

23. Reconfiguration Problems on Submodular Functions.
Naoto Ohsaka and Tatsuya Matsuoka.
*Proceedings of the 15th ACM International Conference on Web Search and Data Mining (**WSDM**)*, pp. 764–774, 2022.
https://doi.org/10.1145/3488560.3498382
24. Some Inapproximability Results of MAP Inference and Exponentiated Determinantal Point Processes.
Naoto Ohsaka.
Journal of Artificial Intelligence Research, 73, pp. 709–735, 2022.
https://doi.org/10.1613/jair.1.13288
25. On the Parameterized Intractability of Determinant Maximization.
Naoto Ohsaka.
*Proceedings of the 33rd International Symposium on Algorithms and Computation (**ISAAC**)*, pp. 46:1–46:16, 2022.
https://doi.org/10.4230/LIPIcs.ISAAC.2022.46
26. On Reconfigurability of Target Sets.
Naoto Ohsaka.
Theoretical Computer Science, 942, pp. 253–275, 2023.
https://doi.org/10.1016/j.tcs.2022.11.036
27. Gap Preserving Reductions between Reconfiguration Problems.
Naoto Ohsaka.
*Proceedings of the 40th International Symposium on Theoretical Aspects of Computer Science (**STACS**)*, pp. 49:1–49:18, 2023.
https://doi.org/10.4230/LIPIcs.STACS.2023.49
28. A Critical Reexamination of Intra-List Distance and Dispersion.
Naoto Ohsaka and Riku Togashi.
*Proceedings of the 46th International ACM SIGIR Conference on Research and Development in Information Retrieval (**SIGIR**)*, pp. 1619–1628, 2023.
https://doi.org/10.1145/3539618.3591623
29. Curse of "Low" Dimensionality in Recommender Systems.
Naoto Ohsaka and Riku Togashi. (Equal contribution)
*Proceedings of the 46th International ACM SIGIR Conference on Research and Development in Information Retrieval (**SIGIR**)*, pp. 537–547, 2023.
https://doi.org/10.1145/3539618.3591659

30. Fast and Examination-agnostic Reciprocal Recommendation in Matching Markets.
    Yoji Tomita, Riku Togashi, Yuriko Hashizume, and Naoto Ohsaka.
    *Proceedings of the 17th ACM Conference on Recommender Systems (**RecSys**)*, pp. 12–23, 2023.
    https://doi.org/10.1145/3604915.3608774
31. Gap Amplification for Reconfiguration Problems.
    Naoto Ohsaka.
    *Proceedings of the 35th Annual ACM-SIAM Symposium on Discrete Algorithms (**SODA**)*, pp. 1345–1366, 2024.
    https://doi.org/10.1137/1.9781611977912.54
32. On the Parameterized Intractability of Determinant Maximization.
    Naoto Ohsaka.
    *Algorithmica (Special issue of **ISAAC** 2022)*, 86(6), pp. 1731–1763, 2024.
    https://doi.org/10.1007/s00453-023-01205-0
33. Safe Collaborative Filtering.
    Riku Togashi, Tatsushi Oka, Naoto Ohsaka, and Tetsuro Morimura.
    *Proceedings of the 12th International Conference on Learning Representations (**ICLR**)*, 2024.
    https://openreview.net/pdf?id=yarUvgEXq3
34. Probabilistically Checkable Reconfiguration Proofs and Inapproximability of Reconfiguration Problems.
    Shuichi Hirahara and Naoto Ohsaka.
    *Proceedings of the 56th Annual ACM Symposium on Theory of Computing (**STOC**)*, pp. 1435–1445, 2024.
    https://doi.org/10.1145/3618260.3649667
35. Computational Complexity of Normalizing Constants for the Product of Determinantal Point Processes.
    Tatsuya Matsuoka and Naoto Ohsaka.
    Theoretical Computer Science, 997, pp. 114513, 2024.
    https://doi.org/10.1016/j.tcs.2024.114513
36. Optimal PSPACE-hardness of Approximating Set Cover Reconfiguration.
    Shuichi Hirahara and Naoto Ohsaka.
    *Proceedings of the 51st EATCS International Colloquium on Automata, Languages, and Programming (**ICALP**)*, pp. 85:1–85:18, 2024.
    https://doi.org/10.4230/LIPIcs.ICALP.2024.85
37. Alphabet Reduction for Reconfiguration Problems.
    Naoto Ohsaka.
    *Proceedings of the 51st EATCS International Colloquium on Automata, Languages, and Programming (**ICALP**)*, pp. 113:1–113:17, 2024.
    https://doi.org/10.4230/LIPIcs.ICALP.2024.113

38. Matroid Semi-Bandits in Sublinear Time.
    Ruo-Chun Tzeng, Naoto Ohsaka, and Kaito Ariu.
    *Proceedings of the 40th International Conference on Machine Learning (**ICML**)*, 2024.
    https://openreview.net/forum?id=MwQ53xAIPs

Invited Symposium Talks

1. Theoretical Foundations of Computing (COMP) in Tokyo, Japan, March 14th, 2024.
   "Gap Amplification for Reconfiguration Problems"
2. The 5th Combinatorial Reconfiguration Workshop in Fukuoka, Japan, October 8th, 2024.
   "On the Complexity of Approximating Reconfiguration Problems"

Invited Academic Talks

1. 20th CoRe Seminar, KAKENHI Grant-in-Aid for Transformative Research Areas (B), January 6th, 2022.
   "On Reconfigurability of Target Sets"
2. Kawarabayashi Lab Seminar, the University of Tokyo, January 19th, 2024.
   "Reconfiguration Problems, Hardness of Approximation, and Gap Amplification: What Are They?"

Awards and Honors

November 2012	3rd Place (with Izuru Matsuura and Masafumi Yabu), ACM International Collegiate Programming Contest Asia Regional Contest 2012 in Tokyo, Tokyo, Japan
July 2013	14th Place (with Izuru Matsuura and Masafumi Yabu), ACM International Collegiate Programming Contest World Finals 2013, St. Petersburg, Russia

Referee

1. Conference referee: AAAI'16 (subreviewer), NeurIPS'19, ICML'20, NeurIPS'20, AAAI'21, AISTATS'21, ICML'21, ICML'22, MFCS'23 (subreviewer), ISAAC'23 (subreviewer), CCC'24 (subreviewer)
2. Journal reviewer: IEICE Transactions on Information and Systems (2015; 2018; 2023), IEEE Access (2019), Algorithmica (2019), PLOS ONE (2020), The VLDB Journal (2021), ACM Transactions on Database Systems (2022)