Omid Sadeghi

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Online Learning | Submodular Optimization | Quantitative Research

Machine Learning Researcher

- Extensive research experience in applying convex optimization tools to tackle non-convex problems in Machine Learning under various additional considerations (e.g., limited resource/budget availability, privacy, incentive compatibility, and fairness) and in both online and offline settings, and implementing the algorithms on real-world data sets.

Skills

Languages — Farsi (Native), English (Full Proficiency), and Spanish (Elementary Proficiency).
Coding — Python.
Misc. — CVXPY, Scikit-learn, Pandas, LaTeX typesetting and publishing, Word, Excel, PowerPoint.

Education

2017 – Present — **Ph.D. Electrical Engineering,** University of Washington, Seattle, WA, USA.
2017 – 2022 — **M.S. Mathematics (Optimization),** University of Washington, Seattle, WA, USA.
2011 – 2016 — **B.S. Mathematics,** Sharif University of Technology, Tehran, Iran.
B.S. Electrical Engineering, Sharif University of Technology, Tehran, Iran.

Experience

2017 – Present — **Graduate Research Assistant,** at the University of Washington.
• Designed incentive-compatible methods for online prediction with strategic experts.
• Used tools from mathematical optimization to design online algorithms with improved performance guarantees for submodular optimization problems under limited resource availability (e.g., online ad placement with budget-constrained advertisers).
• Designed and analyzed competitive algorithms for online resource allocation problems with procurement cost.
• Designed differentially private algorithms for submodular optimization.
• Proposed an algorithm for interactive combinatorial bandit problems in the presence of both competitivity and complementarity between the elements.

Summer 2015 — **Junior Research Assistant,** at the Chinese University of Hong Kong (CUHK).
Research on invex functions and very weak interference channels.

Honors and Awards

2011 – 2016 — Recipient of grant and membership of Iranian National Elite Foundation.
2011 — Ranked 18th out of nearly 300,000 applicants in the Iranian nationwide university entrance exam of Math and Physics.

Honors and Awards (continued)

- Ranked 67th out of nearly 100,000 applicants in the Iranian nationwide university entrance exam of the English Language.

Publications

Papers

1. **Sadeghi, O.**, & Fazel, M. (2023a). Fast first-order methods for monotone strongly dr-submodular maximization. In *Siam conference on applied and computational discrete algorithms (acda23)* (pp. 169–179). SIAM.
2. **Sadeghi, O.**, & Fazel, M. (2023b). No-regret online prediction with strategic experts. *arXiv preprint arXiv:2305.15331, Under Review*.
3. Narang, A., **Sadeghi, O.**, Ratliff, L. J., Fazel, M., & Bilmes, J. (2022). Online submodular + supermodular (bp) maximization with bandit feedback. *arXiv preprint arXiv:2207.03091, Under Review*.
4. **Sadeghi, O.**, & Fazel, M. (2021). Differentially private monotone submodular maximization under matroid and knapsack constraints. In *International Conference on Artificial Intelligence and Statistics (AISTATS)* (pp. 2908–2916). PMLR.
5. **Sadeghi, O.**, Raut, P., & Fazel, M. (2021a). Improved regret bounds for online submodular maximization. *ICML Workshop on Subset Selection in Machine Learning: From Theory to Applications*.
6. **Sadeghi, O.**, Raut, P., & Fazel, M. (2021b). Online dr-submodular maximization: Minimizing regret and constraint violation. In *Proceedings of the AAAI Conference on Artificial Intelligence* (Vol. 35, pp. 9395–9402).
7. Ray, M., **Sadeghi, O.**, Ratliff, L. J., & Fazel, M. (2020). Function design for improved competitive ratio in online resource allocation with procurement costs. *arXiv preprint arXiv:2012.12457, Under Review*.
8. **Sadeghi, O.**, Eghbali, R., & Fazel, M. (2020). Online algorithms for budget-constrained dr-submodular maximization. *ICML Workshop on Negative Dependence and Submodularity for ML (NDSML)*.
9. **Sadeghi, O.**, & Fazel, M. (2020). Online continuous dr-submodular maximization with long-term budget constraints. In *International Conference on Artificial Intelligence and Statistics (AISTATS)* (pp. 4410–4419). PMLR.
10. **Sadeghi, O.**, Raut, P., & Fazel, M. (2020). A single recipe for online submodular maximization with adversarial or stochastic constraints. *Advances in Neural Information Processing Systems (NeurIPS)*.

Notes and Surveys

1. **Sadeghi, O.** (2021). Online adversarial zero-sum games [pdf].
2. **Sadeghi, O.**, Gray, M., & Fiez, T. (2021). Data-dependent regret bounds for bandits problems [pdf].
3. **Sadeghi, O.**, Babecki, C., & Liu, K. (2020). Introduction to spectral graph theory [pdf].
4. **Sadeghi, O.**, Linder, J., Leeb, F., & Mukherjee, S. (2018). Linear regression and linear sequential experimental design [pdf].
5. **Sadeghi, O.** (2017). Analysis of alternatives to stochastic gradient descent [pdf].

Mentoring Experience

2019 – 2021 **Prasanna Raut,** Mechanical Engineering M.S. student at the University of Washington. Received the exceptional M.S. thesis award from the Mechanical Engineering department for our joint work [6].

2018 – 2020 **Mitas Ray,** Electrical Engineering Ph.D. student at the University of Washington.

Professional Service

2019 – Present Reviewer for: NeurIPS, ICML, AISTATS, AAAI, IJCAI, L4DC, CDC, JOCO, ACDA.

Spring 2021 Organized MLOpt, the weekly seminar on Machine Learning and Optimization at the University of Washington.

Volunteering Experience

2017 – Present **Facilitator,** at FIUTS (the Foundation for International Understanding Through Students).
Led events, activities, and conversation groups and helped with international student orientation at the University of Washington.

2021 **Mentor,** at GASP (UW ECE Graduate Applicant Support Program).
Provided mentorship and feedback on graduate school applications to underrepresented and marginalized applicants.

Teaching Experience

Fall 2022 **Teaching Assistant,** Submodular Optimization course (EE 563) at the University of Washington, Seattle, WA, USA.

Winter 2018/2020/2022, Spring 2018 **Teaching Assistant,** Convex Optimization course (EE 578) at the University of Washington, Seattle, WA, USA.

Fall 2015 **Teaching Assistant,** Digital Signal Processing course at the Sharif University of Technology, Tehran, Iran.

Spring 2014 **Teaching Assistant,** Discrete Mathematics course at the Sharif University of Technology, Tehran, Iran.

Selected Coursework

Online Courses

Coursera **Divide and Conquer, Sorting and Searching, and Randomized Algorithms**.

Graph Search, Shortest Paths, and Data Structures.

Supervised Machine Learning: Regression and Classification.

Udemy **Quantitative Finance & Algorithmic Trading in Python**.

Codeacademy **Python 3**.

Graduate Courses

CSE 521 **Design and Analysis of Algorithms**.

CSE 525 **Randomized Algorithms and Probabilistic Analysis**.

CSE 535 **Theory of Optimization and Continuous Algorithms**.

CSE 541 **Interactive Machine Learning**.

CSE 546 **Machine Learning**.

Selected Coursework (continued)

CSE 599	**Online and Adaptive Methods for Machine Learning**.
EE 546	**Learning in Games**.
EE 563	**Submodular Optimization**.
MATH 514	**Networks and Combinatorial Optimization**.
MATH 516	**Numerical Optimization**.
MATH 521-522	**Advanced Probability**.
MATH 582	**Convex Analysis**.
STAT 533	**Theory of Linear Models**.
STAT 559	**Measure Theory**.