Alaleh Ahmadian

alaleh.github.io

Research Summary

My general research interests are in artificial intelligence (AI), machine learning (ML), and sequential decision-making under uncertainty, focusing on their applications to real-world problems in engineering and scientific domains. My current research revolves around developing fast and effective Bayesian Optimization (BO) methods and applying them to real-world problems.

Education

Washington State University, Pullman, WA 2019 – 2024
Doctor of Philosophy in Computer Science
Advisor: Prof. Jana Doppa
Research: *Use-Inspired Bayesian Optimization for Engineering Design: From Circuits to 3D Printing and Materials*

Sharif University of Technology, Tehran, Iran 2014 – 2019
Bachelor of Science in Computer Science
Research: *Design and development of scalable algorithms for graph-matching in large ride-sharing networks*

Professional Experience

Research Assistant, *Washington State University, Pullman, WA* 2019 – 2024
Description: Focused on ML research by developing novel Bayesian optimization algorithms for diverse engineering applications. Collaborated with multi-disciplinary teams on real-world challenges, analyzed large datasets, and published findings through top-tier publications and international conferences.

Software Engineer - Machine Learning Intern, *Meta, Bellevue, WA* May 2024 - August 2024
Description: Played a key role in creating a supervised training dataset by feature engineering and set up an online pipeline for ML methods to increase the precision and recall of compromise detection models.

Teaching Assistant, *Washington State University, Pullman, WA* Aug 2019 – Dec 2023
Courses: Big Data, Machine Learning, Advanced Data Structures, Algorithm Design and Analysis
Description: Helped enhance student understanding through dedicated teaching methods, grading feedback for exams and assignments, conducting office hours including individual assistance and clarification on course materials, and preparing and presenting demonstration sessions to supplement lectures.

Machine Learning Engineer Intern, *Rahnema* Dec 2018 – Mar 2019
Description: Played a key role in developing a recommendation system using deep learning methods. Responsibilities included designing and implementing ML models, collaborating with the software development team, and conducting data analysis to identify trends for system improvement.

Teaching Assistant, *Sharif University of Technology* Fall 2015 – Fall 2018
Courses: Intro To Programming (Java/C/C++), Algorithm Design and Analysis, Data Structures
Description: Responsibilities included Designing creative, analytical problem sets and programming projects, preparing and presenting demonstration sessions to supplement lectures, grading assignments and exams, and conducting office hours.

Front-End Web Development Intern, *Chi Co.* Sept 2016 – Dec 2016
Description: Specialized in Front-End design and development, utilizing HTML, CSS, JavaScript, and Bootstrap frameworks. Played a key role in creating responsive and user-friendly web interfaces, ensuring cross-browser compatibility, and integrating dynamic content for an enhanced UX.

Algorithm Design and Programming Instructor, *Farzanegan-1* June 2014 – Sept 2014
Description: Taught algorithm design and advanced C++ programming to highschool students. Developed a curriculum emphasizing essential algorithms and problem-solving techniques, and conducted practice contests to enhance students' computational skills. .

Publications

- A. Ahmadian, S. Belakaria, B. E. Engelhardt, S. Ermon, and J. Doppa **Non-myopic Multi-objective Bayesian Optimization**. *Pe-print*, 2024 (Under review).
- A. Ahmadian, E. S. Chen, S. S. Sparks, C. Chen, A. Deshwal, J. R. Doppa, and K. Qiu **Machine Learning Enabled Design and Optimization for 3D-Printing of High-Fidelity Presurgical Organ Models** Journal of Advanced Materials Technologies, 2024.
- A. Ahmadian, S. Belakaria, and J. Doppa **Pareto front-Diverse Batch Multi-Objective Bayesian Optimization**. *The 38th Annual AAAI Conference on Artificial Intelligence (AAAI)*, 2024.
- A. Ahmadian, S. Belakaria, J. Doppa **Preference-Aware Constrained Multi-Objective Bayesian Optimization**. *7th Joint International Conference on Data Science & Management of Data (ACM CODS-COMAD)*, 2024.
- A. Ahmadian, S. Belakaria, J. Doppa **Preference-Aware Constrained Multi-Objective Bayesian Optimization for Analog Circuit Design: An Information-Theoretic Approach**. *Workshop on ML for Systems at Conference on Neural Information Processing Systems (NeurIPS)*, 2022.
- S. Belakaria, Z. Zhou, A. Ahmadian, J. Doppa, and D. Heo. **Multi-Output Switched-Capacitor Converter Design Optimization via Machine Learning**. (Pre-print), 2021
- A. Ahmadian, A. Deshwal, S. Belakaria, C. Simon, and J. Doppa. **Bayesian Optimization for Design of Metal-organic Frameworks.** *(In preparation)*

Skills

- Python(pandas, numpy, scipy, pytorch, botorch, scikit-learn), R, SQL, MATLAB, C, C++, Java
- Data Analysis, Data Visualization, Mathematical Modeling, Statistical Modeling, Algorithm Analysis, Data structures, Discrete Mathematics, Graph Theory, Statistics, and Problem-Solving theoretically and practically
- Web development (Django, Python, CSS, HTML, JS, VueJS), LaTeX, Linux, Bash, git

Academic Projects

Design of Multi-Objective Bayesian Optimization Algorithms, Aug 2019 – Dec 2024
Description: Developing fast and scalable multi-objective Bayesian optimization methods for science and engineering applications.

Machine Learning to Optimize 3D Printing, Dec 2021 – Dec 2023
Description: Designing a multi-objective Bayesian Optimization method to optimize 3D printing of human body organs for pre-surgical training.

Bayesian Optimization to Accelerate Hardware Design, Aug 2021 – Dec 2022
Description: Designing a robust Multi-Objective Bayesian Optimization method to optimize a high conversion ratio converter's efficiency as well as settling time.

Bayesian Optimization for Metal-Organic Frameworks, July 2021 – June 2022
Description: Design a multi-objective Bayesian optimization algorithm to select optimal metal-organic framework (MOF) structures from a library of materials for hydrogen-powered vehicles.

Ride-Sharing graph matching, Oct 2018 – May 2019
Description: Developing a scalable algorithm to find the most efficient matching for a ride-sharing system in a mega city network graph.

Social Network Sentiment Analysis, Jan 2018 – July 2018
Description: Using sentiment analysis to Find the relationship between fake news and its prominent attributes in order to classify news sources that are mostly fake and predict the type of news(fake, true, misleading,...).

Awards and Honors

Outstanding Graduate Teaching Assistant Award from Voiland College of Engineering
Washington State University 2022

Outstanding Graduate Teaching Assistant Award from EECS Department
Washington State University 2022

Ranked 791/191,551 (top 0.5%) in the national university entrance exam (Math and Physics) 2014

Ranked 122/99,104 (top 0.1%) in the national university entrance exam (English Literature) 2014

Miscellaneous

Program Committee Member

- **Conferences:** AAAI 2025 Main track, AAAI 2025 AI for Social Impact Track, AAAI 2025 Student Abstracts, ICLR 2025, AAAI 2024, NeurIPS WiML Workshop 2024, NeurIPS WiML Workshop 2023, AAAI 2023, ICAPS 2021
- **Journals:** IEEE Transactions on Systems, Man, and Cybernetics

Technical/Professional Events

- Selected to Participate in Meetings for Professional Growth
  - CRA-WP Graduate Cohort for IDEALS - 2024
  - CRA-WP Graduate Cohort for Women - 2020, 2021, 2022
- Presentations/Talks
  - AAAI 2024 - Student Abstract Program - Oral Presentation.
  - SRC TechCon 2022 - Presenting our work on "Preference-Aware Bayesian Optimization to Accelerate Hardware Design".
- Volunteer Work
  - AAAI 2024, WiML Workshop (NeurIPS 2021, NeurIPS 2022), ICML 2022

References

- Prof. Jana Doppa
  Huie-Rogers Endowed Chair in Computer Science
  Associate Professor
  School of EECS, Washington State University
  Email: jana.doppa@wsu.edu