Alaleh Ahmadian

Curriculum Vitae

School of Electrical Engineering and Computer Science
Washington State University
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Research Summary

My general research interests are in Artificial Intelligence (AI), Machine Learning (ML), and Sequential Decision-making under Uncertainty with applications to real-world problems in engineering and scientific domains. My current research focuses on developing fast and effective Bayesian Optimization (BO) methods and applying them to real-world problems to accelerate hardware design and 3D printing of biomedical structures.

Education

Washington State University, Pullman, WA — Fall 2019 –
Doctor of Philosophy in Computer Science
Advisor: Prof. Jana Doppa
Research Topic: *Use-Inspired Bayesian Optimization for Science and Engineering Applications*

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

Professional Experience

Research Assistant, Washington State University, EECS — Aug 2019 – Present

Teaching Assistant, Washington State University, EECS — Aug 2019 – Present
Courses: Big Data, Machine Learning, Advanced Data Structures, Algorithm Design and Analysis

Machine Learning Engineering Intern, Rahnema Co, Tehran, Iran — Dec 2018 – Mar 2019
Description: Played a key role in developing a recommendation system for online shopping websites using deep learning methods. Responsibilities included designing and implementing machine learning models to improve user experience and increase sales, collaborating with the software development team to integrate the recommendation system into the existing platform, and conducting data analysis to identify trends and insights for system improvement.

Teaching Assistant, Sharif University of Technology, CS-Math — Fall 2015 – Fall 2018
Courses: Introduction To Programming(Java), Design and Analysis of Algorithms, Data Structure Design, Introduction To Programming(C/C++)

Front-End Web Development Intern, Chi Co, Tehran, Iran — Sept 2016 – Dec 2016
Specialized in Front-End design and development, utilizing a proficient command of 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 user experience.

Algorithm Design and Programming Instructor — June 2014 – Sept 2014
National Organization for Development of Exceptional Talents, Farzanegan1, Mashhad, Iran

Publications

- A. Ahmadianshalchi, S. Belakaria, and J. Doppa **Pareto front-Diverse Batch Multi-Objective Bayesian Optimization**. *The 38th Annual AAAI Conference on Artificial Intelligence (AAAI)*, 2024.
- A. Ahmadianshalchi, 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. Ahmadianshalchi, E. Chen, S. Sparks, A. Deshwal, J. Doppa, and K. Qiu **Machine Learning Enabled Design and Optimization for 3D-Printing of High-Fidelity Presurgical Organ Models** Journal of Advanced Materials Technologies (Under Review)
- S. Belakaria, Z. Zhou, A. Ahmadianshalchi, J. Doppa, and D. Heo. **Multi-Output Switched-Capacitor Converter Design Optimization via Machine Learning**. *IEEE Design and Test of Computers*. Under review.
- A. Ahmadianshalchi, 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.
- A. Ahmadianshalchi, 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 – Present
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 body parts

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. Paper to be submitted to Chemistry journal.

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 Posts 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

Selected amongst the top 40 people from 1800 candidates through three rounds of exams for Rahnema College ML internship 2018

Ranked in the first 0.5% (791 out of 191,551 participants) in the national university entrance exam (Math and Physics major) 2014

Ranked in the first 0.1% (122 out of 99,104 participants) in the national university entrance exam (English Literature major) 2014

Certifications

- TOEFL IBT : 110/120 (Reading: 26/30, Listening: 30/30, Speaking: 27/30, Writing: 27/30)
- General GRE: Quantitative Reasoning: 170/170, Verbal Reasoning: 149/170, Analytical Writing: 4.5/6

Miscellaneous

Program Committee Member - Reviewer

- International Conference on Learning Representations (ICLR) - 2024
- Conference on Neural Information Processing Systems (NeurIPS) WiML workshop - 2023
- Association for the Advancement of Artificial Intelligence (AAAI) Conference - 2023, 2024
- AAAI Workshop on AI to Accelerate Science and Engineering - 2022 ,2024
- The International Conference on Automated Planning and Scheduling (ICAPS) - 2021
- 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 Conference on Artificial Intelligence, 2024
  - Women in Machine Learning (WiML) Workshop, NeurIPS 2022
  - International Conference on Machine Learning (ICML), 2022
  - Women in Machine Learning (WiML) Workshop, NeurIPS 2021

Languages

- Persian (Native), English (Professional), Arabic (Limited Working Proficiency), French (Limited Working Proficiency)

References

- Prof. Jana Doppa
  George and Joan Berry Distinguished Associate Professor
  School of Electrical Engineering and Computer Science
  Washington State University
  Email: jana.doppa@wsu.edu
- Prof. Partha Pande
  Boeing Centennial Chair Professor
  School of Electrical Engineering and Computer Science
  Washington State University
  Email: pande@wsu.edu