AMEL AWADELKARIM

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EDUCATION

Ph.D. in Computational and Mathematical Engineering, Stanford University — Sept 2023 (expected)
Advised by: Johan Ugander. *NSF Graduate Research Fellow.*

M.S. in Engineering Science and Mechanics, The Pennsylvania State University — Aug 2016 - Dec 2017
B.S. in Engineering Science and Mechanics, The Pennsylvania State University — Aug 2012 - Dec 2016

TECHNICAL HIGHLIGHTS

Research Interests	Computational social science, personalization & recommender systems, network science
Relevant Courses	Machine Learning, Applied Statistics, Numerical Linear Algebra, Numerical Optimization
Languages & Tools	Python (Numpy, pandas, PyTorch, NetworkX, Matplotlib, Jupyter notebook), C++, SQL, Git

WORK EXPERIENCE

Stanford University, Research Assistant

Preference modeling for school choice — Jan 2021 - present

- Applied recent advancements in discrete choice and ranking models in PyTorch to improve preference models for school choice research, in partnership with the San Francisco Unified School District.
- Improved goodness-of-fit (measured via NLL loss) by 15% by incorporating context effects—effects of already-chosen items on down-rank choices—and further enhanced top-choice prediction accuracy by 14% via model stratification.

Prioritized restreaming algorithms for balanced graph partitioning — May 2018 - Feb 2020

- Developed a taxonomy of modern scalable algorithms for constrained graph partitioning, contributing a new family of algorithms with state-of-the-art performance.
- Our method improves on the min-cut objective by up to 9% over existing graph partitioning techniques such as Google's Linear Embedding algorithm, providing benchmarking that was previously void in the literature.

Training a playlist curator based on user taste — Sept 2018 - Dec 2018

- Built a playlist classifier using PyTorch, mapping a list of unclassified songs to user-created playlists based on similarity.
- Performed feature engineering: collected features from Spotify's API like song metadata and artist genre tags, and computed artist embeddings from related-artists data using NetworkX and Stanford SNAP's implementation of `node2vec`.
- Tested various supervised ML models for the classification task on Spotify-generated and real-user playlists with a shallow neural network reporting the lowest test NLL loss.

Stanford University, Teaching Assistant, *Networks* — Jan 2021 - Mar 2022

- Supported instruction of an undergraduate course on graph theory; social & information networks; the aggregate behavior of markets, auctions, and crowds; information diffusion; and popular concepts such as the "friendship paradox".

Google, Software Engineering Intern — Jun 2019 - Sept 2019

- Developed an alternative score to the average star-rating of Google Maps features (places) based on Bayesian skill-based rating systems, implemented in C++.
- Average star-ratings suffer from the cold-start problem – our score better captures quality of scarcely-rated features by leveraging head-to-head comparisons of similar features within the same user's ratings.
- The score improves accuracy by up to 10% in predicting binary comparisons between features with few star ratings.

PUBLICATIONS

- A Awadelkarim, I Ashlagi, I Lo, and J Ugander, "Network effects of platform interventions for school choice", *In preparation.*
- A Awadelkarim, A Seshadri, I Ashlagi, I Lo, and J Ugander, "Context-dependent household preference modeling for school choice", 29th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (KDD '23), *To appear.*
- A Awadelkarim and J Ugander, "Prioritized restreaming algorithms for balanced graph partitioning", Proceedings of the 26th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (KDD '20).
- A Awadelkarim, "Finite-element implementation and verification of complex fluid models based on evolving natural configurations, motivated by studies of blood", MS Thesis (PSU 2017).

PRESENTATIONS

- "Improved preference modeling for school choice", Poster, International Conference for Computational Social Science (IC2S2), Chicago, IL, July 2022.
- "Designing defaults for school choice", Talk and poster, NeurIPS Workshop for Human Machine Decision-Making (WHMD), Virtual, November 2021, Recorded talk.
- "Prioritized restreaming algorithms for balanced graph partitioning", Talk and poster, ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (KDD), Virtual, August 2020, Slides.
- "Prioritized restreaming algorithms for balanced graph partitioning", Talk, SIAM Network Science, Virtual, July 2020.
- "Prioritized restreaming algorithms for balanced graph partitioning", Talk, Stanford Women in Math Mentoring (SWIMM) Seminar, Stanford, CA, May 2020.
- "Training a playlist curator based on user taste", Poster, Stanford Machine Learning Symposium, Stanford, CA, December 2018, Poster.

AWARDS

National Science Foundation, Graduate Research Fellowship — Fall 2017 - Summer 2020
PSU Engineering Science & Mechanics, Outstanding Undergraduate Thesis Award — Spring 2016
PSU Leonhard Center, Public Speaking & Presentation Contest Winner — Winter 2015

ACTIVITIES

Member, San Francisco Women's Ultimate team, Fury — Jun 2018 - present
Facilitator, Ultimate Impact African-American Affinity Group — Oct 2020 - Apr 2021
Coach, Stanford Women's Ultimate team, Superfly — Sept 2019 - Dec 2020
Mentor, Stanford Women in Math Mentoring (SWIMM) — Oct 2019 - Jun 2020