AMEL AWADELKARIM

EDUCATION

Stanford University — Sept 2017 - June 2023 (expected)
Ph.D. in Computational and Mathematical Engineering
National Science Foundation (NSF) Graduate Research Fellow
Advised by: Johan Ugander

The Pennsylvania State University — Aug 2016 - Dec 2017
M.S. in Engineering Science & Mechanics - GPA: 4.0/4.0

The Pennsylvania State University — Aug 2012 - Aug 2016
B.S. in Engineering Science - Major GPA: 3.82/4.0
Minor in Mathematics

TECHNICAL HIGHLIGHTS

Research Interests	Computational social science, personalization & recommender systems
Relevant Courses	Applied Statistics, Machine Learning, Discrete Math & Algorithms, Social Networks (TA work), Optimization, Numerical Linear Algebra
Languages & Tools	Python (numpy, pandas, PyTorch, matplotlib, Jupyter notebook), git

WORK EXPERIENCE

Google - Software Engineering Internship — Jun 2019 - Sept 2019

- Developed an alternative quality score to the average star-rating of Google Maps features (places) by implementing a Bayesian skill-rating system on existing ratings.
- Average star-ratings suffer from the cold-start problem—the resulting metric better captures quality of scarcely-rated features by leveraging head-to-head comparisons within user ratings of similar places.
- The new metric aids in the decision-making of what to rank for Google Maps search results.

PUBLICATIONS

- A Awadelkarim, I Ashlagi, I Lo, J Ugander. "SUTVA violations in regression discontinuity design: analysis of smart-matching-platforms in school choice". (In preparation).
- A Awadelkarim, A Seshadri, I Ashlagi, I Lo, J Ugander. "Context-dependent household preference modeling for school choice". (Under review).
- A Awadelkarim, J Ugander. "Prioritized restreaming algorithms for balanced graph partitioning". Proc. 26th ACM SIGKDD Int'l Conf. on Knowledge Discovery and Data Mining (KDD), 2020.
- A Awadelkarim, F Costanzo. "Finite-element implementation and verification of complex fluid models based on evolving natural configurations, motivated by studies of blood". M.S. Thesis. The Pennsylvania State University. 2017.

RESEARCH PROJECTS

Preference modeling for school choice — Jan 2021 - present
PhD Research - Stanford University

- *Why it matters:* We developed better models of how families rank schools, which advances our ability to design and analyze school choice mechanisms
- Applied recent advancements in discrete choice and ranking models to improve preference models for school choice research, in partnership with the San Francisco Unified School District.

- The incorporation of context effects in the model—effects of already-chosen items on the distribution of down-rank choices—greatly improves NLL loss and model stratification enhances top-choice prediction.

"Prioritized restreaming algorithms for balanced graph partitioning" May 2018 - Feb 2020
PhD Research - Stanford University

- *Why it matters:* Our proposed method is most effective at minimizing the edge-cut objective compared to state-of-the-art algorithms, and can aid in efficient large-scale distributed graph computation.
- Developed a taxonomy of modern scalable algorithms for constrained graph partitioning, contributing a new family of algorithms with state-of-the-art performance.
- Empirically compared the new class of algorithms with a number of existing graph partitioning techniques, providing benchmarking that was previously void in the literature.

"Training a playlist curator based on user taste" Sept 2018 - Dec 2018
Project - Stanford University

- *Why it matters:* A playlist is a form of self-expression that has the power to impact our mood and energy-level; this project aids in the task of playlist creation by learning the unique taste of the user.
- Built a playlist classifier, mapping a list of unclassified songs to user-created playlists based on similarity.
- Trained, validated, and tested various ML models, including neural network, SVMs, and perceptron.
- Performed feature engineering: collected Spotify API features like Spotify song metadata and artist genre tags, and computed node2vec artist embeddings (learned from related-artists graph).

"Finite-element implementation and verification of complex fluid models based on evolving natural configurations, motivated by studies of blood" May 2015 - Aug. 2017
M.S. Research - The Pennsylvania State University

- *Why it matters:* New surgical procedures require great testing, in-vitro or in-vivo; computational simulation is a safe and inexpensive first step toward development and adoption.
- Numerically modeled novel thrombectomy procedure for less-invasive blood clot removal.
- Developed finite-element scheme using COMSOL Multiphysics to numerically solve balance laws of momentum and mass with a continuum model for an Oldroyd-B fluid and for blood.

AWARDS

- NSF Graduate Research Fellowship (Fall 2017 - Summer 2020).
- Outstanding Undergraduate Thesis Award (Spring 2016).
- 1st place at the Penn State Speaking & Presentation Contest (Fall 2015).

ACTIVITIES

Member - San Francisco Fury Jun 2018 - present

- Elite women's Ultimate frisbee club, based in the Bay Area. National champions in 2018 & 2021.

Coach - Stanford Women's Ultimate team Sept 2019 - Dec 2020

- Awarded coaches of the year across the entire college division.