

Avishai S. Halev

San Francisco Bay Area

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Education

University of California, Davis

2018-February 2024

PH.D. CANDIDATE, APPLIED MATHEMATICS (ABD)

3.8 GPA

- Areas of expertise: **machine learning, deep learning, reinforcement learning, exploratory data analysis, data visualization.**

University of California, Davis

2020

M.S., APPLIED MATHEMATICS

3.7 GPA

University of North Carolina at Chapel Hill

2018

B.S., APPLIED MATHEMATICS (DOUBLE MAJOR: PHYSICS, MINOR: COMPUTER SCIENCE)

3.6 GPA (3.7 Major GPA)

Work Experience

Machine Learning Engineering Intern

Summer 2022

STRIPE

South San Francisco, CA

- Built and optimized machine learning models to detect transaction laundering rings using natural language processing, classification, and clustering methods, with a detection rate of over 94%.
- Prepared model for deployment, allowing prevention of over \$2 million in annual fines and \$350 thousand in monthly detection expenses.
- Developed and deployed self-supervised methods to finetune a BERT-based website encoding to predict risk factors of Stripe merchants.

Data Science Intern

June 2020-February 2023

TOTALENERGIES RESEARCH & TECHNOLOGY

San Francisco, CA

- Collaborated with a team to develop *pymgrid*, an open-source microgrid simulator for reinforcement learning research.
- Designed deterministic and stochastic model-based control algorithms for optimal control of electrical microgrids.
- Used linear algebra and data structure techniques to improve efficiency of major model predictive control algorithm by over 90%.

Machine Learning Intern

Summer 2019

LACEWORK

Mountain View, CA

- Developed probabilistic models for anomaly detection in AWS CloudTrail events via a graph-theoretical approach.
- Employed linear algebra to reduce linear time iterative clustering algorithm to a constant time, exact formulation.

Research Projects

Genotype Prediction with Computer Vision

June 2023-Present

UNIVERSITY OF CALIFORNIA DAVIS

Davis, CA

- Build computer vision models to predict gene alleles from retinal fundus images to allow for early intervention in macular degeneration.
- Transform and process retinal fundus images with laplacian filtering methods.
- Train multitask, ensemble and pretrained convolution neural network and vision transformer models for multiclass classification.

Swine Infection Prediction with Machine Learning

November 2021-June 2023

UNIVERSITY OF CALIFORNIA DAVIS

Davis, CA

- Built a complete data processing pipeline to extract, clean and use data from swine farms to predict and detect infections.
- Extracted features and performed feature selection via filter selection with correlation and wrapper methods.
- Trained and validated random forest, gradient boosting and MLP machine learning models to optimize performance.

Constrained Reinforcement Learning

March 2020-November 2021

UNIVERSITY OF CALIFORNIA DAVIS

Davis, CA

- Developed constrained reinforcement learning algorithms to optimize the cost and minimize diesel fuel usage of running microgrids that were able to outperform traditional heuristic algorithms by over 70%.
- Built safety-layer reinforcement learning algorithms to ensure constraint satisfaction of reinforcement learning policies.
- Benchmarked algorithms with heuristic models as well as model predictive controllers.

Publications

- **A. Halev**, B. Martínez-López, M. Clavijo, C. Gonzalez-Crespo, J. Kim, C. Huang, R. Robbins, and X. Liu. Infection prediction in swine populations with machine learning. *Scientific Reports*, in press.
- J. Kim, R. Rupasinghe, **A. Halev**, C. Huang, S. Rezaei, M. Clavijo, R. Robbins, B. Martínez-López and X. Liu. Predicting antimicrobial resistance of bacterial pathogens using time series analysis. *Frontiers in Microbiology* (14), 2023.
- Y. Liu, **A. Halev**, and X. Liu. Policy Learning with Constraints in Model-free Reinforcement Learning: A Survey. *IJCAI*, 2021.
- G. Henri, T. Levent, **A. Halev**, R. Alami and P. Cordier. *pymgrid*: An Open-Source Python Microgrid Simulator for Applied Artificial Intelligence Research. *NeurIPS Climate Change AI Workshop*, 2020.
- **A. Halev**, D. M. Harris. Bouncing ball on a vibrating periodic surface. *Chaos* (28:9), 2018.

Skills

Technologies

Python, SQL, MATLAB, Mathematica, Excel, \LaTeX

Packages

PyTorch, Pandas, Scikit Learn, Weights and Biases, NumPy, SciPy, Matplotlib