Ethan Harvey

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Highlights

- Ph.D. candidate in the Machine Learning Research Group at Tufts University
- 4+ years of applied experience in Python programming with emphasis on probabilistic machine learning
- 4+ years of academic experience with implementation details of deep neural networks using machine learning frameworks including PyTorch and TensorFlow
- 2+ years of teaching assistant experience for the graduate level machine learning course (Python) and data structures (C/C++) at Tufts University

EDUCATION

Tufts University, Medford, MA *Fall 2021 – Present*
Ph.D. in Computer Science

Relevant Coursework: Learning from Limited Labeled Data (Fall 2024)

Tufts University, Medford, MA *Fall 2021 – Spring 2023*
M.S. in Computer Science, Cumulative GPA: 4.0

Relevant Coursework: Convex Optimization, Deep Neural Networks, Statistical Pattern Recognition, Machine Learning, Mathematical Aspects of Data Analysis

Grove City College, Grove City, PA *Fall 2017 – Spring 2021*
B.S. in Computer Science, Mathematics minor

RESEARCH EXPERIENCE

Tufts University, Medford, MA *September 2021 – Present*
A private R1 research university.
Research Assistant, Advisor: Michael C. Hughes
Collaborating with Tufts Medical Center and Kaiser Permanente Southern California to develop 3D deep neural networks for early prediction of stroke and dementia from MRI and CT scans.
Wrote preliminary work for NIH grant R01-NS134859 which resulted in an archival Proceedings Track paper at the 3rd *Machine Learning for Health (ML4H)* symposium (see publications).
Major user of Tufts University High Performance Computing (HPC) system including 40 NVIDIA A100 GPUs.

Philips, Cambridge, MA *May 2022 – August 2022*
Machine Learning Intern, Philips Research
Developed ensemble tree model from millions of patient records for early detection of hospital-acquired infections.
Compared general and infection-specific machine learning models (see publications).
Implemented integrated gradient using Reimann sums to evaluate feature importance for deep neural networks.

UnitedHealth Group, Minnetonka, MN *June 2021 – August 2021*
Data Science Intern, OptumLabs (R&D Department)
Developed a deep neural network to predict estimated glucose values based on sleep metrics from wearable fitness data and glucose monitoring data.
Collaborated with internal data scientists on reinforcement learning project.

Grove City College, Grove City, PA *January 2021 – May 2021*
An ABET accredited college.
Research Assistant, Advisor: Jonathan O. Hutchins
Collaborated with Highmark Health to research the application of unsupervised learning on acoustic signals as a surrogate for quantitative measurements of human foot pressures during walking and running.

TECHNICAL SKILLS

Programming Languages: Python, C/C++, Java, MATLAB
Machine Learning Frameworks: PyTorch, TensorFlow, JAX, scikit-learn
Data Analysis Tools: NumPy, Pandas, SciPy, Matplotlib, Spark, SQL, NoSQL
Cloud Computing Services: Amazon Web Services, Google Cloud Platform, Microsoft Azure

PUBLICATIONS

Ethan Harvey, Wansu Chen, David M. Kent, and Michael C. Hughes. A Probabilistic Method to Predict Classifier Accuracy on Larger Datasets given Small Pilot Data. In *Machine Learning for Health (ML4H)*, 2023. (28.7% acceptance rate)

Ethan Harvey, Junzi Dong, Erina Ghosh, and Ali Samadani. A Comparative Analysis of Machine Learning Models for Early Detection of Hospital-Acquired Infections. Extended Abstract presented at *Machine Learning for Health (ML4H)*, 2023. (40.3% acceptance rate)

Ethan Harvey, Junzi Dong, Erina Ghosh, and Ali Samadani. A Comparative Analysis of Machine Learning Models for Early Detection of Hospital-Acquired Infections. In *Proceedings of the 6th Philips Global Data and AI Conference (PGDAI)*, 2023. (Oral presentation)

Evana Gizzi, Wo Wei Lin, Mateo Guaman Castro, **Ethan Harvey**, and Jivko Sinapov (2022). Toward Life-Long Creative Problem Solving: Using World Models for Increased Performance in Novelty Resolution. In *Proceedings of the 13th International Conference on Computational Creativity (ICCC)*, 2022.

TEACHING EXPERIENCE

CS 135 Machine Learning Teaching Assistant, Tufts University, Medford, MA *Spring 2023*
Developed Python unit testing framework that automatically grades student assignments.

CS 135 Machine Learning Teaching Assistant, Tufts University, Medford, MA *Fall 2022*

CS 135 Machine Learning Teaching Assistant, Tufts University, Medford, MA *Spring 2022*
Taught weekly recitations on topics including linear and polynomial regression, perceptron learning, evaluating model performance, logistic regression, kernels, support vector machines, neural networks, convergence and non-convergence, parameter tuning, decision trees, dynamic programming, reinforcement learning, and k-means clustering.

CS 15 Data Structures Teaching Assistant, Tufts University, Medford, MA *Fall 2021*
Lectured on topics including lists, complexity, queues, stacks, recursion, binary search, sets, and trees.
Worked with infrastructure team to design, maintain, and test programs that automatically grade student assignments.

GRANTS

Alzheimer's Drug Discovery Foundation (ADDF), $599,788 *October 2023 – April 2025*
Funded by *Covert Cerebrovascular Disease Detected by Artificial Intelligence (C2D2AI): Pilot Investigation for Pragmatic Neuroimaging Biomarkers for Future Stroke and Dementia Risk*.
Investigators: David M. Kent (PI, Tufts Medical), Michael C. Hughes (Tufts University), and Wansu Chen (Kaiser Permanente Southern California)

HONORS & SCHOLARSHIPS

Tufts University Full Tuition Scholarship 2023
$9,660 scholarship based on academic merit.
Tufts University Full Tuition Scholarship 2022
$9,378 scholarship based on academic merit.
Tufts University Full Tuition Scholarship 2021
$9,194 scholarship based on academic merit.
Dean's List with High Distinction, Grove City College, Spring 2021
Honor based on academic merit.
Grove City College General College Scholarship 2020
$4,000 scholarship based on academic merit.
Grove City College Arlene and James Adams Scholarship 2019
$3,400 scholarship based on academic merit.
Grove City College Timson-Eaton Student Aid Fund 2018
$4,100 scholarship based on academic merit.

REVIEWING

2024: Conference on Health, Inference, and Learning (CHIL)