github.com/ericmfischer
linkedin.com/in/ericmfischer

emfischer712@ucla.edu
(310) 408-0200

Eric Fischer

ericmfischer.com

Background

Purpose: I'm a Ph.D. student from the Department of Statistics at the University of California, Los Angeles. I research generative models and representation learning for language at the Center for Vision, Cognition, Learning, and Autonomy at UCLA under my advisor Dr. Ying Nian Wu.

I earned a M.S. from the Department of Computer Science at UCLA, submitting my thesis *Deep Generative Classifier with Short Run Inference* (escholarship.org/uc/item/8kx4z8qw). In this work, a deep generative classifier uses Short Run Markov Chain Monte Carlo inference, Langevin dynamics, and backpropagation through time to achieve similar classification accuracy to an analogous discriminative classifier, while having the advantages that it can generate data, learn unsupervised with additional *unlabeled* data, and exhibit robustness to adversarial attacks due to the stochasticity of the Langevin equation and the top-down architecture of the underlying generator network.

Research Interests: Generative Modeling, Representation Learning, Energy-Based Models, Natural Language Processing, Computer Vision

Education

University of California, Los Angeles | Ph.D. Statistics **Sep 2020 - current**
- Specialization: generative modeling, representation learning

University of California, Los Angeles | M.S. Computer Science **Sep 2018 - June 2020**
- Thesis: *Deep Generative Classifier with Short Run Inference* (escholarship.org/uc/item/8kx4z8qw)

University of California, Los Angeles | B.A. Philosophy **Sep 2009 - June 2013**
- Cum Laude Honors and Philosophy Departmental Honors
- Emphasis in philosophy of language and propositional and first-order logic

Publications

Deep Generative Classifier with Short Run Inference | M.S. Thesis | escholarship.org/uc/item/8kx4z8qw
- Deep generative classifier uses Short Run Markov Chain Monte Carlo inference, Langevin dynamics, and backpropagation through time to achieve similar classification accuracy to an analogous discriminative classifier, while having the advantages that it can generate data, learn unsupervised with additional *unlabeled* data, and exhibit robustness to adversarial attacks due to the stochasticity of the Langevin equation and the top-down architecture of the underlying generator network

Learning Multi-Layer Latent Variable Model via Variational Optimization of Short Run MCMC for Approximate Inference | arxiv.org/pdf/1912.01909.pdf | ECCV | contributor
- Short Run MCMC residual network outperforms a variational autoencoder with regard to image reconstruction error and image synthesis quality, while not requiring the design of a separate inference network

Research

Exact and Cluster Sampling of Ising Model | github.com/EricMFischer/exact-and-cluster-sampling-markov-chains
- A convergence analysis comparing exact sampling, using the Gibbs sampler and coupled Markov chains, to cluster sampling, using the Swendsen-Wang algorithm

First-Order Optimization Methods for CNN | github.com/EricMFischer/first-order-nn-optimization
- Custom Python implementations and convergence analyses of first-order optimization methods Stochastic Gradient Descent (SGD), SGD with momentum, SGD with Nesterov momentum, RMSprop, and Adam

T-Snake Model for Generative Inpainting | github.com/CS269-Capstone/t-snake-mask-generation
- Employs a topology-adaptive snake deformable model to probabilistically generate missing image data

Variational Lower Bound Formulation and Application of VAE | github.com/EricMFischer/variational-autoencoder
- Statistical formulation and analysis of evidence lower bound for the variational autoencoder, using the MNIST dataset

Experience

Center for Vision, Cognition, Learning, and Autonomy | Graduate Researcher | Los Angeles, CA **Dec 2018 - current**
- Carry out research in generative modeling and representation learning for language

University of California, Los Angeles | Teaching Assistant | Los Angeles, CA **Mar 2020 - current**
- Have served as a Teaching Assistant for many undergraduate and graduate statistics courses at UCLA

eXp Realty | **South Bay Association of Realtors** | Realtor | Los Angeles, CA **Nov 2021 - current**
- Realtor for eXp Realty, the fastest-growing real estate brokerage in the world
- Department of Real Estate license ID: 02042145

NatureBox | Full Stack Software Engineer | Redwood City, CA **Mar 2016 - Dec 2017**
- Core contributor to new Flux/React web application created after company added direct-to-consumer business
- Led various projects including a payment processor migration, addition of Amazon payments, and a 2nd version of API

Cinemagram | Software Engineer | San Francisco, CA **Sep 2015 - Dec 2015**
- Worked with Python, Ruby, and SQL code to construct internal data management interfaces and tools

ClearPath Capital Partners | Wealth Advisor Associate | San Francisco, CA **Sep 2013 - June 2014**
- Earned Series 65 (Uniform Investment Adviser Law Exam) license to work as an investment advisor in California

Graduate Coursework

University of California, Los Angeles
STATS 200A - *Applied Probability*
STATS 201A - *Research Design, Sampling, and Analysis*
STATS 201C - *Advanced Modeling and Inference*
STATS 202A - *Statistics Programming*
STATS 202B - *Matrix Algebra and Optimization*
STATS 202C - *Monte Carlo Methods for Optimization*
COM SCI M276A / STATS M231A - *Pattern Recognition and Machine Learning*
COM SCI M266A / STATS M232A - *Statistical Modeling and Learning in Vision and Cognition* (audited)
COM SCI M266B / STATS M232B - *Statistical Computing and Inference in Vision and Cognition*
COM SCI 247 - *Advanced Data Mining*
COM SCI 251A - *Advanced Computer Architecture*
COM SCI 269 - *Seminar in Artificial Intelligence: Deformable Models*
EC ENGR 236C - *Optimization for Large-Scale Systems*
EC ENGR 239AS - *Neural Networks and Deep Learning*
EC ENGR C243A - *Neural Signal Processing* (audited, spring 2023)

Independent
Hack Reactor, Advanced Software Engineering Immersive Program, San Francisco, CA, hackreactor.com, June - Sep 2015
CS 224n - Natural Language Processing with Deep Learning, Stanford University on web.stanford.edu/class/cs224n/
CS 230 - Deep Learning, Stanford University on cs230.stanford.edu
CS 231n - Deep Learning for Computer Vision, Stanford University on cs231n.stanford.edu
Wrote two chapters and edited several other chapters of two textbooks authored by Dr. Song-Chun Zhu and my advisor Dr. Ying Nian Wu, which summarize over 20 years of artificial intelligence research at UCLA: *Statistical Models for Marr's Paradigm* (https://link.springer.com/book/10.1007/978-3-030-96530-3) and *Stochastic Grammars for Scene Parsing* (ericmfischer.com/publication/book-2/book-2.pdf)