Katrina Drozdov (Evtimova)

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Summary

My research focuses on self-supervised learning for extracting useful data representations, including regularization that prevents collapse during model pre-training. I am seeking full-time research opportunities in industry to advance AI through building robust and effective multi-modal generative systems and LLMs.

Education

New York University Sep 2018 - Sep 2024
Ph.D. in Data Science. Advised by Yann LeCun. New York, NY
Thesis: "Representation Learning with Regularized Energy-Based Models".

New York University Sep 2015 - May 2017
M.Sc. in Data Science. New York, NY
Coursework Highlights: Deep Learning, Inference & Representation, Natural Language Understanding.

Harvard College Sep 2009 - May 2013
B.A. in Mathematics. Secondary concentration in Economics. Cambridge, MA
Coursework Highlights: Math 55 (Honors Abstract Algebra, Real and Complex Analysis).

Work Experience

Facebook May 2020 - Aug 2020
Research Intern, Facebook AI Research New York, NY
Research Project: Using variance regularization to prevent collapse when training sparse image encoders.

Facebook May 2019 - Aug 2019
Research Intern, Facebook AI Research New York, NY
Research Project: Deep learning methods for learning hierarchical and sparse representations of images.

eBay Jul 2017 - Aug 2018
Research Engineer, Merchandising Team New York, NY
Developed scalable machine learning algorithms for item recommendations in Scala, deployed in production.

New York University Oct 2016 - Mar 2017
Research Assistant, CILVR Lab New York, NY
Implemented Markov Logic Networks for clinical data. In collaboration w/ Yacine Jernite and David Sontag.

Comcast Jun 2016 - Aug 2016
Data Science Intern New York, NY
Evaluated performance of TV programs using Hive to aggregate and analyze user data.

Columbia Business School Jul 2013 - Jul 2015
Research Associate, Finance and Economics Division New York, NY
Collected and analyzed financial data such as mutual fund performance using Python.

Publications

Video Representation Learning with Joint-Embedding Predictive Architectures
K. Drozdov, R. Shwartz-Ziv, Y. LeCun. Preprint, 2024.
We develop a neural architecture that encodes object dynamics through self-supervised learning from video data. We incorporate variance regularization, which leads to improvements across multiple evaluation metrics.

Variance-Covariance Regularization Improves Representation Learning
Zhu, J., **Evtimova, K.**, Chen, Y., Shwartz-Ziv, R. and LeCun, Y. Preprint, 2023.
We show that our regularization framework which encourages data representations to have high variance and low covariance enhances transfer learning in both the image and video domains.

Sparse Coding with Multi-layer Decoders using Variance Regularization
K. Evtimova, Y. LeCun. TMLR 2022.
ISTA is a classic algorithm for extracting sparse representations of data. We extend ISTA to work with deep neural networks, applying variance regularization to avoid collapse. Sparse image representations extracted with our method boost one-shot learning performance.

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Publications (continued)

Emergent Communication in a Multi-Modal, Multi-Step Referential Game
K. Evtimova, A. Drozdov, D. Kiela, K. Cho. ICLR 2018.
We use reinforcement learning to train a multi-agent neural network architecture where agents cooperate to predict the class of an input image. The architecture is adaptive, using more computation for complex images.

Selected Invited Talks

"Towards Building Intelligent Systems". Apple MLR, Oct 2024.

"Deep Leaning". Leif Weatherby's course "Theory of the Digital", Jan 2023.

"Self-supervised Learning & Sparse Overcomplete Representations of Visual Data". CILVR at NYU, Jan 2020.

Media Mentions

"From Academia to Industry: How a 2018 Paper Foreshadowed OpenAI's Latest Innovation"
Medium, Oct 2024. Discusses my research on emergent communication and its connection to OpenAI's o1 model.

Teaching

Teaching Assistant, New York University — Spring 2020
Introduction to Machine Learning taught by Kyunghyun Cho at the Courant Institute.

Teaching Assistant, New York University — Spring 2019
Deep Learning taught by Yann LeCun at the Center for Data Science.

Teaching Assistant, Harvard College — Fall 2011
Linear Algebra and Applications taught by Vaibhav Gadre at the Math Department.

Professional Service

Conference Reviewing: ICML '21, '22, '23, '24; NeurIPS '21, '22; ICLR '21, '22, '23, '24. AISTATS '24.

Additional Reviewing: WiML Workshop at NeurIPS '17, TMLR.

Student Advising

New York University
O. Che. Independent study on non-linear sparse coding. — Fall 2020

Awards & Distinctions

Highlighted Reviewer, International Conference on Learning Representations — Apr 2022

Best Deep Learning Project Recipient (Jointly with A. Drozdov) — Feb 2017
NYU Center for Data Science Award Ceremony. Award selected by Yann LeCun.
Project Title: Understanding Mutual Information and its Use in InfoGAN.

Ena Blyth Scholarship, Harvard College — Sep 2011 - May 2013
Selected as one of the two recipients of this annual award in the Math Department.

Activities

Organiser, NYU AI School 2022 — Sep 2021 - Jan 2022

President, NYU Center for Data Science Leadership Circle — Sep 2018 - May 2019

Skills & Interests

Technical: Extensive experience with Python and PyTorch for developing custom deep learning pipelines.

Personal Interests: I enjoy singing and was a member of The Noteables, a Broadway show choir at Harvard. I also experiment with art and baking. My mixed media piece "Junk Mail" was featured at NYU's 4th Annual World Tour Pop-Up Gallery. Outside of my creative pursuits, I practice yoga and enjoy outdoor activities such as hiking and cycling.