Teddy Koker

CONTACT
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https://teddykoker.com

EDUCATION

Worcester Polytechnic Institute, Worcester, MA — Sep. 2016 – Dec. 2019
Bachelor of Science in Computer Science
Advisor: Wilson Wong

PROFESSIONAL EXPERIENCE

Massachusetts Institute of Technology, Lincoln Laboratory — Apr. 2021 – Present
Associate Staff
Created a deep learning model to detect early infection of SARS-CoV-2 from wearable device data. Developed methods for contrastive training of graph neural networks for crystalline materials.

Lightning AI — Aug. 2020 – Feb. 2021
Machine Learning Research Engineer
Co-created `torchmetrics` package, complete with efficient and scalable implementations of popular evaluation metrics. Led project on model interpretability, introducing a new way of generating pixel level saliency maps. Assisted with research focusing on self-supervised learning of image representations through Variational Autoencoders.

Harvard Medical School — Dec. 2019 – Aug. 2020
Machine Learning Research Associate
Conducted research within the Image and Data Analysis Core. Created deep learning model to detect manipulation of microscopy images. Proposed a novel approach to biomedical image retrieval.

PUBLICATIONS

Graph Contrastive Learning for Materials.
Teddy Koker, Keegan Quigley, Will Spaeth, Nathan Frey, and Lin Li.
NeurIPS AI for Accelerated Materials Design Workshop, 2022

AAVAE: Augmentation-Augmented Variational Autoencoders.
William Falcon, Ananya Harsh Jha, **Teddy Koker**, and Kyunghyun Cho.
arXiv preprint.

TorchMetrics: Measuring Reproducibility in PyTorch
N. Detlefsen, J. Borovec, J. Schock, A. Jha, **T. Koker**, L. Liello, D. Stancl, C. Quan, M. Grechkin, W. Falcon.
The Journal of Open Source Software, 2022.

U-Noise: Learnable Noise Masks for Interpretable Image Segmentation.
T. Koker, F. Mireshghallah, T. Titcombe, and G. Kaissis.
International Conference on Image Processing, 2021.

On Identification and Retrieval of Near-Duplicate Biological Images: A New Dataset and Protocol.
T. Koker*, S.S. Chintapalli*, S. Wang, B.A. Talbot, D. Wainstock, M. Cicconet, M.C. Walsh.
International Conference on Pattern Recognition, 2020.

Cryptocurrency Trading Using Machine Learning.
Teddy Koker and Dimitrios Koutmos.
Journal of Risk and Financial Management, 2020.

TALKS

Deep Learning for Detection of COVID-19 with Commercial Wearables
MIT Lincoln Laboratory, Recent Advances in AI for National Security — Nov. 2021
DTRA Chemical and Biological Defense Science & Technology Conference — Dec. 2022

Personal Writing	*Learning to Learn with JAX*, 1,000+ page views	Apr. 2022
	Performers: The Kernel Trick, Fourier Features, and Attention, 5,000+ page views	Dec. 2020
	Deep Learning for Guitar Effect Emulation, 15,000+ page views	May. 2020
	NLP from Scratch: Annotated Attention, 2,000+ page views	Feb. 2020
	Beating the Odds: Machine Learning for Horse Racing, 15,000+ page views	Dec. 2019

Code

Torchsort, `https://github.com/teddykoker/torchsort`, 600+ stars
PyTorch library implementing the *Fast Differentiable Sorting and Ranking* algorithm, optimized with custom C++ and CUDA extensions.

Image GPT, `https://github.com/teddykoker/image-gpt`, 100+ stars
PyTorch implementation of *Generative Pretraining from Pixels*, including additional experiments on MNIST and CIFAR datasets. Early example demonstrating the usability of *Transformers* on images in a compute-limited setting.

Reviewing

NPJ Digital Medicine (2022)