Teddy Koker

CONTACT

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https://teddykoker.com
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EDUCATION

Worcester Polytechnic Institute, Worcester, MA

B.S., Computer Science **Sep 2016 – Dec 2019**

3.69/4.0 GPA. Senior thesis focused on applications of machine learning to social network graphs to predict future connections. Completed coursework in statistics, probability theory, machine learning, and computer architecture.

PROFESSIONAL EXPERIENCE

Massachusetts Institute of Technology, Lincoln Laboratory, Lexington, MA

Technical Staff **Apr 2021 –**

Developed a deep learning model to detect early infection of SARS-CoV-2 from wearable device data. Leveraged self-supervised methods to increase model accuracy using additional unlabeled data.

Grid AI, New York City, NY

AI Research Engineer **Aug 2020 – Feb 2021**

Co-created `pytorch-lightning.metrics` 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, Boston, MA

Machine Learning Research Associate **Dec 2019 – Aug 2020**

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.

Analog Devices Incorporated, Boston, MA

Research Engineering Intern **May 2019 – Aug 2019**

Researched and implemented a state-of-the-art inertial navigation system for use in autonomous transportation. Assisted in other projects within the Autonomous Transportation group involving radar and lidar algorithms.

Part-Time Software Engineering Intern **Sep 2017 – Apr 2018**

Created software to analyze products' data sheets and highlight potential security risks. Results were then presented at an internal conference.

Software Engineering Intern **Jun 2017 – Aug 2017**

Built an efficient data communication protocol and software for internet-connected agricultural sensors that is currently deployed in farms across the world.

PUBLICATIONS

T.E. Koker, F. Mireshghallah, T. Titcombe, and G. Kaissis. 2021. U-Noise: Learnable Noise Masks for Interpretable Image Segmentation. *International Conference on Image Processing*. doi:10.1109/ICIP42928.2021.9506345

T.E. Koker*, S.S. Chintapalli*, S. Wang, B.A. Talbot, D. Wainstock, M. Cicconet, M.C. Walsh. 2020. On Identification and Retrieval of Near-Duplicate Biological Images: a New Dataset and Protocol. *International Conference on Pattern Recognition*. doi:10.1109/ICPR48806.2021.9412849

T.E. Koker and D. Koutmos. 2020. Cryptocurrency Trading Using Machine Learning. *Journal of Risk and Financial Management*. doi:10.3390/jrfm13080178.

W. Falcon, A. Harsh Jha, **T.E. Koker**, and K. Cho 2021. AAVAE: Augmentation-Augmented Variational Autoencoders. *Under Review*.

Projects

Personal Writing, `https://teddykoker.com`

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**

Torchsort, `https://github.com/teddykoker/torchsort`

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`

PyTorch implementation of *Generative Pretraining from Pixels*, including experiments on MNIST and CIFAR datasets. Early example demonstrating the usability of *Transformers* on images in a compute-limited setting.

Programming Experience

Languages: Python, C, CUDA, C++, Rust, HTML, CSS, Javascript, Java, LaTeX
Server Technology: Distributed Compute, Docker, PostgreSQL, AWS, Jupyter Notebook, ROS
Libraries: PyTorch, Tensorflow, Scikit-learn, Flask, D3