Alex Eftimiades

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Work Experience

FINRA Rockville, MD
Data Scientist June 2019 - Present

- Kickstarted model monitoring R&D project; developed novel technique for measuring concept drift from samples
- Used random forests, gradient boosted trees, deep neural networks, logistic regression, and ensembles to predict insider trading from trading patterns of potential suspects.
- Designed and implemented POC deep neural network to identify market manipulation from raw market trades, 90% ROC AUC
- Developed best practices for model testing and monitoring with Jupyter notebook based examples
- Developed novel embedding techniques using deep learning
- Developed novel techniques to compare sample distributions
- Gave talk on using normalizing flows for anomaly detection
- Implemented normalizing flow (BNAF) in Jax
- Participated in company hackathon
- Gave nontechnical talks on machine learning research to business users
- Contributed to machine learning education program

Deepsig Arlington, VA
Machine Learning Engineer January 2019 - March 2019

- Designed and implemented deep learning based signal detector and classifier
- Compared and reported on deep learning approaches benchmarked against classical clustering algorithms for signal identification and classification
- Gave talk on semi-supervised learning

Catalist LLC Washington DC
Analytics Engineer February 2018 - January 2019

- Optimized, parallelized, and deployed NLP Keras model
- Wrote SQL parser that refactored over one million lines of legacy SQL scripts
- Designed and wrote real time data processing pipeline
- Wrote internal technical guides on parallel processing
- Fixed Keras' tokenizer

Comsol Burlington, MA
Developer February 2016 - May 2017

- Researched models and techniques to simulate physical phenomena of interest to engineers and scientists
- Wrote technical specifications of model, algorithm, and graphic interface
- Implemented algorithms used for numerical simulations and user interfaces in Java
- Helped customers create and optimize simulations

Freelance Software Engineer March 2013 - Present

- American Dental Association Foundation - performed data visualization and image processing with Python, named second author in publication summarizing results
- University of Maryland Baltimore County - Reduced run time of quantum computing simulation from five days to 50 minutes
- Tor - Wrote code to tunnel citizens of countries with internet censorship to uncensored internet via Google Chat and Tor

University of Maryland College Park, MD
Research Assistant January 2011 - Aug 2012

- Band structure calculations and simulations of carbon nanotubes

NASA Greenbelt, MD
Intern June 2010 - Aug 2010

- Developed and ran optics simulations to debug faulty depolarizer

Army Research Laboratory Adelphi, MD
Intern June 2009 - Aug 2009

- Researched physics of quantum well infrared photodetectors

Skills

Programming Languages:	Python, Bash, SQL, Javascript
Frameworks:	Pytorch, Numpy/Scipy, Cython, Pandas, Scikit-learn
Tools:	Git, Vim, AWS, Jupyter, Seaborn, Docker

Projects

Convolutional Decision Tree *Python, Keras, Scikit-learn*
https://gist.github.com/aeftimia/5587286cb844953528b92bea0cd80bdb
Decision trees are universal approximators just like neural networks. It turns out making decision trees convolutional does not help in the same way it does neural networks, but I had to try!

Pseudoinvertible Neural Network *Tensorflow, Python*
https://gist.github.com/aeftimia/045d1cd04a24f9c1b78baad5b2d5b73e
Modified deep convolutional neural network classifier to use only psuedoinvertible transformations
Achieved near state of the art accuracy with approximately half as many parameters

Toy Q Learning *Python* https://github.com/aeftimia/Reinforcement-TicTacToe
Trained two bots to learn to play tic tac toe via Q learning

Semi-supervised Learning *Keras, Matplotlib, Jupyter, AWS* https://github.com/aeftimia/Deepsig
Experimented with autoencoder based semi-supervised clustering. 80% accuracy on 10% labeled MNIST data

Discrete Exterior Calculus Framework *Python, Cython, Cuda* https://github.com/aeftimia/kahler
Developed and reported on efficient and parallelized finite elements framework

Publications

Enhancing the Three-Dimensional Structure of Adherent Gingival Fibroblasts and Spheroids via a Fibrous Protein-Based Hydrogel Cover. Cells Tissues Organs
Published with biologists at American Dental Association Foundation Aug. 2016

Kahler: An Implementation of Discrete Exterior Calculus on Hermitian Manifolds
http://arxiv.org/abs/1405.7879
Independent research and implementation of finite elements framework May 2014

A New Perspective on Numerical Trigonometric Approximations Montgomery College
Student Journal of Science and Mathematics
Published an algorithm I developed in middle school that calculates trigonometric functions in the Montgomery College Student Journal of Science and Mathematics (no longer published)
https://aeftimia.github.io/files/first_paper.pdf January, 2009

Education

UMBC Catonsville, MD
BS Physics (Minor in Mathematics) 2013 - 2015