Alex Eftimiades

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Work Experience

FINRA Rockville, MD
Data Scientist June 2019 - Present

- Developed internal Python package to measure model drift (Jax).
- Developed reinforcement learning technique to balance setting thresholds used for binary classification and reassessing false negative rate. Gave internal talk on this technique.
- Developed and implemented FINRA's first machine learning based pipeline to search for insider trading (Scikit-learn).
- Developed best practices for model testing and monitoring.
- Helped author curriculum to introduce software testers to data science and machine learning.
- Gave internal talk on normalizing flows.
- Gave internal talk on software engineering for data scientists.
- Created and conducted technical interviews for data scientists. Hired five new data scientists.

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 data processing pipeline for election results as they became available the night of the election.
- Wrote internal technical guides on parallel processing.
- Contributed code to Keras (fixed 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.

University of Maryland Baltimore County Catonsville, MD
Research Assistant June 2014 - September 2014

- Used dynamic programming to reduce run time of quantum computing simulation from five days to 50 minutes.

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.
- 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 - August 2012

- Band structure calculations and simulations of carbon nanotubes using Python.

NASA Greenbelt, MD
Intern June 2010 - August 2010

- Developed and ran optics simulations to debug faulty depolarizer.

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

- Researched physics of quantum well infrared photodetectors.

Skills

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

Projects

Packrat Parser Generator (July 2020) *Python* https://github.com/aeftimia/fpeg
I generalized the PEG parser I wrote as part of David Beazley's week long course on writing a compiler from scratch into a packrat parser generator.

Compiler From Scratch (July 2020) *Python* https://github.com/aeftimia/dabeaz-compilers-2020
Successfully completed David Beazley's week long course on writing a compiler from scratch. My compiler was able to generate working LLVM bytecode from a factorial function defined in a language similar to C.

Semi-supervised Learning (November 2018) *Keras, Matplotlib, Jupyter, AWS*
https://github.com/aeftimia/Deepsig
Experimented with autoencoder based semi-supervised clustering. 80% accuracy on 10% labeled MNIST data.

Toy Q Learning (July 2018) *Python* https://github.com/aeftimia/Reinforcement-TicTacToe
Trained two bots to learn to play tic tac toe via Q learning.

Discrete Exterior Calculus Framework (May 2014) *Python, Cython, Cuda*
https://github.com/aeftimia/kahler
Parallelized and generalized the discrete exterior calculus (similar to finite elements) framework PyDEC. Wrote efficient framework to generate structured and random simplicial complexes of arbitrary dimension, geometry, and topology to test the framework. Fixed PyCULA (Python interface to CULA for linear algebra on CUDA) to offload linear algebra onto a GPU. Wrote up results on arXiv: https://arxiv.org/abs/1405.7879.

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. August 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