

Eric Perkerson

e.l.perkerson@gmail.com | 706 351 5801 | github: eric-perkerson | linkedin: eric-perkerson | ericperkerson.com

Professional Experience

Data Scientist | *Lowe's Companies, Inc.*

April 2021 – Present

- Develops and implements optimization algorithms using Python for retail space category optimization.
- Communicates directly with stakeholders and business partners to provide data-based recommendations.
- Optimizes implementations of knapsack algorithms using data structure and algorithm expertise and in-depth knowledge of Python, reducing the turnaround time between computing results and communicating with business partners from days to hours.
- Developed a sophisticated meta algorithm for space category optimization, deploying the most efficient algorithm from a selection of dynamic programming, integer programming, greedy, and brute force algorithms, resulting in a 6.82% increase in sales.
- Maintains expert-level knowledge on industry trends, emerging technologies, and new methodologies and applies it to projects as well as using it to guide team members.

Machine Learning, Applied Math, PhD Researcher | *University of Georgia*

Jan 2017 – Dec 2019

- Developed novel machine learning algorithms for computer vision using Python, Julia, and Matlab for applications including facial recognition and feature track clustering.
- Improved on state-of-the-art algorithms for subspace clustering combining principle components analysis, linear and non-linear regression using neural networks, and unsupervised clustering techniques to generalize the sparse subspace clustering algorithm to work on data severely corrupted by outliers and missing data.
- Solved convex and non-convex optimization problems by designing algorithms that combine gradient descent and the proximal-point algorithm to optimize objective functions with both differentiable and non-differentiable terms using Julia and Matlab.
- Created data visualizations and presentations using Matplotlib, Matlab, and Latex/Beamer for communicating research and numerical results to other researchers in seminars.

Economics Researcher | *University of Georgia*

Aug 2011 – Aug 2014

- Analyzed macroeconomic shocks using time series analysis and econometrics techniques using R to study the economics of price stickiness, providing evidence to disprove theories that posit differences in price stickiness between supply and demand shocks.
- Generated error bounds for impulse response functions for the supply and demand shocks using bootstrapping, showing that the achieved results were statistically significant.

Data Science Intern | *Federal Reserve Bank of Atlanta*

Jun 2013 – Aug 2013

- Cleaned financial data on options prices using Python, MySQL, and Mathematica to assist research informing monetary policy decisions made by the Federal Reserve Bank.
 - Repaired a corrupted database with tens of millions of entries using Bayesian methods for step detection in time series for anomaly detection and correction of corrupted data.
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Machine Learning Projects

Singular Level Curves of Harmonic Functions

Apr 2015 – Present

- Developed software for facial recognition and image classification tasks by computing a discrete harmonic conjugate function using Python, Mathematica, Julia code.
- Designed an algorithm for uniformly refining a triangulation and its Voronoi dual in $O(n)$ time and implemented it in Julia.
- Optimized functions in Mathematica by writing procedural-style code, sometimes improving speed by a factor of 10^8 over computation using built-in Mathematica functions.

Learning with Noise, Sparse Errors, and Missing Data

Mar 2017 – Dec 2019

- Successfully defended PhD dissertation on mathematical aspects of machine learning in contexts with data heavily corrupted by outliers and missing data.
 - Designed algorithms robust to outliers and missing data by combining matrix completion algorithms based on minimization of the nuclear norm (convex relaxation of the rank) with compressive sensing algorithms for identifying outliers using sparsity (basis pursuit from compressive sensing).
 - Wrote codebase for numerical experiments in Julia using the Flux deep-learning library for training neural networks to calculate the gradient of a neural network itself in order to use coordinate descent to correct anomalies.
 - Extended the orthogonal greedy algorithm and the proximal forward-backward splitting algorithm to solve matrix decomposition problems for outlier detection and matrix completion for missing data.
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Programming Skills

Programming Languages | Python, SQL (PostgreSQL and MySQL), Julia, R, Java, C, ARMv8 Assembly, Bash, Mathematica, Matlab.
Data Science and Machine Learning Libraries | Pytorch, SciPy, Numpy, Pandas, Scikit-Learn, Matplotlib, Flux, CVXOPT.
Tools and Operating Systems | Git, Docker, L^AT_EX, Linux, macOS, Windows, Windows Subsystem for Linux (WSL).

Education

University of Georgia, Athens, GA | **Mathematics, Ph.D. (2019) and B.S. (2013), Economics, M.A. (2014) and A.B. (2013)**