Joe Koch

ML Models > Production | Finance | NLP

Reducing developer toil, increasing developer joy

Experience

2019-07 - Present **Finicity, a Mastercard Company, Salt Lake City, UT**
Senior Machine Learning Engineer

- Productionized GPU accelerated NLP ML models into REST API's, processing on average .35 million financial transactions per day in products using a combination of real time and batch processing. Developed with a focus on low maintenance over time.
- Matured our MLOps infrastructure, reducing time from prototype to production from ~6 months to under 1 month so AI projects can "fail fast". Enabled data scientists to hit the ground running without any experience with tools like docker.
- Built out our data labeling and model retraining pipelines, increasing security and ensuring adherence with government regulations on financial data including the California Consumer Financial Protection Law.
- Developing a feature store and documentation like data spec sheets to reduce time spent data cleaning and feature engineering and encourage knowledge sharing across data science teams.
- Member of Mastercard's Diversity + Inclusion Council, implementing programs to provide diverse perspectives on our strategic priorities and building a more inclusive culture.
- Ask me about why I hate Pandas!

2016-08 - 2018-05 **University of Vermont, Burlington, VT**
Graduate Teaching Assistant

- Developed a Mask R-CNN model for classifying types of microbes in pictures of urine cultures, identifying where colonies are at the pixel level. Used common machine learning tools like TensorFlow, Microsoft Azure, and scikit-learn.
- Used Word2Vec and statistical methods including decision trees, naive Bayes classification, SVM, and logistic regression to predict a measure of political bias in American politicians' tweets.
- Compared ingredients in American and Korean skincare products, scraped from drugstore websites and put into an ingredient search engine, to construct a bipartite graph of ingredient types and frequencies. Used to create a visualization of ingredients and to compare cultural differences in approaches to skincare.
- Instructor for Calculus 1, including all lecturing, lesson planning, quiz/exam writing, and grading.

2016-02 - 2016-07 **Goldman Sachs, Salt Lake City, UT**
Private Wealth Management Analyst

- Team lead of developing an application to automate background checks on clients. Ultimately performed checks on 300,000 parties and saved approximately 15,000 hours of labor and remediation processes while minimizing the risk of human error.
- Developed an automated system for uploading files into an internal database, saving $350,000-$400,000 annually in scanning fees.
- Updated internal work order website used by hundreds of Goldman Sachs employees.

Personal Info

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801-425-0742

Current Location
Salt Lake City, UT

LinkedIn
www.linkedin.com/in/joe-koch-76431063

Website
joe-koch.github.io/personal

Github
github.com/Joe-Koch

Education

2016 - 2018
Masters of Science, Applied Mathematics
University of Vermont

2011 - 2015
Bachelor of Science, Mathematics: Statistics Emphasis
University of Utah

Skills

Python

NLP

Amazon Web Services

Kubernetes

SQL

Docker

Prefect

Go

2015-05 - 2015-09 **Zions Bancorporation, Salt Lake City, UT**
Quantitative Analyst Intern

- Developed and applied stochastic models to analyze potential bank loan losses and ensure compliance with Dodd-Frank Act regulations.
- Performed modeling, data analysis, and data cleaning in SQL, R, SAS and Excel.
- Reported key loan loss indicators and stress test results for supervisors and federal regulators.

2015-01 - 2015-03 **eBay, South Jordan, UT**
Statistical Intern

- Performed time series analysis on large datasets of electrical capacity measurements in order to efficiently allocate power resources to eBay's servers throughout daily and yearly fluctuations.

2014-08 - 2014-12 **University of Utah, Salt Lake City, UT**
Research Assistant

- Researched and modeled electrical breakdown boundaries of composite materials.
- Presented findings at the SIAM Conference on Computational Science & Engineering in Spring 2015.

2013-06 - 2013-08 **Eastern Tennessee State University, Johnson City, TN**
NSF-Funded Undergraduate Researcher

- Researched probabilistic methods applied to combinatorics problems.
- Authored the Journal of Mathematics and System Science, presented findings at the 2014 Joint Mathematics Meetings in Baltimore.

2012-06 - 2012-08 **University of Oklahoma, Norman, OK**
NSF-Funded Undergraduate Researcher

- Collected and analyzed giant flat gold nanoparticle data using Asylum AFM computer programs.
- Modeled molecular interactions in crystal structures.

2012 - 2013 **Organization of Women in Science, University of Utah**
Vice President

- Acquired funding, doubled active membership through campus recruitment.
- Helped foster an inviting environment for aspiring women in STEM.

Publications

Patrick Bardsley, Jonathan Boyle, Nathan Briggs, Zoë Koch, Michael S. Primrose, Michael Zhao and Graeme W. Milton, Criteria for guaranteed breakdown in two-phase inhomogeneous bodies, Inverse Problems, Volume 33, Number 8, 27 June 2017. http://iopscience.iop.org/article/10.1088/1361-6420/aa76c5/meta

Zoë Koch, Anant Godbole, and Ruyue (Julia) Yuan, Covering array bounds using analytical techniques, Congressus Numerantium, Vol. 222, pp. 65—73

Anant Godbole, Zachary Higgins, and Zoë Koch, Multiple finite representability of integers as h-sums. Proceedings of the Integers Conference 2016

My Stack

ML Models: BERT, T5, spaCy, MPNet

ML Libraries: PyTorch, Tensorflow, Keras

Web/RPC Frameworks: FastAPI, gRPC, Falcon, Flask

Data engineering: Prefect, Snowflake, Redshift, Spark

AWS: ECS, EC2, S3, SageMaker, Textract

Python Libraries I like: Poetry, Pydantic, Hypothesis+Schemathesis, Opentelemetry, Prodigy

Other: Gitlab, Sonarqube, RedisAI, Nvidia Triton Inference Server, Gunicorn/Uvicorn, Helm, Protobuf

Courses

Deep Learning

Reinforcement Learning

Statistical Learning

Modeling Complex Systems

Statistical Inference Sequence

Numerical Analysis

Chaos,Fractals&Dynamical Systems

Stochastics Sequence

Interests

Former ski instructor at Deer Valley and Stowe

Food science (mostly the theory, working on the practice)

Cat mother of 2