Peter Wills, Ph.D.

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Pivotal Software
Re: Sr. Data Scientist
March 19th, 2018

Greetings,

Pivotal needs passionate analysts who can not only conceptualize, but also implement and effectively communicate powerful algorithms and methodologies. I have a proven track record of building highly performant systems for analysis and optimization. As a senior data scientist, my expertise in graph analytics, combined with my clear and intuitive communication, will prove invaluable to you.

My name is Peter Wills, and I'm a soon-to-graduate Ph.D. in Applied Mathematics at CU Boulder. My true love is my research, which focuses on anomaly detection in dynamic graphs. My latest project is a survey of algorithms appropriate for analysis of large (terabyte) graphs. I've written an accompanying Python library implementing these algorithms.

I also work in advertising technology, where I've built a machine learning platform which doubles campaign performance. Previously, I've worked at a financial group, where my portfolio optimization software is still used to rebalance their published indices. As a result of this optimization, these indices significantly outperform the S&P 500 over a ten-year backtest.

I have built myriad predictive models, including deep neural nets and Bayesian hierarchical models. These models are built in Python, using the TensorFlow, scikit-learn, numpy, and statsmodels libraries. I also construct the data pipelines which extract, clean, and format the data, using SQL, Spark, pandas, and the Unix command line. My preferred development methodology is Agile, as it allows for rapid feedback and flexibility to changing circumstances.

My appointment as Lead Teaching Assistant for my department is a testament to my ability to present challenging technical ideas in an intuitive and relatable manner. The challenge of stripping down complicated abstractions to their (often surprisingly intuitive) conceptual core is immensely gratifying, and leaves me with a clearer understanding of the material.

I'm very excited about this opening because I know I would be perfect for the position; my hope is that this letter has convinced you of the same. Further examples of my technical work can be found on my website and my GitHub. I look forward to hearing from you.

Best,

Peter Wills

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EDUCATION

Doctoral Candidate, Applied Mathematics — Sept. 2013 to present
University of Colorado, Boulder, CO — *Graduating May 2018*

Bachelor of Science, Physical Sciences — Aug. 2006 through May 2010
Reed College, Portland, OR

TECHNICAL LANGUAGE SKILLS

Fluent in Python (5 years; tensorflow, keras, scikit-learn, pandas, matplotlib, seaborn, numpy, scipy, statsmodels), Spark (1 year), SQL (1 year), MATLAB (10 years), and LaTeX (9 years). Conversant with Markdown, HTML, CSS, Lisp.

PROFESSIONAL EXPERIENCE

Research Scientist, the Trade Desk — Oct. 2017 to Present

- Use machine learning models (TensorFlow) to improve bidding strategies and uncover hidden affinities
- Incorporate external data sources to augment user information and target advertisements more effectively
- In real-world testing, resulting algorithm doubles clicks through rate of advertisements at no additional cost

Data Scientist, Entelligent LLC — Nov. 2016 to Oct. 2017

- Analyze and improve financial model, implement scalable portfolio optimization & risk analytics library
- Use library to construct index and ETF (Smart Climate 500) currently published by Bloomberg
- Index shows higher returns and lower risk than S&P 500

Research Assistant, Statistics & Data Analysis, Natl. Inst. of Standards & Tech. — May 2014 to Aug. 2015

- Develop statistical techniques for analyzing data arising in experimental quantum mechanics
- Method is shown to be significantly more robust than the current most popular approach

Teaching Assistant, CU Dept. of Applied Mathematics — Sept. 2013 to Present

- Teach courses in calculus, differential equations, MATLAB, and Mathematica.
- Appointed Lead Teaching Assistant, Fall 2014 through Spring 2015

SELECTED RESEARCH

Anomaly Detection in Large Graph Data — Jan. 2016 to Present

- Develop & analyze novel machine-learning algorithms to analyze dynamic network (graph) data
- Method is effective on empirical social datasets such as the Enron emails and the Militarized Interstate Dispute record

PUBLICATIONS

- P. Wills and F. Meyer. *Metrics for Graph Comparison: A Practitioner's Guide.* In preparation.
- P. Wills and F. Meyer. *Detecting Topological Changes in Dynamic Community Networks*. arXiv preprint 1707.07362 [cs.SI]
- P. Wills, E. Knill, K. Coakley, and Y. Zhang. *Performance of Test Supermartingale Confidence Intervals for the Success Probability of Bernoulli Trials.* arXiv preprint 1709.04078 [math.ST]
- P. Wills, E. Iacocca, and M. Hoefer. *Stochastic Thermal Perturbations of Dissipative Droplet Solitons*, Phys. Rev. B 93 144408