Steven Elliot Pav

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Summary

Ph.D. mathematician with strong statistical and coding skills, 14 years quantitative finance experience.

Skills

Quantitative strategy development & testing, portfolio construction, multivariate statistics, time series analysis, optimization, financial modeling, regression, classification, machine learning, NLP.

R, Matlab, C, C++, SAS, Python, Perl, SQL, SML-NJ; Bash, GNU Make, git, svn; Linux, docker.

Education

Ph.D., *M.S.*, Mathematics, **Carnegie Mellon University**, Pittsburgh, PA, 2003.
M.A., Mathematics, **Indiana University**, Bloomington, IN, 1999. 4.0 GPA.
B.A., Mathematics, *B.S.*, Ceramic Engineering Science, **Alfred University**, Alfred NY, 1996. 4.0 GPA.

Experience

Director, Senior Quantitative Financial Analyst *May 2016 - May 2021*
Bank of America San Francisco, CA

Built complex models for forecasting equity portfolio revenue, valuing REO properties, and forecasting losses and balances on consumer credit cards for CCAR stress-testing. Developed, tested and documented models using R, SAS, PySpark, SQL and LaTeX. Worked with stakeholders in the lines of business and Model Risk Management to secure approval of models; supervised execution of forecasts and ongoing monitoring. Developed statistical models for feature selection and prediction intervals.

Lead Data Scientist *September 2015 - March 2016*
CoreCast/Alchemy San Francisco, CA

Applied quantitative techniques to optimize return on investment on a portfolio of film rights. Scraped and gathered data, architected databases, linked data from numerous sources. Used natural language processing, graph theory, and linear algebra to cluster, compare, and analyze films.

Quantitative Strategist *July 2008 - July 2015*
Cerebellum Capital San Francisco, CA

Designed, implemented, and used backtest, execution, and research infrastructure in Matlab and C for quantitative strategies on single name equities and volatility futures at a hedge fund. Created, coded, analyzed, and refined quantitative strategies using human and machine learning. Built strategies using multi-factor models, genetic programming, stock clustering, multivariate multiple linear regression. Pioneered and analyzed portfolio construction methodologies. Analyzed execution for trade impact and calibrated backtests accordingly. Devised novel methods to predict and correct for overfit bias in the backtesting and strategy development process. Solved a wide range of prediction and analysis problems with statistical theory, experimentation, simulation, and production coding.

Quantitative Analyst *January 2007 - May 2008*
Convexus Advisors San Francisco, CA

Refined, coded, and executed a technical trading system on U.S. equities at a boutique hedge fund. Developed and analyzed technical and fundamental models using kernel-based machine learning methods. Designed and implemented a backtesting simulator to evaluate trading models.

Senior Research Scientist *July 2005 - Dec. 2006*
Nellcor / Tyco Healthcare Pleasanton, CA

Refined methods for analysis of time series for noninvasive estimation of blood analyte concentration. Developed nonlinear model for diffuse photon transport, and algorithms for predictor selection in multivariate linear regression with PLS.

Selected Publications

S. E. Pav, 'The Sharpe Ratio: Statistics and Applications,' CRC Press, 2021.

M. Lachanski, S. E. Pav,'Shy of the Character Limit: "Twitter Mood Predicts the Stock Market" Revisited.' *Econ Journal Watch,* 14(3), pp 302-345, 2017.

Several others in the field of unstructured mesh generation.

Work in progress

S. E. Pav, 'A Short Sharpe Course,' https://dx.doi.org/10.2139/ssrn.3036276, 2017-2020.
S. E. Pav, 'Inference on Achieved Signal Noise Ratio.' http://arxiv.org/abs/2005.06171, 2020.
S. E. Pav, 'A *post hoc* test on the Sharpe ratio.' http://arxiv.org/abs/1911.04090, 2019.
S. E. Pav, 'Conditional inference on the asset with maximum Sharpe ratio.' http://arxiv.org/abs/1906.00573, 2019.
S. E. Pav, 'Safety Third: Roy's Criterion and Higher Order Moments.' http://arxiv.org/abs/1506.04227, 2015.
S. E. Pav, 'Bounds on portfolio quality.'
S. E. Pav, 'Asymptotic distribution of the Markowitz portfolio.'

Software

S. E. Pav, 'SharpeR: Statistical significance of the Sharpe ratio.' R package version 1.2.1, https://cran.r-project.org/package=SharpeR.
S. E. Pav, 'MarkowitzR: Statistical inference on the Markowitz portfolio.' R package version 1.0.2, https://cran.r-project.org/package=MarkowitzR.
S. E. Pav, 'PDQutils: PDQ functions via Gram-Charlier, Edgeworth and Cornish-Fisher approximations.' R package version 0.1.6, https://cran.r-project.org/package=PDQutils.
S. E. Pav, 'madness: Multivariate Automatic Differentiation.' R package version 0.2.7, https://cran.r-project.org/package=madness.
S. E. Pav, 'fromo: Fast Robust Moments.' R package version 0.2.1, https://cran.r-project.org/package=fromo.
S. E. Pav, 'BWStest: Baumgartner-Weiß-Schindler Test of Equal Distributions.' R package version 0.2.2, https://cran.r-project.org/package=BWStest.
S. E. Pav, 'ohenery: Modeling of Ordinal Random Variables via Softmax Regression.' R package version 0.1.1, https://cran.r-project.org/package=ohenery.
Several others on CRAN: epsiwal, ggallin, cocktailApp, sadists, mazealls, SPYvsSPY.

Selected Patents

S. E. Pav, 'System & Method for Unmixing Spectroscopic Observations with Nonnegative Matrix Factorization,' US 8140272.

S. E. Pav, 'Wavelength Selection & Outlier Detection in Reduced Rank Linear Models,' US 8112375.

7 others in the field of non-invasive monitoring of physiological parameters.

Professional activities

Sharpe ratio blog, 2018-present: http://www.sharperat.io/.

Lightning Talk at R in Finance 2019: "Inference on the asset with maximal Sharpe ratio."

Invited talk at Startup.ML Machine Learning in Trading Conference, 2016: "Guarding Against Broken Backtests and Questionable Research in Quantitative Strategies."

Invited talk at Bloomington Data Collective, 2016: "Backtesting: war stories and cautionary tales."

Invited talk at Thalesians Seminar, 2015: "Portfolio inference and portfolio overfit."

Lightning Talk at R in Finance 2015: "Portfolio Cramér-Rao bounds."

Talk at R in Finance 2014: "Portfolio inference with this one weird trick."

Invited talk at USF Seminar Series in Analytics: "Dude, where's my alpha?" 2013.