Pete Bunch

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SUMMARY AND SKILLS

Devising and applying statistical models to discover structure and glean insights from data has long been a fascination to me and the focus of my work. I have diverse experience solving statistical problems in varied domains, from ad targeting to retail forecasting to paleoclimatology. Along the way I have developed an enthusiasm for writing clean, modular and reusable software.

- Successful record as technical lead on projects focussing on inference and optimization.
- Broad knowledge of modern statistical modeling and machine learning theory and practice.
- Experience with distributed systems and map-reduce, primarily with Quantcast's proprietary Hadoop-like stack.
- Proficient with Java, Python (including NumPy, SciPy, Pandas and Jupyter), MATLAB and various flavours of SQL. Familiarity with C, C++, and Scala.

EMPLOYMENT

Modeling Scientist (Staff since March 2018, Senior since July 2016) 2015 — present
Quantcast, Brand Advertising

- Lead data scientist responsible for modeling, real time bidding and control systems fundamental to advertising campaigns targeting specific audience segments. Primarily technical contributions, but with a growing role in project leadership and wider engineering strategy.
- Masterminded the design and implementation of a new framework to target and trade off between multiple customer performance goals, including derivation of optimal pricing equations, development of a new control system, and planning and coordination of software changes across the bidding stack, resulting in reliable and consistent performance and fewer unhappy customers.
- Wrote new libraries for real-time model scoring, vastly reducing code complexity and adding a new layer of abstraction, facilitating faster product development, cleaner code deployment, and reducing both computational load and developer pain.
- Upgraded the statistical methodology underlying the A/B test framework, introducing Bayesian inference and hypothesis testing, and providing a rigorous foundation for assessing hundreds of modeling experiments.
- Improved log parsing algorithms to extract double the volume of label data for the flagship search product.
- Investigated numerous improvements to demographic modeling, including alternative multi-class classification models, methods for model calibration, and unsupervised approaches to discovering hidden classes.
- Won a company-wide hackathon for innovations in bid pricing strategies, and granted three trade secret awards.
- Mentored two summer interns and a winning intern hackathon team.

Data Scientist and Modeling Consultant 2014 — 2015
Tesco, Supply Chain Development

- Developed custom statistical models and learning algorithms for probabilistic forecasting, and implemented them with MATLAB and SQL to run at scale on a Teradata data warehouse.
- Reduced annual waste by £12M.

Postdoctoral Research Associate 2014 — 2015
Cambridge University Engineering Department

- Devised a number of new Markov chain Monte Carlo algorithms for machine learning with dynamical systems.
- Taught undergraduate engineers in MATLAB, signal processing, and mathematics.
(Modules included linear algebra, probability, vector calculus, differential equations, and filter design.)

EDUCATION

University of Cambridge, Cambridge, UK

PhD in Statistical Modeling and Signal Processing 2010 — 2014

- Thesis: *"Particle filtering and smoothing algorithms for challenging time series models."*
- Formulated and applied statistical models and Bayesian algorithms for inference and learning.
- Worked on theoretical and applied projects, including development of new sequential Monte Carlo methods, and algorithm design for detection of heartbeats in cardiography data.

BA & MEng in Information Engineering (1^{st} with Distinction) 2006 — 2010

- Highest mark in the class in 2008 and 2010; second highest in 2009. Equivalent of 4.0 GPA every year.
- Modules in signal processing, communications, control, hardware and software architecture, and electronics.

RESEARCH

- Main author on four journal and six conference papers on sequential and Markov chain Monte Carlo algorithms for system learning and state estimation.
- Most original contribution has been development of importance-weighted particle flow sampling – related to increasingly popular optimal transport methods for generative models.
- Presented research at four international conferences, including oral and poster sessions.
- Co-author on two paleoclimatology papers, using Bayesian analysis with ice core data to infer the past state of the west Antarctic ice sheet.

ACTIVITIES

- Avid beach runner, wannabe cyclist, pianist and pine cone photographer
- Men's Captain, Cambridge '99s Rowing Club. Led team racing at Henley Royal Regatta. 2013 – 2014
- Captain, Cambridge University Sailing Team. Semi-finals of University Nationals. 2007 – 2008