Fritz Obermeyer, Inference Engineer

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Education

Ph.D. in Pure and Applied Logic, Carnegie Mellon University (Aug. 2005 – June 2009)
Thesis topic: Automated equational reasoning in untyped lambda-calculi.

M.S. in Mathematics, Colorado State University (Jan. 2002 – May 2004)
Thesis topic: Bayes Nets in ambiguity assessment of data association.

B.S. in Physics+Applied Math, Colorado State University (Aug. 1997 – Dec. 2001)

Professional Experience

Software Engineer Google Research (2015-present)
Maintaining, developing, and internally consulting around a machine learning platform.

Lead Predictive Scientist Salesforce.com (2013-2014)
Senior Software Engineer Prior Knowledge, Inc. (acquired) (2012-2013)
Extended, tested, and optimized a parallel distributed machine learning engine.
Researched new probabilistic models and inference algorithms.
Helped maintain and extend an engine and API for prediction-as-a-service.

Software Developer, Zenph Sound Innovations. (2011)
Developed Bayesian spectral analysis algorithms for gestural piano transcription.

Analyst, Toyon Research Corporation. (2009 – 2011)
Developed and implemented algorithms for tracking, classification, and image processing.
Invented scalable belief propagation algorithms for fast probabilistic matching.
Wrote successful proposals for DOD contracts.

Summer Intern, Stottler-Henke A.I. (Summer 2008)
Worked on large Java codebase for multi-agent sensor resource management.
Developed geometry algorithms for ballistic missile intercept.

Research Scientist, Numerica Corporation (2002 – 2005)
Managed 2-year $\times$ 2-person project developing tracking algorithms
and Python implementation. Wrote proposals, reports, and research papers.

Research Experience

Prior Knowledge and Salesforce.com (2012 – 2014)
Developed scalable MCMC inference algorithms for nonparametric Bayes models.

Obermeyer Labs (2009 – 2012)
Developed real-time 3D tracking algorithms for human-computer interface.
Developed quantitative models of consonance for musical instrument control.

Carnegie Mellon University (2005 – 2009)
Focused on programming language theory and probability/machine learning.
Applied computational algebra algorithms to automated theorem-proving.

Numerica Corporation (2002 – 2005)
Developed a "Bayesian Network Tracking Database" for multi-target tracking.
Developed high-accuracy nonlinear batch filters for ballistic prediction.
Worked on ambiguity assessment in data association problems.

Technical Skills

Practical: Nonparametric Bayes - MCMC - Bayesian filtering & classifcation - Belief propagation - Large-scale software development - Ambiguity assessment - Audio analysis & synthesis - Machine vision - Nonlinear optimization - Constraint programming - Automated deduction - Program verification - Graphics programming - Data visualization - Small project management

Writing: Conference papers - research proposals - technical reports - patent applications

Languages: native English, basic German, fluent in Math ;-)

Software:	
10+ years	C/C++ - Python - Unix/Linux - Latex
5+ years	Javascript - OpenGL - Maple
2+ years	HTML5 - Matlab - Excel
3 months	SQL - CUDA (fluent) - Java - MongoDB

Published Software

Pomagma (C++/Python/Javscript, `http://github.com/fritzo/pomagma`, (2005-2014))
A parallel distributed automated theorem prover with low-latency architecture supporting real-time code verification in a browser-based IDE.

The Rational Keyboard (Javascript/HTML5, `http://fritzo.org/keys`, (2012))
A browser-based musical instrument with Bayesian auto accompaniment.

Johann (C++, `http://fritzo.org/johann`, (2004 – 2009))
A system for automated equational reasoning about untyped lambda-calculi, focussing on knowledge representation, verification, and theorem proving.

Jenn 3D (C++/OpenGL, `http://jenn3d.org`, (2001 – 2006))
An immersive tool for visualizing 4-dimensional Coxeter polytopes, focussing on real-time 3D rendering, spherical geometry, and interface design.

Published Papers

Scaling Nonparametric Bayesian Inference via Subsample Annealing, F. Obermeyer, J. Glidden, E. Jonas, JMLR via AISTATS (2014)

Short-term Ambiguity Assessment to Augment Tracking Data Association Information, S. Gadaleta, S. Herman, M. Levedahl, S. Miller, F. Obermeyer, B. Slocumb, and A. Poore, Fusion (2005)

A Bayesian Network Tracking Database, Fritz Obermeyer and Aubrey Poore, Proceedings of SPIE Signal and Data Processing of Small Targets (2004)

Batch maximum likelihood (ML) and maximum a posteriori (MAP) estimation with process noise for tracking applications, A. Poore, B. Slocumb, B. Suchomel, F. Obermeyer, S. Herman, S. Gadaleta, Proceedings of SPIE Signal and Data Processing of Small Targets (2003)

Patents

Application US 20140280065 A1 (Filed in 2013) With B Cronin, C Petschulat, E. Jonas,
Concerning a predictive database querying system for a machine learning API.

US8816962 B2 (Filed in 2013) With Henry Obermeyer,
Concerning optically instrumented multi-axis input devices for computer interface.

US 6956670 B1 (Filed in 2000) With Joan Mitchell of IBM, *et al.*,
Concerning the combination of multiple linescreens of different resolution in color printing.