Sergey Kirshner

Résumé

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Summary

I am a statistical machine learning expert with 23+ years of experience in modeling and understanding of large-scale noisy data in high-impact applications. My previous work spans applications of probabilistic approaches (including graphical and time series models) and Bayesian techniques to high-dimensional data understanding, modeling, prediction, and ranking to diverse areas including e-commerce, search, ad tech, hydrology, and graph analysis.

Education

University of California, Irvine
Ph.D., Information and Computer Science *2005*
Thesis: *Modeling of Multivariate Time Series Using Hidden Markov Models* *Advisor: Padhraic Smyth*

University of California, Irvine
M.S., Information and Computer Science *2001*

University of California, Berkeley
B.A., Mathematics & Computer Science (double) *1998*

Recent Professional Experience

Amazon **Palo Alto, CA, USA**
Senior Applied Scientist *2020 – 2023*
Developed statistical methodology for semantic relevance metrics used by Product Search to set goals and evaluate search experiments impacting $\mathcal{O}(\$10B)$ in revenue; analyzed traffic patterns to understand the behavior of these metrics; collected human labeled data for Search projects, from development of human intelligence tasks to assessment of the quality of the data.

Facebook **Menlo Park, CA, USA**
Research Scientist (Engineering Tech Lead)/Data Scientist *2017 – 2020*
Performed opportunity analysis, set goals, and guided experimentation for search ranking and retrieval in Facebook Marketplace, the leading C2C commerce platform. Trained and deployed ranking models from TBs of search traffic and user actions data; implemented features under strict latency and capacity constraints; analyzed query and user activity traffic to find improvement opportunities and set team's goals; developed metrics to assess the improvements in MP Search.

@WalmartLabs **Sunnyvale, CA, USA**
Director of Modeling/Principal Architect *2016 – 2017*
Drove modeling and analytics projects for the Walmart Advertisement Platform for partnership marketing, including measurement, optimized audience segment construction, and real-time bidding on demand side platforms; built a team of scientists and engineers to convert Walmart's transaction and other data into ad tech products generating revenue for the company.

Skytree (acquired by Infosys) **San Jose, CA, USA**
Principal Member of Technical Staff *2014 – 2015*
Researched and prototyped machine learning approaches for classification and anomaly detection and for automation of the data science process including feature selection and generation, hyperparameter selection, and model estimation; led customer projects and POCs; developed IP and filed for multiple patents.

a9.com (Amazon) **Palo Alto, CA, USA**
SDE/Machine Learning Scientist *2013 – 2014*

Product search ranking by relevance: developed and implemented ranking approaches in a massive data setting with strict latency requirements, ran A/B experiments, deployed ranking functions into production with impact to millions of customers daily, communicated with business teams for decision making and planning.

Purdue University, Statistics **West Lafayette, IN, USA**

Assistant Professor *2008 – 2013*

Research: led original statistical machine learning research with applications to modeling of multivariate atmospheric data and to understanding of large scale network behavior; obtained funding and collaborated with scientists from other disciplines.
Training: mentored and supervised graduate and undergraduate students, developed and taught graduate and undergraduate courses in statistics and machine learning.

Selected Publications and Patent Applications

Full list (20+ peer-reviewed conference and journal publication; patent applications; workshop papers and tech reports) is available at http://sergeykirshner.com/publications.

- Y. Tang, F. Borisyuk, S. Malreddy, Y. Li, Y. Liu, **S. Kirshner,** 'MSURU: Large Scale E-commerce Image Classification with Weakly Supervised Search Data', in *Proceedings of KDD-2019*, pp. 2518-2526, August 2019 (accepted/submitted 321/1808),
- P. Yang, **S. Kirshner,** J. Korlimarla, 'Systems and methods for automated audiences set identification', U.S. Patent Application №16/163,294, filed on October 17, 2018.
- **S. Kirshner,** 'Constructing additive trees monotonic in selected sets of variables', U.S. Patent Application №15/178,549, filed June 9, 2016.
- S. Moreno, J. Pfeiffer, J. Neville, **S. Kirshner,** 'A scalable method for exact sampling from Kronecker family models', in *Proceedings of ICDM-2014*, pp. 440-449, December 2014 (accepted/submitted 143/727)
- S. Moreno, J. Neville, **S. Kirshner,** 'Learning mixed Kronecker product graph models with simulated method of moments', in *Proceedings of KDD-2013*, pp. 1052-1060, August 2013 (accepted/submitted 126/726)
- G. Mallya, S. Tripathi, **S. Kirshner,** R.S. Govindaraju, 'Probabilistic Assessment of Drought Characterization using a Hidden Markov Model', *Journal of Hydrologic Engineering,* volume 18, pp. 834-845, July 2013. doi:10.1061/(ASCE)HE.1943-5584.0000699
- **S. Kirshner**, B. Póczos, 'ICA and ISA using Schweizer-Wolff dependence measure', in *Proceedings of ICML-2008*, pp. 464-471, A. McCallum and S. Roweis (eds.), July 2008 (accepted/submitted 155/583)
- **S. Kirshner,** 'Learning with tree-averaged densities and distributions', in *NIPS-2007*, pp. 761-768, J.C. Platt and D. Koller and Y. Singer and S. Roweis (eds.), MIT Press, Cambridge, MA, 2008 (plenary session, plenary/accepted/submitted 26/217/975)
- A.W. Robertson, **S. Kirshner,** P. Smyth, S.P. Charles, and B.C. Bates, 'Subseasonal-to-interdecadal variability of the Australian monsoon over North Queensland.' *The Quarterly Journal of Royal Meteorological Society*, volume 132, number 615, pp. 519-542, January 2006. doi:10.1256/qj.05.75
- **S. Kirshner,** P. Smyth, A.W. Robertson, 'Conditional Chow-Liu tree structures for modeling discrete-valued vector time series,' in *Proceedings of UAI-2004*, pp. 317-324, M. Chickering, J. Halpern (eds.), AUAI Press, July 2004 (plenary session, plenary/accepted/submitted 27/75/253)
- A.W. Robertson, **S. Kirshner,** and P. Smyth, 'Daily rainfall occurrence over Northeast Brazil and its downscalability using a hidden Markov model.' *Journal of Climate*, volume 17, issue 22, pp. 4407-4424, November 2004. doi:10.1175/JCLI-3216.1

Technical Skills

Programming Languages: Python, C/C++

Computing/Statistical Software: NumPy, SciPy, pandas, scikit-learn, R, Matlab

Data Manipulation: Hive/Presto/SQL

Document Preparation: LaTeX