Thomas Lotze

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executive summary

Data scientist with strong programming background. Experienced in visualization, web technologies, and statistical analysis. Ph.D. in applied mathematics and bachelor's in computer science.

professional experience

Square, Inc. | San Francisco, CA   **Dec 2012 – present**
Technical Lead, A/B Testing and Experimentation:
- Responsible for design and implementation of the companywide A/B testing platform: assignment; metric definition and selection; data pipelines; statistical analysis of significance and impact; and presentation for effective decision-making.
- Enabled and consulted on hundreds of product experiments, which have improved the primary conversion metric by over 10%, added millions in additional annual revenue, and shown significant improvement in key metrics for new and existing products.
- Evangelized experimentation and data use, enabling and encouraging teams to use experimentation to drive decisionmaking.

Technical Lead, Modeling Team:
- Standardized metrics and process for training and evaluating merchant risk models. Team doubled the fraud detection rate though model experimentation and feature generation.
- Led a small team to design and deploy an in-house machine learning service, making machine learning algorithms easily accessible and comparable for any prediction problem at Square.

Grockit, Inc. | San Francisco, CA   **Nov 2009 – Nov 2012**
Lead Data Scientist:
- Responsible for all aspects of quantitative analysis of grockit.com users, from channel marking and event logging, through data extraction and analysis, to visualization and presentation.
- Developed and managed A/B testing framework for easily and reliably running experiments.
- Analyzed and improved machine learning algorithms for estimating question difficulties and student abilities, to improve score predictions and adaptive study question presentation.
- Converted existing reports system from using production SQL database queries to a central log-based system, processed using Hadoop and node.js, using R and Hive for specialized analysis, presented using a combination of Mondrian/Saiku and custom Rails/D3.

DoD/Data Network Technologies | Fort Meade, MD   **Sep 2001 - Mar 2007**
Global Network Security Analyst:
- Developed a high-impact program with a team of three developers. The results from the program were recognized as one of the top five contributors to division-level performance.
- Managed a team of 15 developers to create an autonomous agent program to perform new techniques never before used. Received a special award for my work, noting "Mr. Lotze...has demonstrated an unparalleled effectiveness", and "has proven that he can lead and enable others to produce significant results to some of the…community's hardest problems."
- Received three team awards and four individual cash awards for superior performance.

Other Experience
- Efficient Frontier, 2008: created tools to detect and visualize seasonal advertising patterns.
- Livermore Labs, 2007: created programs to analyze biology research networks.

education

HARVARD UNIVERSITY | Cambridge, MA   **B.A. June 2001**
B.A. *Magna Cum Laude* in Computer Science. 3.92 GPA (4.0 in major). Phi Beta Kappa.
John Harvard Scholarship, "for academic achievement of the highest distinction," all years.

UNIVERSITY OF MARYLAND | College Park, MD   **Ph.D. August 2009**
Ph.D. in Applied Mathematics received August 2009. M.S. received December 2007.
NSF VIGRE Fellowship, 2005-2006; DHS Fellowship, 2006-2009.

computer skills

- R, Ruby, Rails, Python, D3, SQL, Pig, Hive, node.js, Perl, Java

patents

- U.S. Patent #7738504, awarded June 15th, 2010: "Method of establishing and updating master node in computer network"
- U.S. Patent #7743122, awarded June 22nd, 2010: "Method of reliably communicating via computer network"

publications

- Lotze, T., Bader-Natal, A., "Does Peer Collaboration Increase Engagement in an Online Learning Environment?", submitted to the International Conference of the Learning Sciences 2012, Sydney, Australia.
- Bader-Natal, A., Lotze, T., and Furr, D. (2011), "A comparison of the effects of nine activities within a self-directed learning environment on skill-grained learning", *Proceedings of the 15th International Conference on Artificial Intelligence in Education (AIED-2011), Springer.*
- Bader-Natal, A., Lotze, T., "Evolving a learning analytics program" (2011), ACM Proceedings of the 1st International Conference on Learning Analytics and Knowledge, Alberta, Canada, 180-185.
- Yahav, I., Lotze, T. and Shmueli, G., "Algorithm Combination for Improved Detection in Biosurveillance", *Infectious Disease Informatics and Biosurveillance: Research, Systems, and Case Studies*, Springer, 2011.
- Lotze, T, Shmueli, G. and Yahav, I., "Simulating and Evaluating Biosurveillance Datasets", *Biosurveillance: A Health Protection Priority*, Kass-Hout, T. & Zhang, X. (ed.), Chapman and Hall, 2010.
- Lotze, T. and Shmueli, G., "How does improved forecasting benefit detection? An application to biosurveillance", *International Journal of Forecasting*, 2008, 25(3), 467-483.
- Lotze, T. and Shmueli, G. "Ensemble Forecasting for Disease Outbreak Detection", Proceedings of the 23rd AAAI Conference on Artificial Intelligence (AAAI-08), Chicago, IL, 2008.
- Lotze, T., Murphy, S. and Shmueli, G., "Preparing Biosurveillance Data for Classic Monitoring", *Advances in Disease Surveillance*, 2008, 6, 1-20.
- Lotze, T. and Shmueli, G. "On the relationship between forecast accuracy and detection performance: An application to biosurveillance", Proceedings of the 2008 IEEE Conference on Technologies for Homeland Security, Boston, MA, 2008.
- Lotze, T., Shmueli, G., Murphy, S. and Burkom, H. (2006) "A Wavelet-based Anomaly Detector for Early Detection of Disease Outbreaks", Proceedings of the 23rd International Conference on Machine Learning (ICML), Workshop on Machine Learning Algorithms for Surveillance and Event Detection, Pittsburgh, PA.

other

- Maintainer of bandit and ComPoissonReg R packages; contributor to the vanity rails gem.
- Creator and lead organizer of SurviveDC, a 2000-person street game.
- Founder of Vericon and first President of HRSFANS, a science fiction non-profit association.