Jared Sylvester

Résumé

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Education

- University of Maryland
  Ph.D. in Computer Science — September 2014
  Dissertation title: "Neurocomputational Methods for Autonomous Cognitive Control"
  M.S. in Computer Science — May 2010
- University of Notre Dame
  B.S. in Computer Science, Magna cum Laude — May 2006

Experience

- Amazon Web Services: *Data Scientist, AWS Security* — August 2019 – Present
  I build very large scale data analytic tools to enhance the security of AWS and its customers. These tools are deployed and active 24/7, operating up to the petabyte scale to defend some of AWS' most used services by extracting actionable patterns to support both automatic mitigations and hands-on investigations.
- UMBC Master of Professional Studies in Data Science Program: *Adjunct Professor* — January 2019 – December 2019
  I taught the introductory course to professionals seeking certificates and masters degrees in Data Science. I was responsible for weekly lectures, preparation of presentations & demos, course assignments and grading. The course covered elementary Python, data gathering & cleaning, exploratory data analysis, relevant mathematics, machine learning and visualization.
- Booz Allen Hamilton: *Senior Lead Data Scientist / Lead Associate* — October 2014 – August 2019
  As a member of the Strategic Innovation Group, I primarily worked to support a contract with the Laboratory for Physical Sciences, a defense research organization. My work focused on Machine Learning research, especially in the domain of computer security. I developed software for feature extraction in cluster environments, and lead a project to evaluate deep learning techniques for our client. I focused on deep neural architectures for application to non-natural languages and cyberdefense, as well as research in neuromorphic computing. I also worked on internal investment projects developing machine learning techniques to mitigate algorithmic bias. Additionally, I assisted my team administratively by acting as our liaison for recruiting.
- UMD Smith School, Ctr. for Complexity in Business: *Doctoral Research Assistant* — August 2012 – September 2014
  Studied the role of social networks on conversions to paid memberships in a freemium MMO game environment using large, dynamic, real-world network datasets. Developed software for large-scale data collection, analysis and visualization to study propagation of information and influence in Twitter and other social networks. (Research advisor: Dr. William Rand)
- Center for Advanced Study of Language: *Doctoral Research Assistant* — August 2008 – July 2012
  Developed neurocomputational models of working memory and executive function. Investigated Machine Learning models to predict which subjects will benefit from working memory and language training regimes. (Research advisor: Dr. James Reggia)
- UMD Dept. of Computer Science:
  Graduate Research Assistant — January 2007 – July 2012
  Investigated topographic map formation in the sensory cortex through the use of Self-Organizing Map neural networks resulting in an article published in a top-3 AI journal, *Neural Networks*.
  Teaching Assistant — August – December 2006
  Taught twice weekly tutorials for two sections of CMSC 131 (Object Oriented Programming), and conducted lab and office hours in support of the same.
- ND Dept. of Computer Science & Engineering: *Teaching Assistant* — August – December 2005
  Lead lab sessions and graded student work for "Advanced Programming in C/C++."
- NSF Research Experience for Undergraduates: *Summer Researcher* — June – August 2005
  Conducted research in Machine Learning and Data Mining, focused on the application of Genetic Algorithms to heterogenous ensemble formation, and the role of diversity in combining predictions. (Research advisor: Dr. Nitesh Chawla)
- Quantum-dot Cellular Automata Group: *Research Assistant* — August 2004 – May 2005
  Designed and coded a logic-minimization tool to optimize the design of QCA-based processors, a quantum-molecular alternative to CMOS integrated circuits.

Selected Publications

(A full listing of papers and talks, with PDFs, is available at `www.jsylvest.com/home.html#pubs`)

- Sylvester & Raff. "Trimming the thorns of AI Fairness research." *IEEE Data Engineering*, vol. 43(4), pp. 76–90. 2020. (Invited.)
- Raff, Sylvester, Forsyth & McLean. "Barrage of Random Transforms for Adversarially Robust Defense." Conference on Computer Vision and Pattern Recognition (CVPR). *To appear*: 16–20 June, 2019.
- Fleshamn, Raff, Sylvester, Forsyth & McLean. "Non-negative networks against adversarial attacks." AAAI Workshop on Artificial Intelligence for Cyber Security (AICS). 27 January, 2019.
- Raff & Sylvester. "Linear models with many cores and CPUs: A stochastic atomic update scheme." IEEE Conf. on Big Data. 10–13 December, 2018.
- Raff, Sylvester & Nicholas. "Engineering a simplified 0-bit consistent weighted sampling." Conference on Information and Knowledge Management (CIKM). 22-26 October, 2018.
- Raff & Sylvester. "Gradient Reversal Against Discrimination: A fair neural network learning approach." IEEE Conf. on Data Science and Advanced Analytics (DSAA). 1–4 October, 2018.
- Sylvester & Raff. "What about applied fairness?" ICML: The Debates. 15 July, 2018.
- Raff, Sylvester & Mills. "Fair forests: Regularized tree induction to minimize model bias." AAAI/ACM Conference on Artificial Intelligence, Ethics, and Society (AIES). February, 2018.
- Raff, Barker, Sylvester, Brandon, Catanzaro & Nicholas. "Malware detection by eating a whole EXE." AAAI Workshop on Artificial Intelligence for Cyber Security. February, 2018.
- Raff, Sylvester & Nicholas. "Learning the PE header: Malware detection with minimal domain knowledge." ACM Workshop on Artificial Intelligence and Security (AISec), pp. 121–132). October, 2017.
- Raff, Zak, Sylvester, Cox, Yacci & McLean. "An investigation of byte *n*-gram features for malware classification." *Journal of Computer Virology*. September, 2016.
- Sylvester & Reggia. "Engineering neural systems for high-Level problem solving." *Neural Networks*, vol. 79, pp. 37–52. 2016.
- Rand, Darmon, Sylvester & Girvan. "Will my followers tweet? Predicting Twitter engagement using machine learning." European Marketing Academy Conference. June, 2014.
- Sylvester, Healy, Wang & Rand. "Space, time, and hurricanes: Investigating the spatiotemporal relationship among social media use, donations, and disasters." Proc. ASE Int'l Conf. on Social Computing. May, 2014.
- Reggia, Monner & Sylvester. "The computational explanatory gap." *J. Consciousness Studies*, 21(9–10), pp. 153–178. 2014.
- Darmon, Sylvester, Girvan & Rand. "Understanding the predictive power of Computational Mechanics and Echo State Networks in social media." *ASE Human Journal*, vol. 2(2), pp. 13–24. 2013.
- Sylvester, Reggia, Weems & Bunting. "Controlling working memory with learned instructions." *Neural Networks*, vol. 41, Issue on Autonomous Learning, pp. 23–38. 2013.
- Sylvester, Reggia, Weems & Bunting. "A temporally asymmetric Hebbian network for sequential working memory." Proc. Int'l Conf. on Cognitive Modeling, pp. 241–246. 2010.
- Sylvester & Reggia. "Plasticity-induced symmetry relationships between adjacent self-organizing topographic maps." *Neural Computation*, vol. 21(12), pp. 3429–3443. 2009.
- Chawla & Sylvester. "Exploiting diversity in ensembles: Improving the performance on unbalanced datasets." Proc. Multiple Classifier Systems, pp. 397–406. 2007.
- Sylvester & Chawla. "Evolutionary Ensembles: Combining learning agents using genetic algorithms." Proc. AAAI Workshop on Multi-Agent Systems, pp. 46–51. 2005.

Graduate Course Work

Neural Computation
Cognitive Science & Artificial Intelligence
Geographic & Spatial Information Systems
Computational Geometry
Advanced Computer Graphics
Machine Learning
Statistical Pattern Recognition
Complex Systems in Business: Agent-Based Modeling & Social Network Analysis
Nature-Inspired Artificial Intelligence
Algorithmic Game Theory (audited)

Academic Interests

Machine Learning & Artificial Intelligence
Neural Networks
Complex systems modeling & simulation
Graphics & data visualization

Personal Interests

Digital & algorithmic art, abstract animation
Woodworking, calligraphy & print-making
Baking bread