Samuel Rivera

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Profile

Engineer with computer vision and cognitive computational modeling experience.

Education

PhD, Electrical Engineering, *The Ohio State University*, Columbus, OH (GPA: 3.665/4.0) December 16, 2012
-Specialization: machine learning, pattern recognition, computer vision, eye tracking

MS, Electrical Engineering, *The Ohio State University*, Columbus, OH March 18, 2012
-Awarded upon becoming a PhD candidate

BE, Electrical Engineering, *University of Delaware*, Newark, DE (GPA: 3.480/4.0) May 15, 2007
-Minors: Math and Physics; Specialization: signal processing

Skills

- Languages: Python, Pandas, MATLAB, C/C++, LaTeX, OpenCV, R, Psychtoolbox
- Relevant Courses: computer vision, pattern recognition, applied regression analysis, numerical optimization, linear algebra, elements of statistical learning, nonparametric function estimation, random signal analysis and random processes
- Skills: Linux command line; Image and video processing; Machine Learning;

Experience

Postdoctoral Researcher, *The Ohio State University* September 15, 2013 - Present
PI: Dr. Vladimir Sloutsky of the Cognitive Development Lab (CDL). CDL examines the development of cognition.

- Developed novel paradigms to determine the role of labels on category learning in infants
- Inferred latent variables of infant cognition through Bayesian models and noisy infant gaze

Research Assistant, *The Ohio State University* December 15, 2007 - December 15, 2012
PI: Dr. Aleix Martinez of the Computational Biology and Cognitive Science Lab (CBCSL). The CBCSL applies pattern recognition to problems in computer vision, cognitive science, and developmental psychology to name a few.

- Designed and implemented novel shape detection algorithms using kernel regression and probabilistic graphical models
- Defined models for emotion perception from faces based on Discriminant Analysis and Markov Models
- Developed software interfacing MATLAB with OpenCV to automatically process face image databases
- Drafted manuscripts, grant proposals, and technical documents to obtain new funding and document research

Center for Cognitive Sciences Fellow, *The Ohio State University* June 1, 2011 - September 1, 2011
PIs: Dr. Vladimir M. Sloutsky and Dr. Dirk B. Walther of the Department of Psychology, and Dr. Aleix Martinez of the Electrical and Computer Engineering department.

- Discovered relevant patterns in noisy high dimensional data using machine learning and pattern recognition methods
- Developed custom software to format and organize raw eye track data from several sources
- Implemented open source MATLAB toolbox with documentation for eye tracking analysis and visualization

Publications

Rivera, S., Martinez, A. (2014). Precise Fiducial Detection. In S. Z. Li A. K. Jain (Eds.), *Encyclopedia of Biometrics* (pp. 15). Springer US.

Rivera, S. & Sloutsky, V. (2015). Development of selective attention in category learning. In D. C. Noelle, R. Dale, A. S. Warlaumont, J. Yoshimi, T. Matlock, C. D. Jennings, P. P. Maglio (Eds.), *Proceedings of the 37th Annual Conference of the Cognitive Science Society* (pp. 2003-2008). Austin, TX: Cognitive Science Society.

Robinson, C.W., Barnhart, W, & Rivera, S. (2015). Auditory stimuli slow down responses and first fixations: Support for auditory dominance in adults. In D. C. Noelle, R. Dale, A. S. Warlaumont, J. Yoshimi, T. Matlock, C. D. Jennings, P. P. Maglio (Eds.), *Proceedings of the 37th Annual Conference of the Cognitive Science Society* (pp. 2009-2014). Austin, TX: Cognitive Science Society.

Benitez-Quiroz, C.F., Rivera, S., Gotardo, P., & Martinez, A. *Salient and Non-Salient Fiducial Detection using a Probabilistic Graphical Model*. Pattern Recognition, Vol. 47, pp. 208-215, 2014.

Rivera, Samuel. (2012). Computational Methods for the Study of Face Perception. (Doctoral dissertation). *Retrieved from ProQuest Dissertations and Theses*. (Accession Order No. AAT 3535204)

Rivera, S., Best, C., Yim, H., Martinez, A., Sloutsky, V., & Walther, D. (2012). Automatic selection of eye tracking variables

in visual categorization for adults and infants. In N. Miyake, D. Peebles, & R. P. Cooper (Eds.), *Proceedings of the 34th Annual Conference of the Cognitive Science Society* (pp. 2240-2245). Austin, TX: Cognitive Science Society.

Samuel Rivera and Aleix M. Martinez. Learning Deformable Shape Manifolds.
Pattern Recognition, Vol. 45, No. 4, pp. 1792-1801, 2012.

Talks and Presentations

Attention and the development of category learning
Presented at SRCD 2015, Philadelphia, PA, USA March 21, 2015
Anticipatory Looking Paradigm for Visual Categorization in Infants
Presented at VSS 2014, Naples, FL, USA May 17, 2014
The emotion category of expressive faces becomes more influential over development
Presented as SRCD 2013, Seattle, WA, USA April 19, 2013
Automatic selection of eye tracking variables uncovers similar mechanisms for visual categorization in adults and infants *Presented at VSS 2012, Naples, FL, USA* May 7, 2012
Biologically-Inspired Face Shape Detection, with Dr. Aleix Martinez
John D. and Alice Nelson Kraus Memorial Student Poster Contest September 12, 2009
COGFEST May 1, 2009
Deformable Shape Detection, with Dr. Aleix Martinez
Ohio State Biomedical Engineering Conference, Hosted by OSU Department of Biomedical Engineering May 15, 2009

Honors and Awards

- Research Assistantship, The Ohio State University, September 2008 to December 2012
- Center for Cognitive Science fellowship, The Ohio State University, June to August 2011
- Awarded 1^{st} place at John D. and Alice Nelson Kraus Memorial poster competition, The Ohio State University, 2009
- University Fellow, The Ohio State University, September 2007 to August 2008
- President of Caribbean Student Alliance, University of Delaware, 2006
- Vice President of Eta Kappa Nu, University of Delaware, 2006
- Awarded 2^{nd} place at 9th Annual Philadelphia AMP Research Symposium, University of Delaware, November 5, 2006
- Ronald E. McNair Leadership Award, University of Delaware, in August 2006
- Ronald E. McNair Scholar, University of Delaware, June 2005 to August 2007
- Liston A. Houston Scholarship, University of Delaware, Fall 2004
- Latino Student of Distinction, University of Delaware, May 2004 to May 2007

Society Memberships

Vision Sciences Society (VSS)
Institute of Electrical and Electronics Engineers (IEEE) Graduate Student Member, 2008 - 2012
Alpha Psi Lambda, Inc. March 2008
Tau Beta Pi, Engineering Honor Society December 2006
Eta Kappa Nu, Electrical Engineering Honor Society April 2006