

Jinyan Guan

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EDUCATION

Ph.D., Computer Science University of Arizona, Tucson, AZ
Research Interests: Bayesian Statistical Modeling, Computer Vision, Computational Social Science
Aug, 2009 – present
Estimated Graduation Date: May, 2016

Bachelor of Science (with Honors) Winona State University, Winona, MN
Major: Computer Science, Minor: Psychology GPA: 3.83
Jan, 2006 – Dec, 2008

RESEARCH EXPERIENCE

Research Assistant, Department of Computer Science August, 2009 – present
University of Arizona, Tucson, AZ Advisor: Dr. Kobus Barnard

Bayesian generative modeling for complex dynamic social systems Dec, 2012 - present
We develop a Bayesian generative approach to infer the parameters of complex dynamical systems that are used to model emotion-interacting patterns from multivariate data collected in social psychology studies. We use the State Space Model (SSM) to model the dynamics of emotion interactions. The latent states of the SSM are composed of continuous real numbers that represent the level of the true emotional states of both partners and are evolved over time by the differential equation of a coupled oscillator physics model. The observed states include self-reported emotional experiences and physiological measurements of both partners during the interactions. We further use Gaussian process (GP) prior to model the changes/drifts of the coupled oscillator parameters in longer periods of social interactions where the interaction dynamics slowly and smoothly vary over time. To fit the parameters of the proposed Bayesian generative model from noisy experimental data, we develop Monte Carlo Markov chain (MCMC) inference procedures to learn the parameters of the priors from a set of training couples. Finally, we use cross-validation to evaluate the fitted model by learning the group-shared parameters and distributions from training couples and testing the learned models on some held-out testing couples.

Temporal scene understanding May, 2011 - present
We develop a detection-based tracking system that infers people 3D locations, physical dimensions and head orientations from monocular camera videos using Bayesian statistical modeling and MCMC inference methods. We use a principled probabilistic approach within the tracking-from-detection paradigm, using people detection, facial landmark detection, and optical flow as evidence. We seek the MAP estimate of the data association as well as other scene parameters using MCMC sampling techniques. We are currently working on inferring interesting locations in the scene based on people visual attentions that inferred from their head orientations.

CRA-W Distributed Mentor Project Research Internship August – September 2008
University of Washington, Seattle, WA Advisor: Dr. Linda Shapiro

I worked on a content-based image retrieval system for fMRI images using their SPM (Statistical Parametric Mapping) statistical maps. I implemented two clustering algorithms to group similar fMRI images. One is

based on graph theory and the other one is based on replicator dynamics. I also developed a visualization function for the system to present the similarities of the retrieved images using MDS (multidimensional scaling) technique. Finally, I compared the similarity measure of fMRI images based on their SPM maps with the one based on their ICA (Independent Component Analysis)-based components and found out that the similarity matrices generated by these two approaches were highly correlated with each other.

Research Assistant, Department of Computer Science
Winona State University, Winona, MN

January, 2007 – December, 2008
Advisor: Dr. Mingrui Zhang

We investigated an ANN (Artificial Neural Network) based approach of deriving water optical properties from ocean AVIRIS (Airborne Visible/Infrared Imaging Spectrometer) images. I conducted a set of experiments to select a proper number of neurons for the training. To reduce the dimensionality of our training data, I implemented a filter-based feature selection algorithm to select the most informative channels from the AVIRIS images. I also implemented a sample-boosting algorithm to improve the neural network learning performance over difficult training samples.

TALKS

The 32nd International Conference on Machine Learning
Lille, France.
Title: Moderated and Drifting Dynamical Systems.

July, 2015

Cognitive Science Graduate Student Showcase
University of Arizona, Tucson, AZ.

May, 2014

Title: Bayesian Statistical Modeling of Temporal Interpersonal Emotion System (TIES)

TEACHING EXPERIENCE

Teaching Assistant, Computer Science Department
University of Arizona

Feb - May, 2015

Course: Bayesian Modeling and Inference

Instructor: Kobus Barnard

I volunteered to be a TA for this class to gain teaching experience. I hosted weekly office hours during which I helped individual students with the lecture materials and homework questions.

Teaching Assistant, Computer Science Department
Winona State University, Winona, MN

September 2006 – December 2007

Course: Algorithm and Problem Solving

Instructors: Mingrui Zhang & Tim Gegg-Harrison

I graded Java programming assignment and tutored individual student on assignments and course materials.

HONORS AND AWARDS

GPSC Travel Scholarship of University of Arizona	2015
Galileo Circle Scholarship of University of Arizona	2013
Microsoft Research Graduate Women Scholarship	2010 – 2011
Outstanding Student of Winona State University	2008
CRA-W Distributed Mentor Project Summer 2008 Award	2008
Grace Hopper Celebration of Women in Computing Student Scholarship	2007 – 2008
Computer Science Alumni Scholarship of Winona State University	2007 – 2008
Buhler Memorial Scholarship of Winona State University	2007 – 2008

PUBLICATIONS

- J. Guan, K. Simek, E. Brau, C. Morrison, E. Butler, K. Barnard (2015). Moderated and Drifting Linear Dynamical Systems. *International Conference on Machine Learning*, July 6-11, Lille, France.
- E. Brau, J. Guan, K. Simek, L. D. Pero, C. Dawson, K. Barnard (2013). Bayesian 3D tracking from monocular video. *IEEE International Conference on Computer Vision*, Dec 3-6, Sydney, Australia.
- L. D. Pero, J. Guan, E. Brau, J. Schlecht, K. Barnard (2011). Sampling Bedrooms. *Computer Vision and Pattern Recognition*, June 21-23, 2011, Colorado, USA.
- J. Guan, M. Zhang, Z. Lee (2009). Determining inputs to artificial neural network in the retrieval of water optical properties. *33rd International Symposium on Remote Sensing of Environment*, May 4 - 8, 2009, Stresa, Lago Maggiore, Italy.
- R. F. Tungaraza, J. Guan, L. G. Shapiro, J. F. Brinkely, J. Ojemann, and J. D. Franklin (2009). A similarity retrieval tool for functional magnetic resonance imaging (fMRI) Statistical Maps. *International Journal on Artificial Intelligence in Medicine*
- R. F. Tungaraza, J. Guan, S. Rolfe, I. Atmosukarto, A. Poliakov, N. Kleinhans, E. Aylward, J. Ojemann, J. F. Brinkely, and L.G. Shapiro (2009). A similarity retrieval method for functional magnetic resonance imaging (fMRI) statistical maps. *SPIE Medical Imaging*, February 7 - 12, 2009, Florida, USA.
- S. M. Rolfe, L. Finney, R. F. Tungaraza, J. Guan, L. G. Shapiro, J. F. Brinkely, A. Poliakov, N. Kleinhans, and E. Alyward (2009). An independent component analysis based tool for exploring functional connections in the brain. *SPIE Medical Imaging*, February 7 - 12, 2009, Florida, USA.
- M. Zhang, Z. Lee, and J. Guan (2007). Improving the accuracy of water and bottom properties derived from remote sensing reflectance via artificial neural network. *SPIE Optics and Photonics*, August 26 - 30, 2007, San Diego, California, USA.