

Xiao (Cosmo) Zhang

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Research Interest My research interests lie primarily in machine learning, natural language processing, non-parametric statistics and computational cognitive science.

Education **Purdue University, West Lafayette, IN**
Ph.D., Computer Science, Aug 2013-May 2018(Expected)

M.S., Computer Science (jointed with Statistics), Aug 2013-Aug 2015

M.S., Psychology (Mathematical and Computational Cognitive Science), Aug 2011-Aug 2014
Thesis: Optimization of Switch Virtual Keyboard by Using Computational Modeling.

Huazhong Normal University, P.R.China
B.S., Psychology, June 2011

B.A., Linguistics with Merit Student Award (top 3% students), June 2011
Thesis: A Study of Access Pathways of Orthographic and Phonetic Representations to Second Language Lexicon for Chinese-English Bilinguals.

Proficiency *Programming Languages:* Python, R, C/C++, Java, MATLAB, SQL, Lua, HTML, PHP, JavaScript, MongoDB Query, VB, Assembly.
Toolkits: Theano, Torch, Scikit-learn, NLTK, Gurobi.
Technical Skills: Linux/GNU, Bash Scripts, Git, L^AT_EX.

Experience **Department of Computer Science, Purdue University**
Graduate Student Researcher 2014 – Present
Developing and applying structural learning models for text classification, structure prediction and other NLP tasks.
With *Prof. Dan Goldwasser*

Cyber Center, Purdue University
Software Engineer Summer 2015
Managing Indiana State chemical testing data in Mongo database and developing web side applications.

Midcontinent Independent System Operator, Inc.
Data Science Intern Summer 2014
Constructed machine learning models for on-line electricity outage events detection. Designed a greedy algorithm for Final Transition Rights modeling.
With *Alan Hoyt*

Department of Psychological Sciences, Purdue University
Graduate Student Researcher 2011 – 2014
Applied machine learning methods to HCI virtual device design. Constructed neural network models based on cognitive experimental data.
With *Prof. Gregory Francis*

Purdue University
Teaching Assistant 2011 – Present
Head TA for Statistical Machine Learning, 2015.
TA for Experimental Design and ANOVA, 2015.
TA for Statistical Inference, 2014.
Head TA for Introduction to the Analysis of Algorithms, 2013.
TA for Introduction to Cognitive Psychology, 2011 and 2012.

- Projects**
- Inverse Reinforcement Learning on Communication with Robots** 2016 – Present
Building inverse reinforcement learning algorithm to train a virtual robot to understand and follow human instructions.
- Recurrent Neural Networks for Structural Prediction** 2015 – Present
Implementing recurrent neural networks and their variations on Named Entity Recognition (NER), POS tagging, chunking and other structural NLP tasks.
- Dynamic Latent Conditional Random Field for Sentiment Analysis** 2014
Implemented dependency tree based dynamic latent conditional random field (dl-CRF) model for sentiment analysis on Yelp! customer review data set.
- Part of Speech Tagging on Tweet Data** 2014
Implemented a structural perceptron model for part of speech tagging on Tweet data set.
- Parallel Computation of Monte Carlo Markov Chain** 2014
Implemented parallel computation of annealing chains of Monte Carlo Markov Chain (MCMC) on mixed models of large scale data.
- Application of Machine Learning on Optimizing Virtual Keyboard** 2012 – 2014
Constructed and implemented integer linear programming (ILP) and Bayesian multi logit model for producing optimized virtual keyboard, based on HCI experimental data.
- Convolutional Neural Network for Traffic Sign Detection** 2013
Developed a convolutional deep neural network model and tested it on the German Traffic Sign Recognition Benchmark data set.
- Testing of “Facede” Neural Network Model** 2011 – 2012
Used Bayesian statistical tests to compare simulated data from the adaptive resonance theory (ART) based “Facede” neural network model with empirical cognitive experimental data in an induced visual scene fading scenario.
- Publications**
- Zhang, X., Leonor Pacheco, M., Li, C., Goldwasser, Dan. (2016). Introducing DRAIL – a Step Towards Declarative Deep Relational Learning. EMNLP 16 Workshop on Structured Prediction for NLP.
- Goldwasser, D., Zhang, X. (2016). Understanding Satirical Articles Using Common-Sense. Transactions of the Association for Computational Linguistics (presented in EMNLP16).
- Zhang, X., Fang, K., & Francis, G. (2016). How to optimize switch virtual keyboards to trade off speed and accuracy. Cognitive Research: Principles and Implications.
- Francis, G., & Zhang, X. (2014). Modeling and design of optimal switch keyboards. In the 47th Annual Meeting of the Society for Mathematical Psychology, Quebec city, Canada, 2014.
- Zhang, X., Fang, K., & Francis, G. (2013). Optimization of switch keyboards. In the 15th International ACM SIGACCESS Conference on Computers and Accessibility, Bellevue, WA, 2013.
- Zhang, X(C). & Francis, G. (2012). Testing model predictions of induced visual fading. In the Vision Sciences Society annual meeting, Naples, FL, 2012.
- Zhang, X., Peng, G., Zhong, H., Wu, F., & Zhou, D. (2010). Relationship between social behavior, motivation of achievement and internet addiction of undergraduates - five universities in Wuhan as an example. Science of Social Psychology, 25(114), 968-973
- Activities**
- 2013 – 2014
President of Purdue University Computer Science Graduate Students Board
- 2012
Boiler Out! Volunteer Program: Purdue University Community Service Project.