Zhe Gan

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Research Interests

I focus on designing efficient and scalable Bayesian inference algorithms for deep learning models with applications in natural language processing and computer vision.

Education

- Duke University, Durham, NC
  Ph.D., Electrical and Computer Engineering 09/2013 - present
- Peking University, Beijing, China
  M.S., Electrical Engineering 09/2010 - 07/2013
  B.S., Electrical Engineering 09/2006 - 07/2010

Experience

- **Information Initiative at Duke (iiD)** 09/2013 - present
  Research Assistant. Advisor: Prof. Lawrence Carin
  (*i*) Developing deep generative models for image analysis, topic modeling and sequence modeling
  (*ii*) Designing stochastic gradient variational inference algorithms and stochastic gradient MCMC methods for scalable Bayesian inference
  (*iii*) Nonparametric discriminative factor modeling for gene-expression analysis
- **Microsoft Research Redmond** 05/2016 - 08/2016
  Research Intern. Advisor: Xiaodong He, Jianfeng Gao, Li Deng, Ph.D
  (*i*) image captioning: using deep learning techniques to improve the state-of-the-art of image and video captioning.
  (*ii*) deep conflation: using deep learning techniques to implement conflation for business data analytics.
- **Adobe Research** 06/2015 - 09/2015
  Data Scientist Intern. Advisor: Hung Bui, Ph.D
  Recurrent neural networks (RNN) for NLP applications, including sentence classification, sentence retrieval and sentence generation

Publications

Arxiv

1. Y. Pu, **Z. Gan**, R. Henao, C. Li, S. Han and L. Carin "Stein Variational Autoencoder", *arXiv preprint arXiv:1704.05155*
2. Y. Pu, M. R. Min, **Z. Gan** and L. Carin "Adaptive Feature Abstraction for Translating Video to Language", *arXiv preprint arXiv:1611.07837*

Referred Conference

1. **Z. Gan**, Y. Pu, R. Henao, C. Li, X. He and L. Carin "Learning Generic Sentence Representations Using Convolutional Neural Networks", *Conf. on Empirical Methods in Natural Language Processing* (**EMNLP**), 2017

2. Y. Zhang, **Z. Gan**, K. Fan, Z. Chen, R. Henao, D. Shen and L. Carin "Adversarial Feature Matching for Text Generation", *Int. Conf. Machine Learning* (**ICML**), 2017
3. Y. Zhang, C. Chen, **Z. Gan**, R. Henao and L. Carin "Stochastic Gradient Monomial Gamma Sampler", *Int. Conf. Machine Learning* (**ICML**), 2017
4. **Z. Gan**, C. Li, C. Chen, Y. Pu, Q. Su and L. Carin "Scalable Bayesian Learning of Recurrent Neural Networks for Language Modeling", *Association for Computational Linguistics (***ACL***)*, 2017 **Oral**
5. **Z. Gan**, C. Gan, X. He, Y. Pu, K. Tran, J. Gao, L. Carin and L. Deng "Semantic Compositional Networks for Visual Captioning", *Computer Vision and Pattern Recognition (***CVPR***)* 2017, **Spotlight**
6. C. Gan, **Z. Gan**, X. He, J. Gao and L. Deng "StyleNet: Generating Attractive Visual Captions with Styles", *Computer Vision and Pattern Recognition (***CVPR***)*, 2017
7. **Z. Gan**, P. D. Singh, A. Joshi, X. He, J. Chen, J. Gao and L. Deng "Character-level Deep Conflation for Business Data Analytics", *Int. Conf. Acoustics, Speech and Signal Processing* (**ICASSP**), 2017
8. Y. Xian, Y. Pu, **Z. Gan**, L. Lu and A. Thompson "Adaptive DCTNet for Audio Signal Classification", *Int. Conf. Acoustics, Speech and Signal Processing* (**ICASSP**), 2017
9. Q. Su, X. Liao, C. Li, **Z. Gan** and L. Carin "Unsupervised Learning with Truncated Gaussian Graphical Models", *Proc. American Association of Artificial Intelligence* (**AAAI**), 2017
10. Y. Zhang, **Z. Gan** and L. Carin "Generating Text via Adversarial Training", *NIPS Workshop*, 2016
11. Y. Xian, Y. Pu, **Z. Gan**, L. Lu and A. Thompson "Modified DCTNet for Audio Signals Classification", *Journal of the Acoustical Society of America*, 2016
12. Y. Pu, **Z. Gan**, R. Henao, X. Yuan, C. Li, A. Stevens and L. Carin "Variational Autoencoder for Deep Learning of Images, Labels and Captions", *Neural Information Processing Systems* (**NIPS**),2016
13. J. Song, **Z. Gan** and L. Carin "Factored Temporal Sigmoid Belief Networks for Sequence Learning", *Int. Conf. Machine Learning* (**ICML**),2016
14. C. Li, A. Stevens, C. Chen, Y. Pu, **Z. Gan** and L. Carin "Learning Weight Uncertainty with Stochastic Gradient MCMC for Shape Classification", *Computer Vision and Pattern Recognition (***CVPR***)* 2016, **Spotlight**
15. C. Chen, D. Carlson, **Z. Gan**, C. Li and L. Carin "Bridging the Gap Between Stochastic Gradient MCMC and Stochastic Optimization", *Artificial Intelligence and Statistics (***AISTATS***)* 2016, **Oral**
16. **Z. Gan**, C. Li, R. Henao, D. Carlson and L. Carin "Deep Temporal Sigmoid Belief Networks for Sequence Modeling", *Neural Information Processing Systems* (**NIPS**), 2015
17. R. Henao, **Z. Gan**, J. Lu and L. Carin "Deep Poisson Factor Modeling", *Neural Information Processing Systems* (**NIPS**), 2015
18. **Z. Gan**, C. Chen, R. Henao, D. Carlson and L. Carin "Scalable Deep Poisson Factor Analysis for Topic Modeling", *Int. Conf. Machine Learning* (**ICML**),2015
19. **Z. Gan**, R. Henao, D. Carlson and L. Carin "Learning Deep Sigmoid Belief Networks with Data Augmentation", *Artificial Intelligence and Statistics* (**AISTATS**), 2015

Book Chapter

1. **Z. Gan**, X. Yuan, R. Henao, E. Tsalik and L. Carin "Inference of Gene Networks Associated with the Host Response to Infectious Disease", Chapter 13 of Book *Big Data Over Networks*. Cambridge University Press. In Press.

Software Skills

Python, Matlab, R and C

Awards

ECE Fellowship, Duke University, 2013
National Scholarship, Department of Minister of Education of China, 2010-2013.

Teaching Experience

Teaching Assistant 09/2014-12/2014

STA 601 - Bayesian and Modern Statistics
Instructor: David Dunson, Ph.D

Teaching Assistant 01/2015-05/2015

ECE 587 - Information Theory
Instructor: Ahmad Beirami, Ph.D

Graduate Coursework

Bayesian and Modern Statistics, Probabilistic Machine Learning, Advanced Machine Learning, Statistical Inference, Statistical Computation, Information Theory, Graphical Models & Inference, Optimization For Engineers