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 computer vision and natural language processing applications, including variational autoencoder and generative adversarial networks
  (*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** 05/2017 - present
  Research Intern. Advisor: Xiaodong He, Lihong Li, Ph.D
  The project aims at driving disruptive advances in vision and language intelligence. We are focusing on understanding, reasoning, and generation across language and vision, and creation of intelligent services.
- **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 **Oral**
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, **Oral**
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