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## Zhe Gan

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## Research Interests

I work on deep learning, including generative models and its applications in vision and language intelligence.

## 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 autoencoders and generative adversarial networks  
(ii) Designing stochastic gradient variational inference algorithms and stochastic gradient MCMC methods for scalable Bayesian inference
- **Microsoft Research Redmond** 05/2017 - 08/2017  
Research Intern. Advisor: Xiaodong He, Lihong Li, Ph.D.  
Deep reinforcement learning for vision and language intelligence, with focus on the visual storytelling task.
- **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. X. Zhang, R. Henao, **Z. Gan**, Y. Li and L. Carin "Multi-Label Learning from Medical Plain Text with Convolutional Residual Models", *arXiv preprint arXiv:1801.05062*

### Referred Conference

1. T. Xu, P. Zhang, Q. Huang, H. Zhang, **Z. Gan**, X. Huang and X. He "AttnGAN: Fine-Grained Text to Image Generation with Attentional Generative Adversarial Networks", *Computer Vision and Pattern Recognition (CVPR)*, 2018

2. W. Wang, **Z. Gan**, W. Wang, D. Shen, J. Huang, W. Ping, S. Satheesh and L. Carin "Topic Compositional Neural Language Model", *Artificial Intelligence and Statistics (AISTATS)*, 2018
3. Y. Pu, M. R. Min, **Z. Gan** and L. Carin "Adaptive Feature Abstraction for Translating Video to Text", *Proc. American Association of Artificial Intelligence (AAAI)*, 2018
4. **Z. Gan**, L. Chen, W. Wang, Y. Pu, Y. Zhang, H. Liu, C. Li and L. Carin "Triangle Generative Adversarial Networks", *Neural Information Processing Systems (NIPS)*, 2017
5. Y. Pu, W. Wang, R. Henao, L. Chen, **Z. Gan**, C. Li, and L. Carin "Adversarial Symmetric Variational Autoencoder", *Neural Information Processing Systems (NIPS)*, 2017
6. Y. Pu, **Z. Gan**, R. Henao, C. Li, S. Han and L. Carin "VAE Learning via Stein Variational Gradient Descent", *Neural Information Processing Systems (NIPS)*, 2017
7. Y. Zhang, D. Shen, G. Wang, **Z. Gan**, R. Henao and L. Carin "Deconvolutional Paragraph Representation Learning", *Neural Information Processing Systems (NIPS)*, 2017
8. **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**
9. 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
10. Y. Zhang, C. Chen, **Z. Gan**, R. Henao and L. Carin "Stochastic Gradient Monomial Gamma Sampler", *Int. Conf. Machine Learning (ICML)*, 2017
11. **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**
12. **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**
13. 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
14. **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
15. 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
16. 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**
17. Y. Zhang, **Z. Gan** and L. Carin "Generating Text via Adversarial Training", *NIPS Workshop*, 2016
18. 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
19. 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
20. J. Song, **Z. Gan** and L. Carin "Factored Temporal Sigmoid Belief Networks for Sequence Learning", *Int. Conf. Machine Learning (ICML)*, 2016
21. 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**
22. 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**
23. **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
24. R. Henao, **Z. Gan**, J. Lu and L. Carin "Deep Poisson Factor Modeling", *Neural Information Processing Systems (NIPS)*, 2015

25. **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
26. **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.

### 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	

### Professional Activities

**Journal Reviewer:** Transactions on Pattern Analysis and Machine Intelligence, Transactions on Knowledge and Data Engineering, IET Computer Vision

**Conference Reviewer:** CVPR 2018, NIPS 2016, AAAI 2016, IJCAI 2016, UAI 2016/2015

### Talks

- “Deep Generative Models for Vision and Language Intelligence”, *Ph.D. Final Defense*, Durham, NC, February 2018
- “Deep Generative Models for Vision and Language Intelligence”, IBM Thomas J. Watson Research Center, Yorktown, NY, October 2017
- “Deep Generative Models for Vision and Language Intelligence”, NVIDIA, Santa Clara, CA, September 2017
- “Deep Generative Models for Vision and Language Intelligence”, Apple, Cupertino, CA, September 2017
- “Learning Generic Sentence Representations Using Convolutional Neural Networks”, *EMNLP*, Copenhagen, Denmark, September 2017
- “Semantic Compositional Networks for Visual Captioning”, *CVPR*, Hawaii, July 2017
- “Semantic Compositional Networks for Visual Captioning”, *Ph.D. Preliminary Exam*, Durham, NC, April 2017
- “Deep Generative Models for Sequence Learning”, *Ph.D. Qualifying Exam*, Durham, NC, December 2015

### Software Skills

Python (Theano, Tensorflow), Matlab, R and C

### Awards

ECE Fellowship, Duke University, 2013

National Scholarship, Department of Minister of Education of China, 2010-2013.

### Graduate Coursework

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