Chunyuan Li

Researcher
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Research Interests

My PhD research focuses on the intersection of deep learning and Bayesian statistic — enriching one with each other: (1) **Bayesian Deep Learning**: Scalable Bayesian learning methods for the weight uncertainty of deep neural networks, e.g., SG-MCMCs (2) **Deep Bayesian Learning**: Deep neural networks as flexible representation methods in Bayesian models, e.g., GANs and VAEs. These tools have been applied to various domains, including computer vision, natural language processing and deep reinforcement learning etc.

Education

- **Duke University**, Durham, NC 09/2014 - 12/2018
  Ph.D., Electrical and Computer Engineering, GPA: 3.9/4.0.

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

- Concordia University, Montreal, Canada 09/2011 - 02/2013
  M.S., Information System Engineering, Concordia University Merit Award (top 0.5%)

- Huazhong University of Science and Technology, Wuhan, China 09/2007 - 06/2011
  B.S., Electrical Engineering, Excellent Undergraduate Thesis (top 1%)

Research Experiences

- **Microsoft Research**, Redmond, WA 09/2018 - present
  Researcher at MSR AI

- **Information Initiative at Duke (iiD)** 09/2014 - 08/2018
  Research assistant. Advisor: Prof. Lawrence Carin

  (*i*) Stochastic gradient MCMC algorithms, investigate their connections to Dropout, with applications to convolutional/recurrent networks and reinforcement learning
  (*ii*) Deep generative models, inclduing adversarial learning and variational inference

- **Uber AI Labs**, San Francisco, CA Summer, 2017
  Research Scientist Intern. Mentor: Jason Yosinski
  (*i*) Product: Prediction problems in self-driving cars
  (*ii*) Science: Subspace training of neural networks; one paper&patent

- **Adobe Research**, San Jose, CA Summer, 2016
  Data Scientist Intern. Mentors: H. Bui, M. Ghavamzadeh and G. Theocharous
  (*i*) Product: Recurrent neural networks for digital market forecasting; one patent filed
  (*ii*) Science: Investigation of Bayesian deep reinforcement learning

- **National Institute of Standards and Technology**, MD 09/2013 - 08/2014
  Guest researcher.
  Benchmarking 3D shape search techniques. Organized and participated shape retrieval contests in Eurographics 2014

- **Geometrica Group of INRIA Saclay**, France Summer, 2013
  Research intern. Mentors: Maks Ovsjanikov and Frederic Chazal

Developed algorithms for object recognition via topological persistence

- Concordia University, Montreal, Canada 09/2011 - 04/2013
  Research assistant. Advisor: A. Ben Hamza
  Worked on algorithms for deformable 3D shape analysis via spectral geometry
- ANKON International Summer, 2011
  Research intern.
  Developed novel online redundant image elimination algorithms for wireless capsule endoscopy
- Huazhong University of Science and Technology 2009 - 2011
  Research assistant. Advisor: Prof. Xiang Bai
  Worked on algorithms for 2D shape analysis and classification

Publications [Citations =1144, h-index = 19, i10-index=28]

Preprint

1. **C. Li**, K. Bai, J. Li, G. Wang, C. Chen, and L. Carin
   "Adversarial Learning of a Sampler Based on an Unnormalized Distribution"
2. S. Lobel*, **C. Li***, J. Gao, and L. Carin (* Equal contribution)
   "Ranking-Critical Training for Collaborative Filtering"
3. K. Liang, **C. Li**, G. Wang, and L. Carin
   "GAN Training is a Continue Learning Problem"
4. R. Zhang, **C. Li**, J. Zhang, A. Wilson, and C. Chen
   "Learning Multimodal Weight Uncertainty with Cyclical Stochastic Gradient MCMC"

Recent Refereed Journal and Conference

1. **C. Li**, C. Chen, Y. Pu, R. Henao and L. Carin
   "Communication-efficient Stochastic Gradient MCMC for Neural Networks"
   *AAAI Conference on Artificial Intelligence (***AAAI***)* 2019
2. **C. Li**, H. Farkhoor, R. Liu and J. Yosinski
   "Measuring the Intrinsic Dimension of Objective Landscapes"
   *International Conference on Learning Representations (***ICLR***)* 2018
3. C. Chen, **C. Li**, L. Chen, W. Wang, Y. Pu and L. Carin
   "Continuous-Time Flows for Efficient Inference and Density Estimation"
   *International Conference on Machine Learning (***ICML***)* 2018
4. R. Zhang, C. Chen, **C. Li**, and L. Carin
   "Policy Optimization as Wasserstein Gradient Flows"
   *International Conference on Machine Learning (***ICML***)* 2018
5. P. Chapfuwa, C. Tao, **C. Li**, C. Page, B. Goldstein, L. Carin, R. Henao
   "Adversarial Time-to-Event Modeling"
   *International Conference on Machine Learning (***ICML***)* 2018
6. G. Wang, **C. Li**, W. Wang Y. Zhang, D. Shen, X. Zhang, R. Henao and L. Carin
   "Joint Word and Label Embeddings for Text Classification"
   *Annual Meeting of the Association for Computational Linguistics (***ACL***)* 2018
7. D. Shen, G. Wang, W. Wang, M. Min, Q. Su, Y. Zhang, **C. Li**, R. Henao and L. Carin
   "On Simple Word-Embedding-Based Models and Associated Pooling Mechanisms"
   *Annual Meeting of the Association for Computational Linguistics (***ACL***)* 2018
8. R. Zhang, **C. Li**, C. Chen, and L. Carin
   "Learning Structural Weight Uncertainty for Sequential Decision-Making"
   *Artificial Intelligence and Statistics (***AISTATS***)* 2018

9. L. Chen, S. Dai, Y. Pu, **C. Li**, Q. Su, and L. Carin
"Symmetric Variational Autoencoder and Connections to Adversarial Learning"
Artificial Intelligence and Statistics (**AISTATS**) 2018
10. J. Lu, **C. Li**, J. Singh-Alvarado, Z. Zhou, F. Frohlich, R. Mooney and F. Wang
"MIN1PIPE: A Miniscope 1-photon-based Calcium Imaging Signal Extraction Pipeline"
Cell Report 2018 (Impact factor: 8.282)
11. **C. Li**, H. Liu, C. Chen, Y. Pu, L. Chen, R. Henao and L. Carin
"ALICE: Towards Understanding Adversarial Training for Joint Distribution Matching"
Neural Information Processing Systems (**NIPS**) 2017
12. 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
13. 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
14. 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
15. Z. Gan*, **C. Li***, C. Chen, Q. Su, Y. Pu, and L. Carin (* Equal contribution)
"Scalable Bayesian Learning of Recurrent Neural Networks for Language Modeling"
Annual Meeting of the Association for Computational Linguistics (**ACL**) 2017, **Oral**
16. Z. Gan, Y. Pu, R. Henao, **C. Li**, X. He and L. Carin
"Learning Generic Sentence Representations using Convolutional Neural Networks"
Empirical Methods on Natural Language Processing (**EMNLP**) 2017, **Oral**
17. Q. Su, X. Liao, **C. Li**, and Z. Gan, L. Carin
"Restricted Truncated Gaussian Graphical Models"
AAAI Conference on Artificial Intelligence (**AAAI**) 2017, **Oral**
18. **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**
19. **C. Li**, C. Chen, D. Carlson and L. Carin
"Preconditioned Stochastic Gradient Langevin Dynamics for Deep Neural Networks"
AAAI Conference on Artificial Intelligence (**AAAI**) 2016, **Oral**
20. **C. Li**, C. Chen, K. Fan and L. Carin
"High-Order Stochastic Gradient Thermostats for Bayesian Learning of Deep Models"
AAAI Conference on Artificial Intelligence (**AAAI**) 2016
21. C. Chen, N. Ding, **C. Li**, Y. Zhang and L. Carin
"Stochastic Gradient MCMC with Stale Gradients"
Neural Information Processing Systems (**NIPS**) 2016
22. Y. Pu, Z. Gan, R. Henao, Y. Xin, **C. Li**, A Stevens, and L. Carin
"Variational Autoencoder for Deep Learning of Images, Labels and Captions"
Neural Information Processing Systems (**NIPS**) 2016
23. K. Fan, **C. Li**, and K. Heller
"Hierarchical Graph-Coupled HMM with an Application to Influenza Infection"
AAAI Conference on Artificial Intelligence (**AAAI**) 2016
24. Y. Zhang, R. Henao, **C. Li** and L. Carin
"Bayesian Dictionary Learning with Gaussian Processes and Sigmoid Belief Networks"
Int. Joint Conference on Artificial Intelligence (**IJCAI**) 2016
25. 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**

26. Y. Pu, X. Yuan, A. Stevens, **C. Li** and L. Carin
"A Deep Generative Deconvolutional Image Model"
Artificial Intelligence and Statistics (**AISTATS**) 2016
27. D. Pickup, X. Sun, P. L. Rosin, R. R. Martin, **C. Li** *et al.*
"Shape Retrieval of Non-Rigid 3D Human Models",
Int. Journal of Computer Vision (**IJCV**) 2016
28. 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
29. B. Li, Y. Lu, **C. Li**, A. Godil, T. Schreck, *et al.*
"A Comparison of 3D Shape Retrieval Methods: A Benchmark with Multimodal Queries",
Computer Vision and Image Understanding (**CVIU**) 2015
30. **C. Li**, M. Ovsjanikov and F. Chazal
"Persistence-based Structural Recognition"
Computer Vision and Pattern Recognition (**CVPR**) 2014
31. Z. Ren, J. Yuan, **C. Li** and W. Liu
"Minimum Near-Convex Decomposition for Shape Representation"
International Conference on Computer Vision (**ICCV**) 2011
32. **C. Li** and A. Ben Hamza
"Spatially Aggregating Spectral Descriptors for Non-Rigid 3D Shape Retrieval: A Comprehensive Comparison", *Multimedia Systems*, 2014
33. **C. Li** and A. Ben Hamza
"Symmetry Discovery and Retrieval of Nonrigid 3D Shapes using Geodesic Skeleton Paths",
Multimedia Tools and Applications, 2014
34. **C. Li** and A. Ben Hamza
"A Multi-Resolution Descriptor for Deformable 3D Shape Retrieval",
Visual Computer (Computer Graphics International, AR = 18%), 2013

Patents

"Metric Forecasting Employing a Similarity Determination in a Digital Medium Environment"
C. Li, H. Bui, M. Ghavamzadeh and G. Theocharous, *Filed in March, 2017*

"Compressing Neural Networks while Remaining a High Degree of Accuracy"
Jason. Yosinski, **C. Li**, J. Clune, K. Stanley and Zoubin Ghahramani, *Submitted, 2017*

Teaching Experiences

Teaching assistant. Besides grading and office hours, I am honored to give the following lectures.

STA571 Machine Learning: Design discussion material and lead the discussion lecture every week

ECE681 Pattern Classification: Guest Lecture on *Introduction to Deep Neural Networks*

Academic Activities

Reviewer: NIPS 2018/2016, ICML 2019/2018, ICLR 2019/2018, CVPR 2019/2018, ACL 2018, AISTATS 2019/2018, AAAI 2019/2018, ACCV 2018, Computer Vision and Image Understanding, Pattern Recognition, IEEE Transactions on Neural Networks and Learning Systems

Organizer: Two SHREC 3D shape retrieval contests in *Eurographics workshop on 3DOR* 2014

Talks

- "Towards Better Representations with Deep/Bayesian Learning"
Salesforce Research, Palo Alto, January 2018
IBM Watson Research Center, Boston & Yorktown, April 2018
Microsoft Research, Redmond, June 2018
Google, Mountain View, August 2018

- "Scalable Bayesian Learning of Recurrent Neural Networks for Language Modeling" *ACL*, Vancouver, Canada, August 2017
- "Scalable Bayesian Methods for Deep Learning", OpenAI, San Francisco, Feb. 2017
- "Learning Weight Uncertainty with Stochastic Gradient MCMC for Shape Classification" *Computer Vision and Pattern Recognition*, Las Vegas, NV, June 2016
- "Preconditioned Stochastic Gradient Langevin Dynamics for Deep Neural Networks" *AAAI Conference on Artificial Intelligence*, Phoenix, AZ, Feb. 2016
- "Large-scale Comprehensive 3D Shape Retrieval" *Eurographics workshop on 3DOR*, Strasbourg, France, April 2014

Software Skills

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