

Pengyu Cheng

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Research Interests

I am a fourth-year Ph.D. student in the Department of Electric and Computer Engineering at Duke University. My research interests focus on generative models, Bayesian deep learning, geometric deep learning, and their applications in natural language processing and speech processing.

Education

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| Duke University <i>Ph.D. Student, Electrical and Computer Engineering</i> | 08/2017 – Present |
| Tsinghua University <i>B.S., Mathematics and Statistics</i> | 08/2013 – 07/2017 |

Experience

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| Information Initiative at Duke (iiD) <i>Research Assistant</i> Bayesian deep learning, geometric deep learning, and their applications in natural language processing. | 08/2017 – Present <i>Adviser: Lawrence Carin</i> |
| Microsoft Cloud and AI <i>Research Internship</i> Improving self-supervised multi-view contrastive learning with learnable data augmentations. | 06/2020 – 08/2020 <i>Mentor: Jingjing Liu</i> |
| NEC Laboratories America <i>Research Internship</i> Improving disentangled text representation learning with information-theoretic guidance. | 05/2019 – 08/2019 <i>Mentor: Martin Renqiang Min</i> |
| Tsinghua Intelligent Vision Group (IVG) <i>Student Researcher</i> Deep metric learning for person re-identification based on sequential frames information. | 03/2016 – 07/2016 <i>Adviser: Jiwen Lu</i> |
| Student Research Program at Tsinghua <i>Student Researcher</i> Non-parametric k-sample tests with statistics based on local maximum energy distance. | 11/2015 – 05/2017 <i>Adviser: Xuegong Zhang</i> |
| Sogou Map Rendering Group <i>Research Internship</i> Automatic smoothing and compression for polygonal line-like city road data. | 08/2014 – 09/2014 <i>Mentor: Mao Wang</i> |

Publications

- P. Cheng, W. Hao, S. Dai, J. Liu, Z. Gan, and L. Carin, “CLUB: A Contrastive Log-ratio Upper Bound of Mutual Information”, International Conference on Machine Learning (ICML), 2020
- P. Cheng, M. Min, D. Shen, C. Malon, Y. Zhang, Y. Li and L. Carin, “Improving Disentangled Text Representation Learning with Information-Theoretic Guidance”, Annual Meeting of the Association for Computational Linguistics (ACL), 2020
- P. Cheng, Y. Li, X. Zhang, L. Chen, D. Carlson, L. Carin, “Dynamic Embedding on Textual Networks via a Gaussian Process”, American Association of Artificial Intelligence (AAAI), 2020 **Oral**

- **P. Cheng***, D. Shen*, D. Sundararaman, X. Zhang, Q. Yang, M. Tang, A. Celikyilmaz, and L. Carin, "Learning Compressed Sentence Representations for On-Device Text Processing", Annual Meeting of the Association for Computational Linguistics (ACL), 2019 **Oral**
- L. Chen, G. Wang, C. Tao, D. Shen, **P. Cheng**, X. Zhang, W. Wang, Y. Zhang, and L. Carin, "Improving Textual Network Embedding with Global Attention via Optimal Transport", Annual Meeting of the Association for Computational Linguistics (ACL), 2019
- C. Liu, J. Zhuo, **P. Cheng**, R. Zhang, J. Zhu, and L. Carin, "Understand and Accelerate Particle-based Variational Inference", International Conference on Machine Learning (ICML), 2019
- **P. Cheng**, C. Liu, C. Li, D. Shen, H. Ricardo, and L. Carin, "Straight-Through Estimator as Projected Wasserstein Gradient Flow", Neural Information Processing Systems (NeurIPS) Workshop, 2018 **Spotlight**

Technical Reviewer

Conference: AAAI 2020; NeurIPS 2020; ICML 2020; AAAI 2021; ICLR 2021

Journal: IEEE Trans. Signal Process 2020

Academic Activities

- Oral Presentation at AAAI 2020 02/2020
- Teaching assistant for *Probabilistic Machine Learning*, Instructor: Sayan Mukherjee, Ph.D. 01/2020
- Teaching assistant for *Introduction to Deep Learning*, Instructor: Vahid Tarokh, Ph.D. 09/2019
- Oral Presentation at ACL 2019 07/2019
- Spotlight talk at NeurIPS 2019 Bayesian Deep Learning workshop 12/2018

Awards

- Fellowship of Electrical and Computer Engineering at Duke 08/2017
- First in Duke-Tsinghua Machine Learning Summer School (1/112) 08/2017
- Academic Excellence Award of Tsinghua University (top 30%) 10/2014
- Top 5 in the 18-th "Sogou Cup" Artificial Intelligence Programming Contest (5/200) 04/2014
- Silver medal in the 28-th Chinese Mathematical Olympiad (CMO) 01/2013
- First Prize in Chinese National Olympiad in Informatics in Provinces (NOIP) 11/2012

Technical Strengths

Computer Languages : Python (Tensorflow, Pytorch), R, C/C++

Software & Tools : LaTeX, Emacs, Mathematica, MATLAB, Excel, Markdown

Graduate Courses

Theoretical : Random Signals and Noise; Information Theory; Multivariate Statistical Analysis; Stochastic Processes; Compressed Sensing;

Engineering : Programming, Data Structure and Algorithms in C++; Pattern Recognition; Machine Learning; Text Data Analysis; Scalable Reinforcement Learning;