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

Duke University 08/2017 – Present
Ph.D. Student, Electrical and Computer Engineering

Tsinghua University 08/2013 – 07/2017
B.S., Mathematics and Statistics

Experience

Information Initiative at Duke (iiD) 08/2017 – Present
Research Assistant *Adviser: Lawrence Carin*
Bayesian deep learning, geometric deep learning, and their applications in natural language processing.

Microsoft Cloud and AI 06/2020 – Present
Research Internship *Mentor: Jingjing Liu*
Improving self-supervised multi-view contrastive learning with learnable data augmentations.

NEC Laboratories America 05/2019 – 08/2019
Research Internship *Mentor: Martin Renqiang Min*
Improving disentangled text representation learning with information-theoretic guidance.

Tsinghua Intelligent Vision Group (IVG) 03/2016 – 07/2016
Student Researcher *Adviser: Jiwen Lu*
Deep metric learning for person re-identification based on sequential frames information.

Student Research Program at Tsinghua 11/2015 – 05/2017
Student Researcher *Adviser: Xuegong Zhang*
Non-parametric k-sample tests with statistics based on local maximum energy distance.

Sogou Map Rendering Group 08/2014 – 09/2014
Research Internship *Mentor: Mao Wang*
Automatic smoothing and compression for polygonal line-like city road data.

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

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;