

Yuxuan Song

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Education

Shanghai Jiao Tong University

Shanghai, China

Sep. 2013-Mar. 2020

- Bachelor and Master of Science in Computer Science and Technology
- Research Assistant, Apex Data and Knowledge Management Lab
- Advised by Prof. Yong Yu and Prof. Weinan Zhang.

Research Interests

My research is centered on deep unsupervised learning, with various applications on **generative modeling** and **representation learning**. Currently, I focus on applications on discrete and structured data settings such as **natural language processing** (*e.g.*, text generation and representation) and **computational biology** (*e.g.*, molecular generation for drug discovery).

Publications

- W. Shi*, **Y. Song***, H. Zhou, L. Li. Learning from Deep Model via Exploring Local Targets. Accepted at European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (**ECML/PKDD**), 2021.
- **Y. Song**, L. Yu, Z. Cao, Z. Zhou, J. Shen, S. Shao, W. Zhang and Y. Yu. Improving Domain Adaptation with Variational Information Bottleneck. In Proceedings of 24th European Conference on Artificial Intelligence, (**ECAI**), 2020.
- **Y. Song**, N. Miao, H. Zhou, L. Yu and L. Li. Improving Maximum Likelihood Training for Text Generation with Density Ratio Estimation. In Proceedings of 23rd International Conference on Artificial Intelligence and Statistics (**AISTATS**), 2020.
- **Y. Song**, M. Xu, L. Yu, H. Zhou, S. Shao and Y. Yu. Infomax Neural Joint Source-Channel Coding via Adversarial Bit Flip. In Proceedings of 34th AAAI Conference on Artificial Intelligence (**AAAI**), 2020.
- **Y. Song**, H. Cai, K. Ren, W. Zhang and Y. Yu. Volume Ranking and Sequential Selection in Programmatic Display Advertising. In Proceedings of the 26th ACM International Conference on Information and Knowledge Management (**CIKM**), 2017
- N. Miao, **Y. Song**, H. Zhou and L. Li. Do You Have the Right Scissors? Tailoring Pre-trained Language Models via Monte-Carlo Methods. In Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics (**ACL**), 2020
- Z. Zhou, J. Liang, **Y. Song**, L. Yu, H. Wang, Z. Zhang, W. Zhang and Y. Yu. Lipschitz Generative Adversarial Nets. In Proceedings of 36th International Conference on Machine Learning (**ICML**), 2019
- G. Lu, Z. Zhou, **Y. Song**, K. Ren and Y. Yu. Guiding the One-to-one Mapping in CycleGAN via Optimal Transport. In Proceedings of the 33rd AAAI Conference on Artificial Intelligence (**AAAI**), 2019
- Z. Zhou, H. Cai, S. Rong, **Y. Song**, K. Ren, W. Zhang, Y. Yu and J. Wang. Activation Maximization Generative Adversarial Nets. In Proceedings of the 6th International Conference on Learning Representations (**ICLR**), 2018

Manuscripts

- Z. Zhou, **Y. Song**, J. Liang, L. Yu, H. Wang, Z. Zhang, W. Zhang and Y. Yu. Understanding the Effectiveness of Lipschitz Constraint in Training GANs via Gradient Analysis. Technical report. arXiv preprint arXiv:1807.00751, 2018.
- **Y. Song**, M. Xu, Q. Ye, T. Liu. Discriminator Contrastive Divergence: Semi-Amortized Generative Modeling by Exploring Energy of the Discriminator. Technical report. arXiv preprint arXiv:2004.01704, 2020.

Experience

Bytedance AI lab

Shanghai, China

Researcher and Engineer advised by Dr. Hao Zhou and Dr. Lei Li, MLNLC team.

Mar. 2020- Now

- Works on learning neural generative models on large-scale discrete and structured data.
 - **Boosting the Diversity and Quality Trade-off in Neural Text Generation.**
 - Proposed to improve Maximum-Likelihood-Estimation(MLE) training for text generation by likelihood-free importance sampling, where the likelihood ratio is estimated by **Bregmann divergence** minimization.
 - Advanced all previous methods in both quality and diversity.
 - **Efficient Knowledge Transfer between Different Network Architectures**
 - Proposed a simple yet effective method to project the training signal on the student's function space which could be surprisingly viewed as a variant of **mirror decent**.
 - Achieved the state-of-the-art performance in various image and text classification tasks.
 - **Advanced Sampling Strategy for Large-scale Language Model**
 - Addressed the density under-estimation and over-estimation phenomenon with a simple two-step tuning.
 - Proposed a new sampling algorithm called Early Rejection Sampling to both improve and accelerate the sampling procedure in GPT-2.

Apex Data and Knowledge Management Lab

Shanghai, China

Student Researcher advised by Dr. Weinan Zhang and Prof. Yong Yu.

Aug. 2016-Mar. 2020

- Worked on exploring deep neural networks as flexible representation methods in Bayesian models.
 - **Understanding the Unstability in GANs: No Divergence Minimization is Needed**
 - Provided theoretical analysis and proof on the effect of the **Lipschitz** constraint in GAN.
 - Proposed a new family of objective functions, and conduct experiments to prove the superiority.
 - **Information Theoretic Method for Domain Adaptation**
 - Developed a novel approach to unsupervised domain adaptation by leveraging the combination of cluster assumption and **information bottleneck** principle.
 - Demonstrated that the model achieves state-of-the-art on several visual domain adaptation benchmarks.
 - **Lossless and Lossy Compression with Latent Variable Model**
 - Proposed a new coding scheme for the sequential latent variable models based on **bits-back** coding.
 - Proposed a solution for joint source channel coding by variational mutual information maximization.
 - Advanced the previous work on coding with latent variable model by a lower compression rate.
 - **Top Optimization and Sequential Selection in Computational Advertising**
 - Developed a new ranking algorithm to focus on the top ranked items by strategic sampling methods.
 - Designed a reinforcement learning model for the sequential selection scenario in online advertising.
 - Elevated baselines through 7-day A/B test and acquired more stable click numbers and profits.

Honors and Awards

- Huawei Scholarship. 2018
- CIKM'17/SIGIR Student Travel Grant. 2017
- Shanghai Jiao Tong University Outstanding Graduate. 2017
- Shanghai Jiao Tong University Excellent Scholarship. 2014&2015&2016

- **The First Prize in National Mathematical Olympiad in Senior.** 2012

Academic Services

- **Conference Reviewer:** NeurIPS 2020, AAAI 2021, EMNLP 2021, NeurIPS 2021, AAAI 2022.

Skill Set

- **Machine Learning API:** Tensorflow, Pytorch
- **English Proficiency:** TOEFL 105(R30, L25, S23, W27), GRE 325(V156, Q169, W3.5)