Ziyu WANG

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RESEARCH INTEREST

I work in machine learning with an emphasis on challenges with novel and low-information environments. To this end, I have worked on *predictive uncertainty quantification* and *distribution shift* problems, where I designed theoretically grounded, Bayes-inspired methods which have been successfully applied to real-world problems.

I am also generally interested in probabilistic machine learning and Bayesian statistics, and have contributed to topics such as *generative modelling, causal inference* and *frequentist theory of Bayesian models*.

EDUCATION AND TRAINING

Sep 2023 - Current	Postdoctoral Researcher, Department of Statistics, **University of Oxford** Advisor: Prof. Chris Holmes
Aug 2018 - June 2023	Ph.D. in Computer Science and Technology, **Tsinghua University** Advisor: Prof. Jun Zhu and Prof. Bo Zhang
Aug 2014 - July 2018	B.Eng. in Computer Science and Technology, **Tsinghua University** GPA: 93/100 (rank 3/152). Minor: Statistics

EXPERIENCES

June 2020 - Oct 2020	**AWS Shanghai AI Lab**, Applied Scientist Intern Worked with Dr. David Wipf to analyze the use of generative models for unsupervised domain alignment (publication [4]). Also worked on Bayesian uncertainty for graph neural network models.
Sep 2019 - Dec 2019	**Microsoft Research Asia**, Research Intern Worked with Dr. David Wipf to analyze Analyzed variational and Bayes-inspired learning objectives for auto-encoders and the use of deep generative models in outlier detection; see publications [5], [6].
Feb 2018 - Sep 2018	**Ant Financial**, R&D Intern Worked on topic modeling for a real-world downstream task. Proposed a spectral regularizer for neural topic models which significantly improved downstream task performance as well as interpretability.

PUBLICATIONS

Conference Papers

[1] Ziyu Wang*, Binjie Yuan*, Jiaxun Lu, Bowen Ding, Yunfeng Shao, Qibin Wu, Jun Zhu. A Constrained Bayesian Approach for Out-of-Distribution Prediction. In *Conference on Uncertainty in Artificial Intelligence* (UAI), 2023.

[2] Ziyu Wang, Yuhao Zhou, Jun Zhu. Fast Instrument Learning with Faster Rates. In *Conference on Neural Information Processing Systems* (NeurIPS), 2022.

[3] Ziyu Wang*, Yuhao Zhou*, Tongzheng Ren, Jun Zhu. Scalable Quasi-Bayesian Inference for Instrumental Variable Regression. In *Conference on Neural Information Processing Systems* (NeurIPS), 2021.

[4] Qipeng Guo, Zhijing Jin, Ziyu Wang, Xipeng Qiu, Weinan Zhang, Jun Zhu, Zheng Zhang, David Wipf. Fork or Fail: Cycle-Consistent Training with Many-to-One Mappings. In *International Conference on Artificial Intelligence and Statistics* (AISTATS), 2021.

[5] Ziyu Wang, Bin Dai, David Wipf, Jun Zhu. Further Analysis of Outlier Detection with Deep Generative Models. In *Conference on Neural Information Processing Systems* (NeurIPS), 2020.

[6] Bin Dai, Ziyu Wang, David Wipf. The Usual Suspects? Reassessing Blame for VAE Posterior Collapse. In *International Conference on Machine Learning* (ICML), 2020.

[7] Ziyu Wang, Shuyu Cheng, Yueru Li, Jun Zhu, Bo Zhang. A Wasserstein Minimum Velocity Approach to Learning Unnormalized Models. In *International Conference on Artificial Intelligence and Statistics* (AISTATS), 2020.

[8] Ziyu Wang, Tongzheng Ren, Jun Zhu, Bo Zhang. Function Space Particle Optimization for Bayesian Neural Networks. In *International Conference on Learning Representations* (ICLR), 2019.

Preprints and Workshop Abstracts

[9] Ziyu Wang, Chris Holmes. On Uncertainty Quantification with Near-Bayes Optimal Algorithms. *arXiv preprint arXiv:2403.19381*.

[10] Fabian Falck*, Ziyu Wang*, Chris Holmes. Are Large Language Models Bayesian? A Martingale Perspective on In-Context Learning. In *ICLR Workshop on Secure and Trustworthy Large Language Models* (SeT LLM @ ICLR), 2024.

[11] Ziyu Wang, Yucen Luo, Yueru Li, Jun Zhu, Bernhard Schölkopf. Spectral Representation Learning for Conditional Moment Models. *arXiv preprint arXiv:2210.16525*.

[12] Ziyu Wang, Yuhao Zhou, Ruqi Zhang, Jun Zhu. On Equivalences between Weight and Function-Space Langevin Dynamics. In *NeurIPS Workshop on Understanding Deep Learning Through Empirical Falsification* (ICBINB @ NeurIPS), 2022.

Awards and Honors

2019	Travel Award, ICLR 2019
2016	Department Scholarship for Academic Excellence
2015	9miao Scholarship for Academic Excellence
2014	Outstanding Freshman Award
2014	2nd Place, the 2014 ACM-ICPC Asia Guangzhou Regional Contest
2013	Gold Medal, National Olympiad in Informatics

Professional Services

Reviewer / PC Member

- NeurIPS (2019-), ICLR (2020-), ICML (2020-), AAAI (2022-), JMLR (2022-), TMLR (2022-)

- NeurIPS 2021 Workshop on Deep Generative Models and Downstream Applications

Skills

- Python (JAX, Tensorflow), LaTeX, R, C/C++, Java, Haskell, OCaml, HTML/CSS

- Language: English, Chinese