Zhe Zeng | Curriculum Vitae

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EDUCATION

University of California, Los Angeles (UCLA)   **Los Angeles, CA**
Ph.D. Student in Computer Science, Advisor: Guy Van den Broeck   *Sept. 2018 – Jun. 2023 (Expected)*
Focused on Artificial Intelligence and Machine Learning

Ohio State University   **Columbus, OH**
Exchange Student in Mathematics   *Aug. 2016 – Dec. 2016*

Zhejiang University   **Hangzhou, China**
Bachelor of Science in Mathematics with honors   *Sept. 2014 – Jul. 2018*

RESEARCH INTERESTS

My research interests lie in the intersection of machine learning (*tractable probabilistic modeling, statistical relational learning, graphical models, Bayesian deep learning, kernel and non-parametric methods*) and formal methods. The goal of my research is to combine probabilistic and formal verification techniques to enable AI systems to efficiently and reliably learn and infer from noisy, structured, and mixed discrete-continuous data.

WORK EXPERIENCE

Yahoo Research   **New York, NY, USA**
Research Scientist Intern | Team: Scalable Machine Learning Group   *Jun. 2021 - Sept. 2021*
o *Deep-learning based Click-through Rate Prediction:* developed a neural-network based framework to learn from aggregated feedback for click-through rate prediction tasks; schemed for updating the cohort functions in a one-shot learning way as well as in a multi-shot learning way using ideas from boosting.

RESEARCH EXPERIENCE

UCLA StarAI Lab   **Los Angeles, CA, USA**
Graduate Student Researcher | Advisor: Prof. Guy Van den Broeck   *Sept. 2018 – Present*
o *Hybrid Probabilistic Inference under Algebraic Constraints:* performed efficient exact inference on probabilistic relational models defined on hybrid domains with logical and numeric constraints, by proposing state-of-the-art weighted model integration solvers.
o *RCR-based Approximate Probabilistic Inference:* proved the hardness of hybrid probabilistic inference under constraints and proposed a relax-compensate-recovery based approximate solver that achieves the state-of-the-art performance.
o *Learning Hybrid Constrained Models:* proposed an efficient parameter learning algorithm for learning weight functions of hybrid probabilistic models with algebraic constraints via weighted model integration solvers.
o *Kernel-method based Tractable Probabilistic Inference:* proposed black-box importance sampling for graphical models by leveraging the tractable probabilistic circuits to allow efficient computation of Kernelized Stein Discrepancy.

Dartmouth College   **Hanover, NH, USA**
Undergrad Research Intern | Advisor: Prof. Qiang Liu   *Summer 2017*
o *Stein-method based Variational Inference:* proposed a novel distributed inference algorithm for continuous graphical models by extending Stein variational gradient descent to leverage local kernel functions.
o *Subset Selection:* proposed Stein lower bound for estimating Bayesian optimal risk with guarantees on finite-sample confidence bounds, and applied the Stein lower bound to subset selection tasks on probabilistic graphical models.

PUBLICATIONS

[1] Wenzhe Li, **Zhe Zeng**, Antonio Vergari, and Guy Van den Broeck. Tractable computation of expected kernels. In *Proceedings of the 37th Conference on Uncertainty in Aritifical Intelligence (UAI)*, 2021.
[2] **Zhe Zeng**, Paolo Morettin, Fanqi Yan, Antonio Vergari, and Guy Van den Broeck. Is parameter learning via weighted model integration tractable? In *Proceedings of the UAI Workshop on Tractable Probabilistic Modeling (TPM)*, 2021.
[3] **Zhe Zeng**, Paolo Morettin, Fanqi Yan, Antonio Vergari, and Guy Van den Broeck. Probabilistic inference with algebraic constraints: Theoretical limits and practical approximations. In *Advances in Neural Information Processing Systems (NeurIPS)*, 2020. ***Spotlight presentation, acceptance rate 280/9454 = 2.96%***.

[4]   **Zhe Zeng**, Paolo Morettin, Fanqi Yan, Antonio Vergari, and Guy Van den Broeck. Scaling up hybrid probabilistic inference with logical and arithmetic constraints via message passing. In *Proceedings of the 37th International Conference on Machine Learning (ICML)*, 2020.

[5]   **Zhe Zeng**, Paolo Morettin, Fanqi Yan, Antonio Vergari, and Guy Van den Broeck. Relax, compensate and then integrate. In *Proceedings of the ECML-PKDD Workshop on Deep Continuous-Discrete Machine Learning (DeCoDeML)*, 2020.

[6]   **Zhe Zeng**, Fanqi Yan, Paolo Morettin, Antonio Vergari, and Guy Van den Broeck. Hybrid probabilistic inference with logical constraints: Tractability and message-passing. In *Workshop on Knowledge Representation & Reasoning Meets Machine Learning at Neural Information Processing Systems (NeurIPS)*, 2019.

[7]   **Zhe Zeng** and Guy Van den Broeck. Efficient search-based weighted model integration. In *Proceedings of the 35th Conference on Uncertainty in Artificial Intelligence (UAI)*, 2019.

[8]   Dilin Wang, **Zhe Zeng**, and Qiang Liu. Stein variational message passing for continuous graphical models. In *Proceedings of the 36th International Conference on Machine Learning (ICML)*, 2018.

SELECTED AWARDS

The NEC Student Research Fellowship	2021
Excellent Graduate, Zhejiang University	2018
First-Class Scholarship for Elite Students in Basic Sciences, Zhejiang University	2016

TALKS & PRESENTATIONS

Tractable Computation of Expected Kernels by Circuits
Yahoo Research Seminar, Apr. 2021

Tractable Computation of Expected Kernels by Circuits
The Alan Turing Institute, Apr. 2021

Probabilistic Inference with Algebraic Constraints: Theoretical Limits and Practical Approximations
NeurIPS, Dec. 2020

Scaling up Hybrid Probabilistic Inference with Logical and Arithmetic Constraints
ICML, Jul. 2020

Stein variational message passing for continuous graphical models
ICML, Jul. 2018

SERVICES

Program Committees / Reviewers for *ICLR 2022*; *UAI 2021*; *IJCAI 2021*; *ICML 2020, 2021*; *AISTATS 2020, 2021*; *NeurIPS 2020, 2021*; *AAAI 2020, 2021*

Teaching Assistant for Fundamentals of Artificial Intelligence, CS161 at UCLA, Fall 2020

MENTORING

Fanqi Yan (Master at CAS, now PhD student at UT Austin)
Wenzhe Li (Undergrad at Tsinghua University, now PhD student at Tsinghua University)

SKILLS

Programming Languages Python, Matlab, C++, Julia, LaTeX
Framework TensorFlow, PyTorch, Scikit-learn, Numpy