Jitian Zhao
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Education

University of Wisconsin-Madison — Madison, WI
Ph.D. in Statistics; GPA: 3.91 — *Sep. 2020 – Present*
Master of Science in Data Science; GPA: 4.00 — *Aug. 2019 – May. 2020*
Visiting Student; GPA: 4.00 — *Aug. 2018 – May. 2019*

Zhejiang University — Hangzhou, China
Bachelor of Science in Statistics; GPA: 3.71 — *Aug. 2015 – Jun. 2019*

Work and Research Experience

Amazon Alexa AI — Bellevue, WA
Applied Scientist Intern — *May 2023 - Aug 2023*

- **Multimodal vector search system:** Designed and implemented a vector search system efficiently retrieves multimodal data include texts, images, and videos. Conducted comprehensive evaluation on embedding models, assessed effectiveness of indexing methods and indexing platforms. Built an interactive API capable of searching million-level database in milliseconds.
- **LLM-augmented search system:** Developed a two-stage search method incorporating LLM to facilitate searches based on user-defined metrics and semantic relevance. Experimented with large language models on prompt engineering, model finetuning and structure editing. Designed human feedback mechanism for system updates.

Amazon Alexa AI — Bellevue, WA
Applied scientist intern — *May 2022 - Sep 2022*

- **Cascading multi-task language model:** Proposed a novel transformer-based cascading multi-task learning framework for intent detection and slot filling. Achieved 30% relative accuracy increase over traditional MTL language models in easy-to-hard cascading dataset. Extended the proposed framework to multi-task problem with complicated task dependencies.
- **Applications:** Improved labeling efficiency using Cascade MTL model with adaptive label hints based on previous task label selection. Increased labeling accuracy with high-quality model predictions.

Improving Zero-shot Classification via Optimal Transport — Madison, WI
Advised by Prof. Fred Sala — *Sep. 2023 - Present*

- **De-biasing pre-trained foundation models:** Proposed a light-weight post-processing algorithm to offset foundation model bias inherited from training corpus. Applied algorithm to multiple datasets and showed significant improvements in foundation models' zero-shot classification performance.
- **Theoretical guarantee:** Developing theoretical guarantee on finite sample estimation.

Hierarchical Clustering in Directed Graphs — Madison, WI
Advised by Prof. Karl Rohe — *Apr 2023 - Present*

- **Co-factor problem:** Studies a novel problem of discovering latent hierarchy in directed graphs with asymmetric input-output attributes and different sending-receiving behaviours.
- **Consensus hierarchy recovering algorithm:** Developed algorithms to recover consensus latent hierarchical clusters for both sending and receiving nodes. Applying algorithm to real and synthetic datasets. Studying theoretical guarantees and convergence for the proposed method.

Publications

- N. Roberts, X. Li, D. Adila, S. Cromp, T. Huang, **J. Zhao**, and F. Sala, "Geometry-Aware Adaptation for Pretrained Models," in Neural Information Processing Systems (NeurIPS), 2023.
- S. Raschka, **J. Zhao**. Chapter 16: Transformers–Improving Natural Language Processing with Attention Mechanisms, Machine Learning with PyTorch and Scikit-Learn. Birmingham, UK: Packt Publishing, 2022. ISBN: 978-1801819312

Programming Skills

- **Software:** Proficient in Python and R, experienced in SQL, Matlab and C
- **Packages:** Pytorch, Transformers, Networkx, Geomstats, Pandas, Numpy