

TIANSHENG WEN

☎ (+86)187-022-07309 ✉ neilwen987@gmail.com 🎓 Google Scholar

Education

Xidian University

Master of Information and Telecommunication Engineering. Advised by Prof. Bo Chen

Sep. 2023 – Present

Xi'an, China

Xidian University

Bachelor of Electronic Information Engineering

Sep. 2019 – Jun. 2023

Xi'an, China

- GPA: 3.8/4.0

Looking for PhD in 26 Fall !!!

Research Interests

My primary research goal is to solve practical problems or to provide inspiration for future study and develop methods that are accessible, scalable and effective. Recently, I have been concentrating on developing trustworthy algorithms, learning disentangled representations, and optimizing preference alignment. Specifically, I am interested in or working in the following subjects:

- Trustworthy unsupervised algorithms for large-scale data.
- Disentangled Representation Learning and its applications.
- Generative models and their applications on downstream tasks.
- Topic Models and Bayesian probabilistic models.

Projects

Beyond Matryoshka: Revisiting Sparse Coding for Adaptive Representation

2024.07 - 2025.02

- Propose sparse coding as an alternative approach to adaptive representation learning and demonstrate its numerous advantages over Matryoshka Representation Learning in terms of fidelity, retrieval cost, and training cost.
- Combine a task-specific sparse contrastive learning loss with a reconstructive loss to maintain overall embedding quality, improving performance across different tasks like classification and retrieval.
- Validate our method's effectiveness across real-world domains and benchmarks (Imagnet classification, MTEB text benchmark, MultiModal Retrieval), where it achieves competitive performance against heavily trained state-of-the-art MRL models with significantly lower computational costs.

Contrastive Factor Analysis

2024.03 - 2024.06

- Extend traditional Bayesian Factor Analysis with unsupervised method, leading to improved performance on downstream tasks as well as out-of-distribution (OOD) tasks compared with contrastive learning methods.
- More disentangled feature representation by incorporating the gamma distribution, which enhances the clarity and separability of latent factors in the data.
- Provide uncertainty estimation on extensive unlabeled data, resulting in a trustworthy unsupervised learning algorithm.

A Non-negative VAE: the Generalized Gamma Belief Network

2023.09 - 2024.02

- Gamma distribution outperforms the Gaussian distribution in modeling dense data. Exploring the Gamma distribution's capabilities results in smaller NLL values and reduced FID scores compared to Gaussian-based VAE models
- Achieved more disentangled latent representation without hurting reconstruction performance.
- Designed the Weibull variational upward-downward inference network to approximate the posterior of gamma latent variables.

Publications (*) denotes equal contribution

Under review

- **Tiansheng Wen***, Yifei Wang*, Zequn Zeng, Zhong Peng, Xinyang Liu, Bo Chen, Stefanie Jegelka, Chenyu You
Beyond Matryoshka: Revisiting Sparse Coding for Adaptive Representation
- Zhibin Duan*, **Tiansheng Wen***, Yifei Wang, Chen Zhu, Bo Chen, Mingyuan Zhou
Contrastive Factor Analysis
- Zhibin Duan, **Tiansheng Wen**, Muyao Wang, Bo Chen, QuChunhui, Mingyuan Zhou
A Non-negative VAE: the Generalized Gamma Belief Network