Tiansheng Wen

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Homepage: https://neilwen987.github.io/

EDUCATION

Xidian University ***Xi'an, China***

M.S. in Information and Telecommunication Engineering *Sept. 2023 - present*

Advisor : Prof. Bo Chen

Overall GPA: 3.8 / 4.0

Research Focus: Sparsity, Interpretability, Uncertainty Estimation, Probabilistic Machine Learning

Xidian University ***Xi'an, China***

Bachelor in Electronic Engineering *Sept. 2019 - Jul. 2023*

Advisor : Prof. Bo Chen

Overall GPA: 3.8 / 4.0; Rank: 31/342

Stony Brook University ***NY, United States***

Research Intern *Jul. 2024 - present*

Advisor : Prof. Chenyu You

RESEARCH INTERESTS

My primary research goal is to develop **efficient, reliable, and scalable** methods for machine learning and generative AI, with a particular focus on sparsity, disentangled representation learning, and the intrinsic interpretability of foundation models—including LLMs, VLMs, and diffusion models. I am also interested in the memorization effects in foundation models, especially at the intersection of cognitive science and machine learning.

PUBLICATION(* EQUAL CONTRIBUTION)

Beyond Matryoshka: Revisiting Sparse Coding for Adaptive Representation

Oral Presentation *ICML 2025* ***Github repo 70+ stars***

Tiansheng Wen*, Yifei Wang*, Zequn Zeng, Xinyang Liu, Bo Chen, Hongwei Liu, Stefanie Jegelka, Chenyu You

- With sparse autoencoders + sparse contrastive learning, we can compress SOTA text/image/multi-modal embedding models from 2k/4k dimensions to 16 active dimensions with: 100x faster at large-scale retrieval, minimal degradation (eg <3% acc drop on ImageNet), and extreme low cost by training an MLP head with 1-2 hours on a single GPU

Explaining Domain Shifts in Language: Concept erasing for Interpretable Image Classification

CVPR 2025

Zequn Zeng, Yudi Su, Jianqiao Sun, **Tiansheng Wen**, Hao Zhang, Zhengjue Wang, Bo Chen, Hongwei Liu, Jiawei Ma

HICEScore: A Hierarchical Metric for Image Captioning Evaluation

ACM MM 2024

Zequn Zeng, Jianqiao Sun, Hao Zhang, **Tiansheng Wen**, Yudi Su, Yan Xie, Zhengjue Wang, Bo Chen

Contrastive Factor Analysis

Arxiv 2024 *under journal review*

Zhibin Duan*, **Tiansheng Wen***, Yifei Wang, Chen Zhu, Bo Chen, Mingyuan Zhou

- By leveraging the connections between factor analysis and matrix factorization, we develop reliable contrastive learning methods capable of providing uncertainty estimates that reflect the confidence of the model's predictions.

A Non-negative VAE: the Generalized Gamma Belief Network

Arxiv 2024 *under journal review*

Zhibin Duan, **Tiansheng Wen**, Muyao Wang, Bo Chen, Mingyuan Zhou

- We introduce a non-Gaussian VAE that employs a standard gamma prior, leveraging the sparsity of non-Gaussian priors to encourage better separation of underlying factors in the data, without compromising the quality of generated samples or the fidelity of reconstructions.

Simple Feature Reweighting for Multi-modal Model Group Robustness

under journal review

Chenyu You*, Weicheng Dai*, Yifei Min*, **Tiansheng Wen***, Lawrence Staib, James Ducan

SERVICE

Journal Reviewer: JMLR, TMI, TNNLS.

AWARDS & HONORS

- ➢ First-Class Graduate Scholarship in Xidian University *2024*
- ➢ Second-Class Undergraduate Scholarship in Xidian University *2021*
- ➢ First-Class Undergraduate Scholarship in Xidian University *2020*

TECHNICAL PROFICIENCIES

Programming Languages: Python, C/C++, MATLAB, HTML, etc.

Tools & Frameworks: PyTorch, git, Latex, Markdown, etc.

Language: Mandarin(Native speaker), English(Fluent).