

Boming Miao

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EDUCATION

Beijing Normal University

Sep 2023 - Jun 2025

Master of Science, School of Statistics

GPA: 3.7/4

Thesis Supervisor: *Xiaoyi Wang* Co-supervised by: *Chuanlong Xie*

Northeastern University

Sep 2019 - Jun 2023

Bachelor of Science, Department of Mathematics

GPA: 90.32/100

RESEARCH INTERESTS

- Trustworthy AI: adversarial machine learning and explainable machine learning.
- Generative Models: LLMs, VLMs and their application in various fields.
- Statistical Learning: learning theory and probabilistic models.

PAPERS AND WORK IN PROGRESS

Noise Diffusion for Enhancing Faithfulness in Text-to-Image Synthesis [[arXiv](#)] [[Code](#)]

Submitted to and reviewed by CVPR, November 2024

RRDataset: A Comprehensive Benchmark for AI-Generated Image Detection in Real-World Scenarios

Submitted to and reviewed by CVPR, November 2024

KPA-Score: An Annotation-free Metric For Human Keypoint Detection

Submitted to and reviewed by CVPR, November 2024

AdvLogo: Adversarial Patch Attack based on Diffusion Models [[arXiv](#)] [[Code](#)]

Submitted to and reviewed by TNNLS, September 2024

An Efficient Framework for Enhancing Discriminative Models via Diffusion Techniques

Submitted to and reviewed by AACL, August 2024 [[OpenReview](#)]

OOD Dection, with [Andi Zhang](#) @ Cambridge

- Investigating novel methods for calculating in-distribution and out-of-distribution probabilities using generative and reconstructive techniques based on generative models.

ACADEMIC EXPERIENCE

Department of Automation, Tsinghua University

Beijing, China

Research Assistant

Oct 2023 - Present

- Studied the robustness and vulnerabilities of deep learning models.
- Leveraged generative models to enhance the stealthiness of adversarial examples.
- Explored the explainability of deep neural networks through gradient maps and local masks.

Department of Computer Science, North Carolina State University

Raleigh, USA

Summer Exchange Research Program [[Poster](#)] [[Project Report](#)]

Jul 2022 - Aug 2022

- Investigated the effectiveness of several modern classifiers under a semi-supervised learning framework in the context of missing labels.
- Applied the Expectation-Maximization (EM) algorithm to generate pseudo labels during the training stage of Naive Bayes and BERT classifiers.
- Found that while the EM algorithm enhances the accuracy of the Naive Bayes classifier, it does not improve the performance of the BERT classifier due to BERT's reliance on accurate labels.

PROJECTS

Randomized learning for vision tasks

Shenyang, China

Undergraduate Dissertation (Distinct) Supervised by [Xuefeng Zhang](#)

Dec 2022 - Jun 2023

- Designed the framework of Matrix Configuration Networks (MSCN) and solved the computational problem caused by low ranks with shifting window mechanism.
- Introduced convolution to MSCN, extending it to a deep architecture, and proposed a method for incremental weight construction in convolutional neural networks.
- Applied MSCN to vision tasks based on patch embedding, and demonstrated the great potential of randomized learning in vision tasks such as image denoising.

Soliton solutions for curve shortening flow on the pseudo-sphere

Shenyang, China

NEU CN, Department of Mathematics, Research Assistant

Sep 2020 - Dec 2021

- Proved that a curve is a soliton solution to the curve shortening flow if and only if its geodesic curvature is proportional to the inner product between its tangent vector and a fixed vector.
- Described the geometric properties of curves on the pseudo-sphere and further studied their qualitative behavior.
- Proved that these curves converge to the equator orthogonal to the fixed vector, providing new insights into the behavior of the curve shortening flow on the pseudo-sphere.

AWARDS

- 2024, First-class Scholarship, Beijing Normal University
- 2024, Second Prize in the Graduate Market Research Competition
- 2023, First-class Scholarship, Beijing Normal University
- 2023, Second-class Scholarship, Northeastern University
- 2022, Third-class Scholarship, Northeastern University
- 2021, Third-class Scholarship, Northeastern University
- 2021, First Prize, Mathematics Competition of Chinese College Students

MEMBERSHIPS

- Student Member, Chinese Association for Applied Statistics
- President, Debate Association of College of Science, Northeastern University

SKILLS

- **Programming:** Python, R, C++, Java, SQL, Matlab
- **Language:** Chinese (Native), English (TOEFL 101)