Xingjian ZHEN

zhenxingjian1995@gmail.com
(XXX)-XXX-XXXX
https://zhenxingjian.github.io/homepage
https://github.com/zhenxingjian

Meta Platforms, Inc.
1550 121st Ave NE
Bellevue, WA, USA
98005

RESEARCH **Deep Learning, Multi-modality, Computer Vision, Efficiency, and Medical Imaging**

EDUCATION

University of Wisconsin-Madison, Madison, WI, U.S. 08/2017-05/2023
Ph.D., Department of Computer Science GPA: 3.89/4.0

Tsinghua University, Beijing, P.R. China. 08/2013-06/2017
B.E., Department of Electronic Engineering GPA: 90.9/100

WORK EXPERIENCES

Research Scientist, **Meta**, Bellevue, WA, U.S. 02/2024-present
- Suggested enhancements to the recommendation system, aimed at optimizing efficiency across an extensive dataset of over 2.8 billion real-world users
- Proposed streamlining the pipeline within Facebook's internal platform, aiming to alleviate the workload of deep learning engineers

Scientist I, **Allen Institute for Brain Science**, Seattle, WA, U.S. 04/2023-02/2024
- Utilized Variational Autoencoder (VAE) techniques to analyze both single-cell RNA and multimodal data, resulting in a remarkable 0.86 mean F1 score and 91% accuracy across 138 classes
- Pioneered the implementation of the innovative approach, named CELL and CELLBLAST, on MapMyCells platform, democratizing access for the wider scientific community

Research Scientist Intern, **Meta**, Menlo Park, CA, U.S. 05/2022-09/2022
- Introduced 4 novel techniques for communicating gradient information among multiple runs of deep learning recommendation models
- Demonstrated significant improvements on the Criteo 1T benchmark, achieving a 1% better test AUROC and reducing the generalization gap by 4%

Applied Scientist Intern, **Amazon**, Pasadena, CA, U.S. 05/2021-08/2021
- Proposed a transformer-based agent method designed to process pairwise input for co-detection
- In our in-house dataset, our approach exhibited 6% enhancement in F1 score over current SOTA
- On the MS-COCO dataset, our method outperformed Deformable DETR by an impressive 4%

Applied Scientist Intern, **Amazon**, Seattle, WA, U.S. 05/2020-09/2020
- Developed MTXNet for generating answers, textual, and visual explanations for TextVQA
- Got 1% better accuracy, 7% better textual explanation CIDEr, 2% better visual explanation IoU
- Curated the TextVQA-X dataset from the TextVQA dataset with additional explanatory content

Research Scientist Intern, **DAMO Academy, Alibaba**, Beijing, P.R. China. 05/2019-09/2019
- Developed an automated anatomical labeling system for coronary arteries, employing CPR-GCN
- Utilized 3D CNN with BiLSTM to extract features from CT images along arterial branches
- Achieved a mean recall of 95.8%, showcasing a 9% improvement over the baseline performance

RESEARCH EXPERIENCES

Partial Distance Correlation (PDC) in Deep Learning and the Benefit 12/2020-04/2022
- This work won Best Paper Award in ECCV 2022
- Introduced DC to enhance the robustness, getting a 9% lower transferred attack rate with PGD
- Utilized Partial DC to selectively remove information from one network to another, providing insights into the performance variations among different models

Certified Robustness Training via Propagating Gaussian Distribution 01/2020-11/2020
- Implemented the certifiable randomized smoothing robustness without sampling with 2× faster

- Introduced a precise estimation method for Gaussian distribution to reduce computational overhead
- Achieved improved certified accuracy and a 5% better robustness on ImageNet and Places365

Flow-based Generative Model for Non-Euclidean Data 03/2019-12/2019

- Proposed the integration of 3 invertible layers specifically designed for manifold-valued data
- Developed a two-stream GLOW architecture capable of transferring information between manifolds
- Successfully transferred Diffusion Tensor Imaging (DTI) data to corresponding Orientation Distribution Function (ODF) data while preserving verifiable group differences (with a p-value of <0.001).

Manifold Dilated CNN in Group Analysis of Alzheimer's Disease 08/2018-02/2021

- Incorporated the SPD and S^n manifolds into the DCNN model, enhancing the extraction of information from DTI and ODF data.
- Accelerated both training and testing processes by 5×, while maintaining a competitive number of parameters compared to the SOTA models
- Demonstrated statistically significant differences in 14 and 16 (out of 50) fiber bundles, as indicated by PiB-PET and gene mutation carriers, on the DIAN and WRAP datasets, respectively.

SELECTED PUBLICATIONS

2 Oral
7 Poster
1 Journal
349 Citations
210+ Stars GitHub

[1] [***Nature Neuroscience***] "A Multimodal Brain Cell Atlas and Community Resource of Alzheimer's Disease."
Zhen X., and et al.

[2] [***ECCV (Best Paper Award), 2022***] "On the Versatile Uses of Partial Distance Correlation in Deep Learning."
Zhen X., Meng Z., Chakraborty R., and Singh V.

[3] [***NAACL-MAI, 2021***] "A First Look: Towards Explainable TextVQA Models via Visual and Textual Explanations."
Zhen X.*, Rao V.N.*, Hovsepian K., and Shen M.

[4] [***AAIC, 2021***] "Altered Structural Connectivity Detected with Dilated Convolutional Neural Network Analysis in the DIAN study and the Wisconsin Registry for Alzheimer's Prevention."
Zhen X., Chakraborty R., Vogt N., Wang R., Yang K.L., Adluru N., Gordon B., Benzinger T., Mckay N., Betthauser T., Johnson S.C., Singh V., and Bendlin B.B.

[5] [***CVPR (Oral), 2021***] "Simpler Certified Radius Maximization by Propagating Covariances."
Zhen X., Chakraborty R., and Singh V.

[6] [***AAAI, 2021***] "Flow-based Generative Models for Learning Manifold to Manifold Mappings."
Zhen X., Chakraborty R., Yang L., and Singh V.

[7] [***CVPR (Oral), 2020***] "CPR-GCN: Conditional Partial-Residual Graph Convolutional Network in Automated Anatomical Labeling of Coronary Arteries."
Zhen X.*, Yang H.*, Chi Y., Zhang L., and Hua X.S.

[8] [***ICCV, 2019***] "Dilated Convolutional Neural Networks for Sequential Manifold-valued Data."
Zhen X.*, Chakraborty R.*, Vogt N., Bendlin B.B., and Singh V.

[9] [***AAIC, 2019***] "Sequential Deep Learning Algorithms Show Structural Connectivity Differences By Amyloid Status."
Zhen X., Chakraborty C., Vogt N., Hwang S.J., Johnson S.C., Bendlin B.B., and Singh V.

[10] [***NeurIPS, 2018***] "A Statistical Recurrent Model on the Manifold of Symmetric Positive Definite Matrices."
Chakraborty R., **Zhen X.***, Yang C.H.*, Banerjee M., Archer D., Vaillancourt D., Singh V., and Vemuri B.C.

COMPUTER SKILLS

Deep learning framework: PyTorch, TensorFlow
Languages: Python, LaTeX