Xingjian ZHEN

xzhen3@wisc.edu
(xxx)-xxx-xxxx
https://zhenxingjian.github.io/homepage
https://github.com/zhenxingjian

5770B Medical Science Center
1300 University Ave.
Madison, WI, USA
53706-1510

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

EDUCATION

University of Wisconsin-Madison, Madison, WI, U.S. 08/2017-11/2022
Ph.D. Candidate, Department of Computer Science GPA: 3.85/4.0

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

INTERN EXPERIENCES

Research Scientist Intern, **Meta**, Menlo Park, CA, U.S. 05/2022-09/2022
- Proposed 4 methods to communicate the gradient information among the multi-runs of the deep learning recommendation models
- For the Criteo 1T benchmark, we show 1% better test AUROC, and 4% smaller generalization gap

Applied Scientist Intern, **Amazon**, Pasadena, CA, U.S. 05/2021-08/2021
- Introduced transformer-based agent method that takes pair-wise input to do the co-detection
- In the in-house dataset, our method improved F1 score 6% from the current SOTA
- In the MS-COCO dataset, our method beats Deformable DETR by 4%

Applied Scientist Intern, **Amazon**, Seattle, WA, U.S. 05/2020-09/2020
- Built MTXNet to generate answer, textual explanation, and visual saliency explanation for TextVQA
- Got 1% better accuracy, 7% better textual explanation CIDEr, 2% better visual explanation IoU
- Collected a novel TextVQA-X dataset from public available TextVQA with extra explanation

Research Scientist Intern, **DAMO Academy, Alibaba**, Beijing, P.R. China. 05/2019-09/2019
- Developed automated anatomical labeling of coronary arteries via CPR-GCN
- Used 3D CNN with BiLSTM to extract the features from the CT images along branches
- Combined both image domain and position information with the partial-residual connection over GCN to achieve 95.8% mean recall, 9% improvement from baseline

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 into robustness so that the transferred attack accuracy under PGD drops 9%
- With Partial DC, we "removed" the information of one network out of another network

Certified Robustness Training via Propagating Gaussian Distribution 01/2020-11/2020
- Applied the certifiable randomized smoothing robustness without sampling with 2× faster
- Proposed a tight estimation of the channel-wise Gaussian distribution to reduce computational cost
- Achieved better certified accuracy and 5% larger certified radius on ImageNet and Places365

Flow-based Generative Model for Non-Euclidean Data 03/2019-12/2019
- Introduced three invertible layers on manifold-valued data
- Built the two-stream GLOW that can transfer information from one manifold to another
- Transferred DTI to corresponding ODF maintaining verifiable group difference ($p-$value < 0.001)

Manifold Dilated CNN in Group Analysis of Alzheimer's Disease 08/2018-02/2021
- Introduced SPD/ S^n manifold into the Dilated CNN model to extract information from DTI/ ODF
- Sped up the training and testing 5× with a competitive number of parameters with SoTA
- Got statistically significant difference on 14 and 16 (out of 50) fiber bundles, by PiB-PET and Gene mutation carriers, on DIAN and WRAP dataset, with total 9 fiber bundles in common

PUBLICATIONS

2 Oral
7 Poster
2 In Submission
61 Citations

[1] [***In Submission***] "Variational Sampling of Temporal Trajectories."
Nazarovs J., Huang Z., **Zhen X.**, Pal S., Chakraborty R., and Singh V.

[2] [***In Submission***] "Frank-Wolfe based Anytime Neural Networks."
Meng Z., **Zhen X.**, Ravi S., and Singh V.

[3] [***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.

[4] [***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.

[5] [***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.

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

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

[8] [***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.

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

[10] [***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.

[11] [***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