Xingjian Zhen

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[Homepage][1] [Github][2]

RESEARCH INTERESTS

My research interest is about structured data or high-order features in Computer Vision. Since it's quite mature for Euclidean space deep learning, I would like to explore some different structured data or constrained data. The covariance matrices of the feature vectors can be viewed as the second-order features. Those high-order features are constrained by their own structure, i.e., Symmetric Positive Denite. Thus this will break the basic rules in Euclidean space. But those matrices are more robust to noise and contain more high-level information. I want to try some neural networks in Euclidean space, and extend them to those structured data.

EDUCATION

Ph.D. Student, Department of Computer Science 2017 - 2022(Expected)
University of Wisconsin-Madison, WI, U.S.

B.E., Department of Electronic Engineering 2013 - 2017
Tsinghua University, Beijing, P.R. China.

Paper

- [***In submission***] "ManifoldGLOW: Extending Flow-based Generative Models to Manifolds."
  Liu Yang, **Xingjian Zhen**, Rudrasis Chakraborty, Vikas Singh.
- [***In submission***] "CPR-GCN: Conditional Partial-Residual Graph Convolutional Network in Automated Anatomical Labeling of Coronary Arteries."
  Xingjian Zhen, Han Yang, Ying Chi, Lei Zhang, Xiansheng Hua.
- [***ICCV, 2019***] "Dilated Convolutional Neural Networks for Sequential Manifold-valued Data."
  Xingjian Zhen, Rudrasis Chakraborty, Nicholas Vogt, Barbara B. Bendlin, Vikas Singh.
- [***AAIC, 2019***] "Sequential Deep Learning Algorithms Show Structural Connectivity Differences By Amyloid Status."
  Xingjian Zhen, Rudrasis Chakraborty, Nicholas Vogt, Seong Jae Hwang, Sterling C. Johnson, Barbara B. Bendlin, Vikas Singh.
- [***NeurIPS, 2018***] "A Statistical Recurrent Model on the Manifold of Symmetric Positive Definite Matrices."
  Rudrasis Chakraborty, **Xingjian Zhen**, Chun-Hao Yang, Monami Banerjee, Derek Archer, David Vaillancourt, Vikas Singh, Baba C. Vemuri.

[1] `https://zhenxingjian.github.io/homepage/`
[2] `https://github.com/zhenxingjian`

RESEARCH EXPERIENCES

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

- Introduced three invertible layers whose determinant of Jacobian is simple
- Built the two-stream version of GLOW that can transfer information from one manifold to another
- Showed the ability to transfer DTI to corresponding ODF, and vice versa
- Generated/ Mixed texture images based on the covariance matrices

Point Cloud Completion 09/2019-11/2019

- Used encoder-decoder based network to roughly complete the point cloud
- Found nearest neighbor in the training dataset to extract local information

Dilated CNN in Group Analysis of Alzheimer's Disease 08/2018-03/2019

- Applied SPD/ODF Manifold into Dilated CNN model to directly extract information from DTI/ ODF
- Speed up the training and testing model with competitive number of parameters with the state of the art
- With PiB and APOE biomarkers, got statistically signicant results on several fiber bundles

Statistical Recurrent Model on the Manifold 01/2018-05/2018

- Defined the operator in the manifold space
- Applied SPD manifold into statistical recurrent model
- Significantly reduced the number of parameters of the video classification model
- Used this model to achieve the state of art of accuraccy in UCF11 dataset

Correlationship for Image-Text Pair in Latent Space 09/2017-01/2018

- Applied the pre-trained CNN as the feature extractor from image side
- Applied the word2vec method on text as the representive of sentence
- Used t-SNE to minimum the KL divergence between latent space and the Image-Text pair
- Got meaningful result for the local dataset

INTERN EXPERIENCE

DAMO Academy, Alibaba 05/2019-09/2019

- Research intern in DAMO Academy Medical AI Algorithm Research, Alibaba
- Developed an automated anatomical labeling of coronary arteries via CPR-GCN
- Used 3D-CNN with BiLSTM to extract the features from the CT images along branches
- Used both image domain and position information with the partial-residual connection to achieve 95.8% mean recall

COMPUTER SKILLS

Deep learning framework: PyTorch, TensorFlow
Languages: Python, C++, Matlab
Softwares: Visual Studio, Matlab