Xingjian Zhen

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RESEARCH INTERESTS

My research interest is about different structured data for medical application in Computer Vision. Since it's quite mature for Euclidean space machine learning, I would like to explore some different structured data or constrained data for classification. For example, the Symmetric Positive Definite matrix in medical data (DTI) or covariance matrix are the data with constraint. I would like to try some neural networks in Euclidean space and extend them to the manifold data, which is the structured data, to do the classification or regression. I believe this will be useful in diagnosis from a medical perspective or analysis the video/image information.

EDUCATION

PhD. Student, Department of Computer Science — August 2017 - present
UW-Madison, WI, U.S.

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

Paper

- Rudrasis Chakraborty, **Xingjian Zhen**, Chun-Hao Yang, Monami Banerjee, Derek Archer, David Vaillancourt, Vikas Singh, Baba C. Vemuri. "A Statistical Recurrent Model on the Manifold of Symmetric Positive Definite Matrices." In *Thirty-second Conference on Neural Information Processing Systems (NeurIPS), 2018*
- **Xingjian Zhen**, Rudrasis Chakraborty, Nicholas Vogt, Seong Jae Hwang, Sterling C. Johnson, Barbara Bendlin, Vikas Singh. "Group Analysis for PiB Status with Seqential Deep Learning Model on DTI." *Alzheimer's Association International Conference (AAIC), 2019*
- **Xingjian Zhen**, Rudrasis Chakraborty, Nicholas Vogt, Barbara Bendlin, Vikas Singh. "Dilated Convolutional Neural Networks (DCNN) for Sequential Manifold-valued Data in Neuroimaging." *IEEE International Conference on Computer Vision (ICCV), 2019*

RESEARCH EXPERIENCES

Group Analysis for PiB Status with Seqential Deep Learning Model on DTI 01/2019-03/2019

- Used Ants as registration tool to warp information from template space into subject space
- Extracted each voxel along each fiber bundles in DTI space to fit the sequential model
- With PiB status as group, found 2 fiber bundles satisfying significance level

Dilated CNN in Group Analysis of Alzheimer's Disease 08/2018-12/2018

- Pre-processed the dMRI to extract the information of fiber bundles

- 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 CSF and APOE biomarkers, got statistically significant 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

Form Line Detection in the Picture 12/2016-06/2017

- Developed a system that detects and recognizes the form lines in pictures
- Used the bidirectional RNN method to achieve the state of the art, with MXNet as the core of the deep-learning system
- Tested in multiple databases such as the NIST Special Database 2 and got a high accuracy rate

Emotion Detection in Voice Recordings 07/2016-08/2016

- Used different classifiers to predict the emotion of a speaker in a voice memo
- Extracted voice features like MFCC, LPCC, Zero Cross Rate, etc., from FAU Aibo Emotion Corpus dataset
- Trained both an SVM and a neural network using the features, tested them, and compared their accuracy with the state-of-the-art

INTERN EXPERIENCES

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 graph neural networks
- Used 3D-CNN with LSTM model to extract the features from the CT images along vessels
- Used both image domain and position information to classify the coronary arteries and achieved 93% accuracy on the test set

COMPUTER SKILLS

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