Fengchao Xiong

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Education

Zhejiang University, Hangzhou, Zhejiang. 2014.9-2019.9

Ph.D candidate in College of Computer Science
Supervisor: Prof. Yuntao Qian.

Griffith University, Nathan, Queensland. 2017.11-2018.12

Visiting Scholar in School of Information and Communication Technology, supported by China Scholarship Council (CSC).
Supervisor: Dr. Jun Zhou.

Shandong University, Jinan, Shandong. 2010.9-2014.7

B.E in School of Software Engineering
Thesis title: Research on Fingerprint Image Segmentation Algorithm Based on Unsupervised Learning.
Supervisor: Prof. Gongping Yang.
GPA: 88.8/100 (Rank 22/259).

Wuhan University, Wuhan, Hubei. 2011.9-2012.7

Exchange student in International School of Software.

Research

- Object tracking
- Hyperspectral imaging
- Low-rank and sparse matrix/tensor representation
- Machine learning
- Deep learning

Research Experience

Model driven deep learning for hyperspectral imaging 2019.1-

Instead of treating deep learning as a black box and using large scale of data to train a deep model, we are doing researching on model driven deep methods for image processing. Concretely we embed the physical models of an image to deep learning and use deep learning to learn their parameters.

Object tracking 2017.12-

We mainly focus on the scenarios where the background and the foreground, i.e., the target and the surrounding environment share similar colour and textures, often making color trackers fail. We propose a material based object tracking framework in this project, taking advantages of hyperspectral images in material identification.

Hyperspectral denoising 2017.12-2018.5

We utilize tensor factorization to recover a corrupted HSI. One one hand, we proposed a sparse low-rank non-negative tensor factorization method to remove noise in an HSI, where the low-rankness in both spatial and spectral domain is considered. On the other hand, we develop a spectral-spatial L_0 gradient regularization and embed it into tensor factorization to enhance the spectral-spatial texture information in restored HSI.

Hyperspectral unmixing 2014.9-2017.12

We adopt matrix-vector nonnegative tensor factorization, a special case of block term decomposition(BTD), to tackle hyperspectral unmixing in this project. This method decomposes a hyperspectral data cube into R

component tensors represented by the outer-product of a matrix and a vector which denote an abundance map and an endmember respectively. Moreover, in order to strength the local spatial structure in abundance maps, we embed superpixel and total variation into tensor factorization.

Radar working state recognition 2015.7- 2017.2

I act as a team leader in this project, in cooperation with Southwest China Research Institute of Electronic Equipment. The aim of this project is utilizing machine learning algorithm to identify radar signal.

PUBLICATION

1. Yuntao Qian, **Fengchao Xiong**, Shan Zeng, Jun Zhou, and Yuanyan Tang. "Matrix-Vector Nonnegative Tensor Factorization for Blind Unmixing of Hyperspectral Imagery". *IEEE Transactions on Geoscience and Remote Sensing*, vol. 55, no. 3, pp. 1776-1792, March 2017. (JCR 2)
2. **Fengchao Xiong**, Jingzhou Chen, Yuntao Qian, Jun Zhou. "Superpixel-Based Nonnegative Tensor Factorization for Hyperspectral Unmixing", *IEEE International Geoscience and Remote Sensing Symposium*, IGARSS'18, 2018.(Oral)
3. **Fengchao Xiong**, Yuntao Qian, Jun Zhou. "Hyperspectral Unmixing via Total Variation Regularized Nonnegative Tensor Factorization" , *IEEE Transactions on Geoscience and Remote Sensing,* vol. 57, no. 4, pp. 2341-2357, April 2019 (JCR 2)
4. **Fengchao Xiong**, Yuntao Qian, Jun Zhou. "Hyperspectral Imagery Denoising via Reweighed Sparse Low-Rank Nonnegative Tensor Factorization" , *IEEE International Conference on Image Processing*, ICIP'18, 2018.
5. Kun Qian, Jun Zhou, **Fengchao Xiong**, Huixin Zhou. "Object Tracking in Hyperspectral Videos with Convolutional Features and Kernelized Correlation Filter", *International Conference on Smart Multimedia*, ICSM 2018.
6. **Fengchao Xiong**, Jun Zhou, Yuntao Qian. "Hyperspectral restoration via L0 Gradient Regularized Low-Rank Sparse Tensor factorization" , *IEEE Transactions on Geoscience and Remote Sensing*, 2018. (JCR 2, Minor Revision, Under Review)
7. **Fengchao Xiong**, Jun Zhou,Yuntao Qian. "Material based object tracking in hyperspectral video" *IEEE Transactions on Image Processing.* (Under Review)
8. Qipeng Qian, **Fengchao Xiong**, Jun Zhou. "Deep Unfolded Iterative Shrinkage-Thresholding Model for Hyperspectral Unmixing", *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, Tokyo, 2019.
9. **Fengchao Xiong**, Jun Zhou, Yuntao Qian, Jocelyn Chanussot. "Dynamic Material-Awarded Object Tracking in Hyperspectral Videos", *IEEE Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing (WHISPERS)*, Amsterdam, 2019.(Oral)

PROFESSIONAL ACTIVITIES

Reviewer:

1. IEEE Transactions on Multimedia(TMM)
2. IEEE Transactions on Image Processing(TIP)
3. Multimedia Tools and Applications (MTA)
4. IET Computer Vision
5. IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing

Volunteer: The 11th IAPR International Conference on Biometrics (ICB 2018) 2018.2

SKILLS

- Programming Languages: Python, Java, Matlab, C
- Platform: Linux
- Development: Web, J2EE

♡ Honors and Awards

Excellent Research Assistant	2018.11
Excellent Graduate Student	2017.9
Excellent Exchange Student Scholarship	2012.9
Excellent Student Awards	2012.9
National Aspiration Scholarship	2011.9
Excellent Student Awards	2011.9

ℹ Miscellaneous

- GitHub: GitHub: https://github.com/bearshng
- Blog: http://www.xiongfuli.com
- Languages: English - Fluent (IELTS, 6.5), Mandarin - Native speaker

Referees

- Yuntao Qian (ytqian@zju.edu.cn)
- Jun Zhou (jun.zhou@griffith.edu.au)