Fengchao Xiong

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EDUCATION
- ◇ **Griffith University**, Nathan, Queensland. (2017.11-2018.11)
  Visiting scholar in School of Information and Communication Technology, supported by China Scholarship Council (CSC).
  Supervisor: Dr. Jun Zhou.

- ◇ **Zhejiang University**, Hangzhou, Zhejiang. (2014.9-)
  Ph.D. candidate in College of Computer Science
  Supervisor: Prof. Yuntao Qian.

- ◇ **Shandong University**, Jinan, Shandong. (2010.9-2014.7)
  B.E in School of Software Engineering, July 2014.
  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.

HONORS
- ◇ Excellent Exchange Student Scholarship (2012.9)
- ◇ Excellent Student Awards (2012.9)
- ◇ National Aspiration Scholarship (2011.9)
- ◇ Excellent Student Awards (2011.9)
- ◇ Excellent Graduate Student (2017.9)

RESEARCH INTERESTS
- ◇ Object tracking
- ◇ Matrix/Tensor decomposition
- ◇ Low-rank and Sparse representation
- ◇ Pattern Recognition
- ◇ Computer Vision
- ◇ Machine Learning
- ◇ Hyperspectral Imaging

RESEARCH PROJECTS
- ◇ Object tracking (2017.12-)
  Currently, I am doing research on object tracking in hyperspectral video. In this project, We mainly focus on the situations where the background and the foreground, i.e., the target, share similar colour, which makes traditional methods often fail to tell. We take advantages of hyperspectral imagery in identifying objects, leading to a material based tracking system. In this system, instead of tracking an object by its texture features, for example, Hog, we track an object by its material, for example plastic or steel.

⋄ Hyperspectral Denoising (2017.12-2018.3).
This project aims to utilize tensor factorization to recover a corrupted HSI. Motivated by the merit of sparse representation and low-rank representation in HSI denoising, we proposed a sparse low-rank nonnegative tensor factorization method to remove noise in an HSI, where the low-rankness in both spatial and spectral domain is considered. This work has been submitted to IEEE International Conference on Image Processing (ICIP 2018).

To better takes advantages of the spectral-spatial information in an HSI, we then develop a L0 gradient regularized tensor factorization method to concurrently remove mixed noise, including Gaussian noise and sparse noise. In this method, a piecewise edge-preserving method, L0 gradient smoothing, is integrated to tensor factorization. This work will be submitted to IEEE Transactions on Geoscience and Remote Sensing (TGRS, JCR 2).

⋄ Hyperspectral Unmixing (2014.9-2017.12).

I utilized 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 abundance map and endmember respectively. We analysis the algorithm from theoretical perspective and experimental perspective. This work is published on IEEE Transactions on Geoscience and Remote Sensing (TGRS, JCR 2).

However, HSI is high likely to be contained by various noise, which makes tensor factorization fail to be unique. To overcome this, in subsequent research, various prior information is imbedded into tensor factorization, resulting in superpixel based matrix-vector nonnegative tensor factorization (S-MV-NTF) and total variation regularized nonnegative tensor factorization (MV-NTF-TV). In term of S-MV-NTF, taking advantage of superpixel in representing local spatial information, two specific regulations are added to factor matrices to enforce the pixels in the same superpixel to behave similarity. This has been accepted by IEEE International Geoscience Remote Sensing Symposium (IGARSS 2018) with oral presentation. On account of MV-NTF-TV, the total variation is added to the abundance map directly to make the abundance map piecewise smooth, which has been submitted to IEEE Transactions on Geoscience and Remote Sensing (TGRS, JCR 2).

⋄ 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. Due to confidential agreement,I cannot describe the details of this project, but this work is interesting actually.

PUBLICATION ⋄ 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 (TGRS, JCR 2), 2017, 55(3): 1776-1792.

⋄ **Fengchao Xiong**, Jingzhou Chen, Yuntao Qian, Jun Zhou. "Superpixel-Based Nonnegative Tensor Factorization for Hyperspectral Unmixing", IGARSS 2018(Oral, AR=25%)

⋄ **Fengchao Xiong**, Yuntao Qian, Jun Zhou. "Hyperspectral Unmixing via Total Variation Regularized Nonnegative Tensor Factorization" ,IEEE Transactions on Geoscience and Remote Sensing (TGRS, JCR 2) (Major Revision)

⋄ **Fengchao Xiong**, Yuntao Qian, Jun Zhou. "Hyperspectral Imagery Denoising via Reweighed Sparse Low-Rank Nonnegative Tensor Factorization" ,IEEE International Conference on Image Processing, ICIP 2018(Accepted)

PROGRAMMING ⋄ Proficient: Java, Matlab

⋄ Familiar: C, C++, Python, Linux

LANGUAGE   ⋄ Chinese: Native
                       ⋄ English: IELTS(6.5)