SHIQI LIU

(0086)18706728059 ⋄ Wuchan, Hubei
shiqi.liu647@foxmail.com

RESEARCH INTERESTS

Theory: Generative Models, Self-paced Learning, Weakly Supervised Learning, Partial Label Learning, Active Learning, Learning Theory, Neural PDE/ODE/SDE, Fusion

Application: EEG Emotions Recognition, Segmentation, Disentanglement, Calibration, Change Detection, Pan-sharpening, Relative Radiometric Normalization, Blending, Dehazing, Daily Runoff Prediction, Phase Unwrapping

EDUCATION

Xi'an Jiaotong University(XJTU) Xi'an, China
M.S. in Applied Mathematics (supervised by Prof. Deyu Meng) Sept 2017-Jun 2020
GPA 3.81/4.00 GPA-Math 3.92/4.00

B.S. in Mathematics and Applied Mathematics (Honors Science Program), Sept 2013-Jun 2017
Special Class for the Gifted Young, Sept.2011–Jun.2013
GPA 3.84/4.00 GPA-Math 3.95/4.00

Georgia Institute of Technology Atlanta, US
Visiting Student in the Department of Mathematics Sept 2015-Jun 2016
GPA 4.11/4.33 GPA-Math 4.17/4.33

EXPERIENCE

HESAI Tech *Shanghai, China*
Internship Mar 2019-Aug 2019

Naolu Brain Technology *Beijing, China*
Internship Dec 2019-Mar 2020

Beijing Data Intelligence Information Technology *Wuhan,China*
Internship Jun 2020-Dec 2020
Algorithm Engineer Dec 2020-Jul 2022

HONOR&AWARDS

- National Award Graduate Scholarship, 2018, (about rank 0.2%)
- National Second Prize in China Undergraduate Mathematical Contest in Modeling, 2014 (about rank 3%)

PUBLICATIONS

[1] **Discovering influential factors in variational autoencoders.**[link][code]
Shiqi Liu, Jingxin Liu, Qian Zhao, Xiangyong Cao, Huibin Li, Deyu Meng, Hongying Meng, Sheng Liu.
Pattern Recognition, 2020, Citations 10

[2] **On Convergence Property of Implicit Self-paced Objective.**[link]
Shiqi Liu, Zilu Ma, Deyu Meng, Yong Zhang, SioLong Lo, Zhi Han.
Information Sciences, 2018, Citations 21

[3] **Understanding Self-Paced Learning under Concave Conjugacy Theory.**[link]
Shiqi Liu, Zilu Ma, Deyu Meng, Kai-Dong Wang, Yong Zhang.
Communications in Information and Systems, 2018, Citations 9

PREPRINTS

[1] **Auto robust relative radiometric normalization via latent change noise modelling.**[link]
Shiqi Liu, Lu Wang, Jie Lian, Ting chen, Cong Liu, Xuchen Zhan, Jintao Lu, Jie Liu, Ting Wang, Dong Geng, Hongwei Duan, Yuze Tian.
Arxiv, 2021

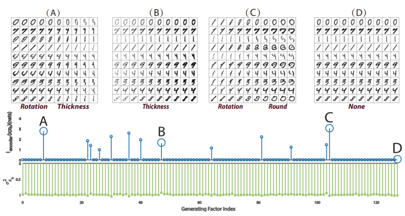
[2] **Automatically eliminating seam lines with Poisson editing in complex relative radiometric normalization mosaicking scenarios.**[link]
Shiqi Liu, Jie Lian, Xuchen Zhan, Cong Liu, Yuze Tian, Hongwei Duan.
Arxiv, 2021

SKILLS

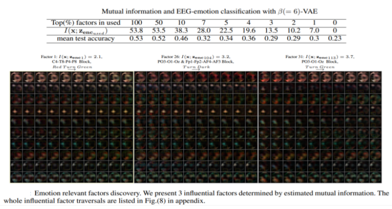
Languages: Mandarin Chinese (Native), English (Academic Communication)
Programming: Python, Tensorflow, Latex, Matlab

PROJECTS

Machine Learning



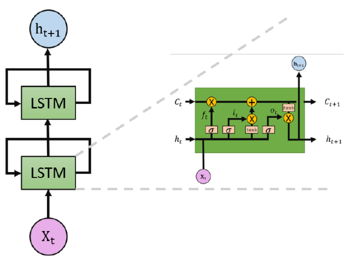
Discovering Influential Factors of VAEs Jul 2017-Apr 2020
VAE is a deep learning model of data dimensionality reduction, disentangling, generation, and low-dimensional visualization. However, its factors sometimes fail to work. We found that VAEs' objectives induce separation and sparsity in mutual information and proprosed approaches to find influential generating factors.



Predicting Emotions via 32 Channels of EEG Nov 2017-Apr 2020
We applied the framework of VAE + LSTM Net, using DEAP data set, for four kinds of emotional recognition and achieved good results.

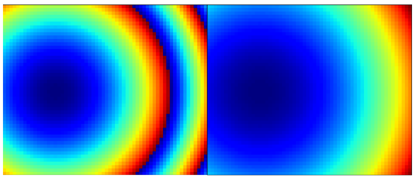
$$g^*(\mathbf{l}) = \inf_{\mathbf{v}\in\Psi}\{\langle \mathbf{v}, \mathbf{l}\rangle - g(\mathbf{v})\}$$

Understanding Self-Paced Learning Jun 2016-Apr 2018
Self-paced learning is a machine learning algorithm that imitates human easy-to-hard learning paradigms and has a good effect in weakly supervised learning. We studied its equivalence model and its convergence properties.

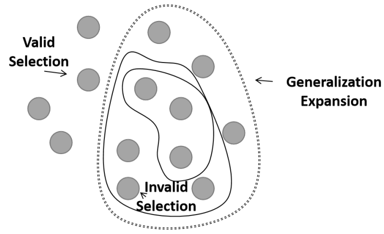


Daily Runoff Data Prediction via LSTM Jul 2016-Apr 2020
I used double-layer LSTM net to forecast daily runoff data. The model achieved good results beyond traditional methods.

Weakly Semantic Segmentation via Partial Labels Dec 2020-Jul 2022
Remote sensing image samples rarely have completely elements all labeled, especially for cloud, shadow and crops. We produced partial label samples by introducing unknown categories and single-position multi-label settings so that all samples can be utilized in training. Through weakly supervised learning, we used improved HROCRnet/Swin-Transformer/PSPnet with pruning and achieved good results, detecting clouds, shadows, wheats, rices and other crops in thousands of images.

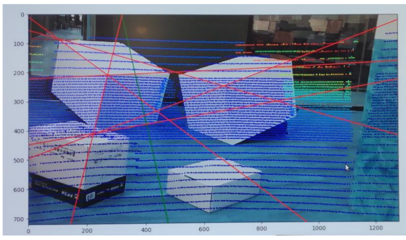


Phase Unwrapping and Denoising via CNN Dec 2020-Jul 2022
The synthetic aperture radar phase map often has a lot of noise. We used denoising CNN methods to alleviate noises directly and utilized quality map-guided method to prioritize the recovery of the phase in the high-quality region.

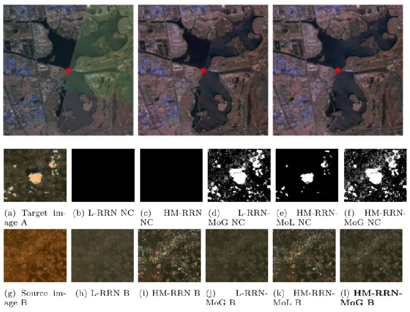


Actively Sample Recommending for Labeling Dec 2020-Jul 2022
Labeling remote sensing images is Laborious. We proposed to use active learning combined with multiple "good students" to interpret the labeled samples to determine the recommended samples to improve the human-in-the-loop efficiency.

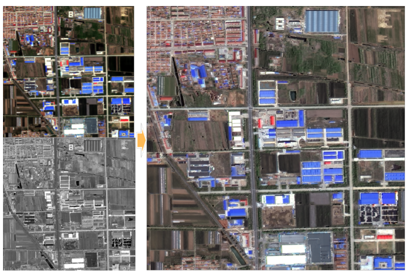
Computer Vision and Remote Sensing



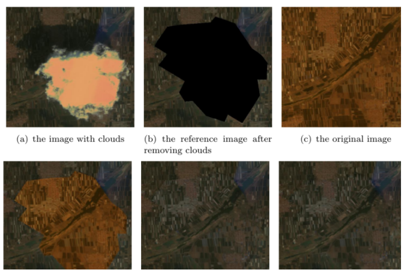
Lidar and Camera Calibration Mar 2019-Aug 2019
We calibrated lidar and camera through the correspondence of 3-d lines and 2-d lines and completed a patent.



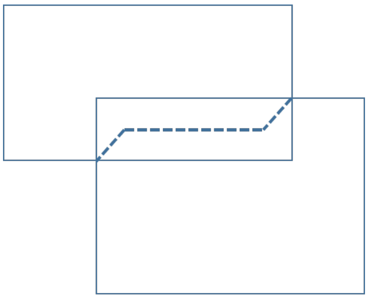
Color Contrast Removing Mar 2019-Aug 2019
Multiple images mosaicked together can create the big-flower-cloth effect with color contrast. Through collaborative extracting no-change points and matching color, we invented a method to eliminate the this effect and make the color consistent. This method is a relative radiation normalization method and can reduce difference between vegetation/water index and the pseudo-detected-change of building.



Pan-sharpening for Multi/Hyper-spectral Images Dec 2020-Jul 2022
The remote sensing image obtained by optical satellites is generally divided into a monochrome image with high spatial resolution and a high-spectral image with high color resolution and low spatial resolution. We improved the GSA method to synthesize high-spatial-resolution hyperspectral images to obtain clear features and rich colors.

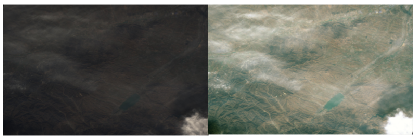


Poisson/Laplace/Matching Fusion & Cloud Filling Dec 2020-Jul 2022
There are a significant difference in color over the boundary of multiple image stitching. We combined template uniform color and Poisson fusion, as well as Laplace fusion, to alleviate the problem, making the stitching boundaries difficult to be distinguished.



Mosaic Line Generation Dec 2020-Jul 2022

When mosaicking multiple images, it is necessary to determine the mosaic boundary of the image. We used the bisecting overlapping area criterion to generate a refined feature trace of the mosaic skeleton combined with little color contrast for the mosaic line.



Quality Detection Dec 2020-Jul 2022

We checked the quality problems of remote sensing images via different quality detection methods, including moment detection, entropy function detection, null value detection, and fog detection via Kaiming He's dehazing algorithm and used the pyramid method to determine its maximum useful area.