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

Johns Hopkins University Baltimore, US

Intern in CCVL research group May 2023-Jun 2024

Xi'an Jiaotong University Xi'an, China

M.S. in Applied Mathematics (supervised by Prof. Deyu Meng) Sept 2017-Jun 2020

B.S. in Mathematics and Applied Mathematics (Honors Science Program), Sept 2013-Jun 2017

Special Class for the Gifted Young, Sept.2011–Jun.2013

Georgia Institute of Technology Atlanta, US

Visiting Student in the Department of Mathematics Sept 2015-Jun 2016

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 11

[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

[4] **Experimental Report on the Effect of Water Vapor on Climate Warming.**
水蒸气对气候变暖影响的实验报告.[link]
刘仕琪 (Shiqi Liu), 金广禹, 潘劭平, 马腾, 刘宇曼, 卢涵, 陈佑宁, 陈式如.
地理教学 (Geography Teaching), 2015

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

ACADEMIC SERVICES

Journal Reviewer:

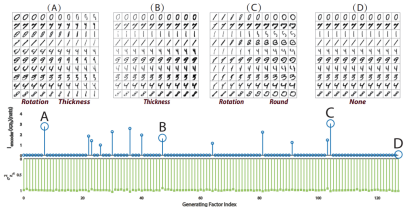
- Pattern Recognition(PR)
- IEEE Transactions on Neural Networks and Learning Systems(TNNLS)
- IEEE Transactions on Circuits and Systems for Video Technology(TCSVT)
- IEEE Transactions on Multimedia(TMM)
- Engineering Applications of Artificial Intelligence(EAAI)

Conference Reviewer:

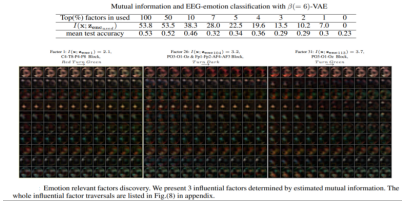
- Uncertainty in Artificial Intelligence(UAI 2023)

PROJECTS

Machine Learning



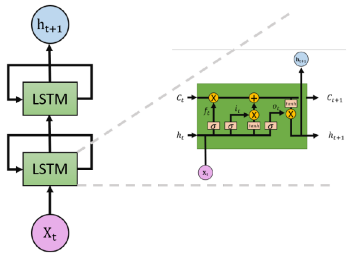
Discovering Influential Factors of VAEs Jul 2017-Apr 2020
VAE is a deep learning model of data dimensionality reduction, disentangling, generation, and low-dimensional visualization. However, its factors sometimes fail to work. We found that VAEs' objectives induce separation and sparsity in mutual information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

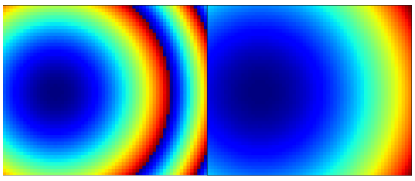


Daily Runoff Data Prediction via LSTM Jul 2016-Apr 2020

I used double-layer LSTM net to forecast daily runoff data. The model achieved good results beyond traditional methods.

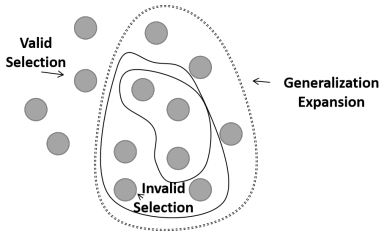
Weakly Semantic Segmentation via Partial Labels Dec 2020-Jul 2022

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

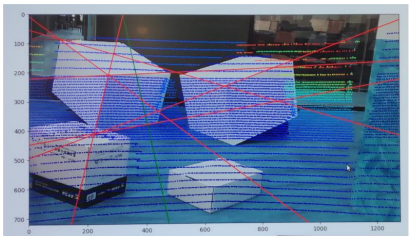
The synthetic aperture radar phase map often has a lot of noise. We used denoising CNN methods to alleviate noises directly and utilized quality map-guided method to prioritize the recovery of the phase in the high-quality region.



Actively Sample Recommending for Labeling Dec 2020-Jul 2022

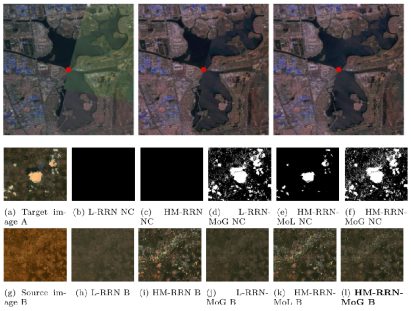
Labeling remote sensing images is Laborious. We proposed to use active learning combined with multiple "good students" to interpret the labeled samples to determine the recommended samples to improve the human-in-the-loop efficiency.

Computer Vision and Remote Sensing



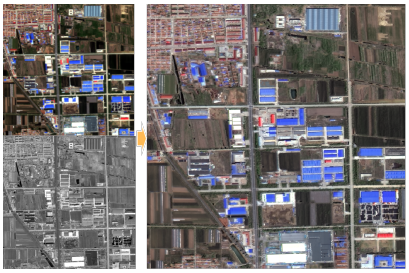
Lidar and Camera Calibration Mar 2019-Aug 2019

We calibrated lidar and camera through the correspondence of 3-d lines and 2-d lines and completed a patent.



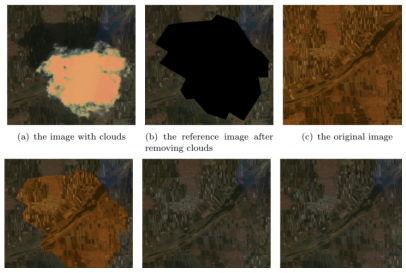
Color Contrast Removing Mar 2019-Aug 2019

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.



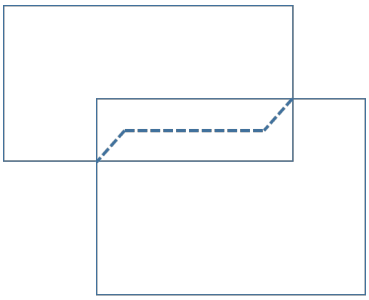
Pan-sharpening for Multi/Hyper-spectral Images Dec 2020-Jul 2022

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.



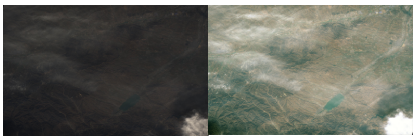
Poisson/Laplace/Matching Fusion & Cloud Filling Dec 2020-Jul 2022

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.

PATENTS

[1] **Emotion recognition method and system via deep learning model and LSTM network.**
基于深度学习模型与长短记忆网络的情绪识别方法及系统 [link]
刘仕琪 (Shiqi Liu), 刘京鑫, 孟德宇, 孟鸿鹰.
CN109271964B, 2022, Citation 10

[2] **Remote Sensing Image Sample Migration Method.**
遥感影像样本迁移方法 [link]
彭哲, **刘仕琪 (Shiqi Liu)**.
CN113936227A, 2022, Citation 1

[3] **Quantitative Evaluation Method of Remote Sensing Image regarding Cloud and Shadow.**
基于云及阴影的遥感影像质量定量评价方法 [link]
陈婷, 陈宇, **刘仕琪 (Shiqi Liu)**, 谢新林, 董铱斐, 段红伟, 邹圣兵.
CN115082452B, 2022, Citations 1

[4] **Remote Sensing Sample Classification Method Via Transfer Learning and Bag of Visual Words.**
基于迁移学习和视觉词包的遥感样本分类方法 [link]
贾若愚, **刘仕琪 (Shiqi Liu)**, 李洁, 邹圣兵.
CN115661504A, 2022

[5] **Annotation Method for Remote Sensing Samples via Combined Transfer Learning.**
基于组合迁移学习的遥感样本标注方法 [link]
陈婷, **刘仕琪 (Shiqi Liu)**, 李洁, 邹圣兵.
CN115439710A, 2022

[6] **Annotation Method of Remote Sensing Samples via 3D Point Cloud.**
基于三维点云的遥感样本标注方法法 [link]

李洁, **刘仕琪 (Shiqi Liu)**, 邹圣兵.
CN115269896A, 2022

[7] **Change Detection Method of Remote Sensing Image via Invariant Object.**
基于不变对象的遥感影像变化检测方法 [link]
刘杰, **刘仕琪 (Shiqi Liu)**, 王凡, 李洁, 邹圣兵.
CN114937211B, 2022

[8] **A Usability Evaluation Method for Geometric Quality of Optical Remote Sensing Images.**
一种光学遥感影像几何质量可用性评价方法 [link]
高小花, **刘仕琪 (Shiqi Liu)**, 段红伟, 李洁, 邹圣兵.
CN115205251A, 2022

[9] **Usability-Oriented Quality Evaluation Method of Remote Sensing Image.**
面向可用性的遥感影像质量评价方法 [link]
万珍会, 陈宇, 詹旭琛, 陈婷, **刘仕琪 (Shiqi Liu)**, 李洁, 段红伟, 董铱斐, 邹圣兵.
CN114937038B, 2022

[10] **Automatic Color Uniform Method of Remote Sensing Image Via Poisson Editing.**
融合泊松方程的遥感影像自动化匀色方法 [link]
李贵现, 白莉霜, 邹圣兵, **刘仕琪 (Shiqi Liu)**.
CN113850734A, 2021