Meiqi Hu

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EDUCATION

State Key Laboratory of Information Engineering in Survey, Mapping and Remote Sensing, Wuhan University (WHU) | Wuhan, China
- ***Ph.D.*** *of Photogrammetry and Remote Sensing (2+3)* *Sept. 2021 – Up to Now*

State Key Laboratory of Information Engineering in Survey, Mapping and Remote Sensing, Wuhan University (WHU) | Wuhan, China
- ***M.E.*** *of Photogrammetry and Remote Sensing* *June 2019 – Sept. 2021*

School of Geomatics and Info-physics, Central South University (CSU) | Changsha, China
- ***B.E.*** *of Surveying and Mapping Engineering* *Sept. 2015 – June 2019*

RESERCH INTERESTS

I am working in Remote Sensing Image Interpretation and Analysis, Change detection; Deep learning; Information Extraction; Self-Supervised Learning, Spectral Unmixing.

PUBLICATIONS

Instructor: Prof. Liangpei Zhang & Prof. Chen Wu, WHU *June 2019 – Up to Now*

[1] **M. Hu**, C. Wu, B. Du and L. Zhang, "Binary Change Guided Hyperspectral Multiclass Change Detection," *IEEE Transactions on Image Processing*, vol. 32, pp. 791-806, 2023. [link]

[2] **M. Hu**, C. Wu and L. Zhang, "HyperNet: Self-Supervised Hyperspectral Spatial–Spectral Feature Understanding Network for Hyperspectral Change Detection," *IEEE Transactions on Geoscience and Remote Sensing*, vol. 60, pp. 1-17, 2022, Art no. 5543017. [link]

[3] **M. Hu**, C. Wu, L. Zhang and B. Du, "Hyperspectral Anomaly Change Detection Based on Autoencoder," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 14, pp. 3750-3762, 2021. [link]

[4] D. Zhu, B. Du, **M. Hu**, Y. Dong, and L. Zhang, "Collaborative-guided spectral abundance learning with bilinear mixing model for hyperspectral subpixel target detection," *Neural Networks*, Feb. 2023. [link]

[5] J. Li, **M. Hu**, and C. Wu, "Multiscale Change Detection Network based on Channel Attention and Fully Convolutional BiLSTM for Medium-resolution Remote Sensing Imagery," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, pp. 1–14, 2023. [link]

[6] C. Han, C. Wu, H. Guo, **M. Hu**, and H. Chen, "HANet: A Hierarchical Attention Network for Change Detection With Bitemporal Very-High-Resolution Remote Sensing Images," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 16, pp. 3867–3878, 2023. [link]

[7] C. Han, C. Wu, H. Guo, **M. Hu**, J. Li, and H. Chen, "Change Guiding Network: Incorporating Change Prior to Guide Change Detection in Remote Sensing Imagery," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*., pp. 1–15, 2023. [link]

[8] C. Wu, S. Zhu, J. Yang, **M. Hu**, B., Du, L. Zhang, L. Zhang and M. Lan, "Traffic Density Reduction Caused by City Lockdowns Across the World During the COVID-19 Epidemic: From the View of High-Resolution Remote Sensing Imagery," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 14, pp. 5180–5193, 2021. [link]

[9] **M. Hu**, C. Wu, and B. Du, "Multi-Temporal Spatial-Spectral Comparison Network For Hyperspectral Anomalous Change Detection," *IGARSS 2022 - 2022 IEEE International Geoscience and Remote Sensing Symposium*, Jul. 2022, pp. 1432–1435. [link]

[10] **M. Hu**, C. Wu, and B. Du, "EMS-NET: Efficient Multi-Temporal Self-Attention for Hyperspectral Change Detection," *IGARSS 2023 - 2023 IEEE International Geoscience and Remote Sensing Symposium*, Pasadena, CA, USA: IEEE, Jul. 2023, pp. 6664–6667. [link]

HONORS & AWARDS

- First Prize of Academic Scholarship, Wuhan University *Oct. 2023*
- Yugang-Songxiao Scholarship *Oct. 2023*
- The International Graduate Workshop on Geoinformatics 2022, Best Representation Award *Dec. 2022*
- Outstanding Graduate Student, Wuhan University *Nov. 2022*
- The 6th National Symposium on Imaging Spectral Earth Observation, Best Representation Award *Oct. 2021*
- Outstanding Graduate Student, Central South University *June 2019*
- National Encouragement Scholarship for Undergraduates, Ministry of Education *Oct. 2018*
- Zhonghaida Scholarship *Nov. 2017*

RESEARCH EXPERIENCES & PROJECTS

Theoretic Research on Scene Change Detection of Hyperspectral Remote Sensing Image Based on Self-Supervised Learning (A Project Funded by National Natural Science Foundation of China)

Key Member | Sigma Laboratory of Wuhan University *Jan., 2022 – June, 2022*

Advisor: Liangpei Zhang & Chen Wu, Professor at LIESMARS, Wuhan University

✧ Introduced self-supervised learning to hyperspectral change detection and establish a novel self-supervised Spatial–Spectral Feature Understanding Network for hyperspectral change detection.

✧ Put forward a powerful spatial–spectral attention module to explore the spatial correlation and discriminative spectral features of multitemporal hyperspectral images.

✧ Tested the huge potential of self-supervised framework on two different hyperspectral change detection tasks.

Theoretic Research on Multiclass Change Detection of Hyperspectral Remote Sensing Image Under the Weakly Supervision of Binary Change Detection Labels (A Project Funded by National Key Research and Development Program of China)

Key Member | Sigma Laboratory of Wuhan University *Mar., 2021– Dec., 2021*

Advisor: Liangpei Zhang & Chen Wu, Professor at LIESMARS, Wuhan University

✧ Proposed an unsupervised multi-task framework for multi-class change detection with the mature binary change detection approaches, which can only promote the multi-temporal spectral unmixing results but also boost multiclass change detection performance.

- ✧ Designed an innovative constraint for spectral unmixing from the point view of change detection, integrating the temporal correlation into the spectral unmixing, where the abundance maps of the unchanged pixels are boosted to be more similar and that of the changed pixels more accurate.
- ✧ To further effectively clear the impact of error accumulation and bias, we designed the alterative optimization between the unmixing and change detection, contributing to greater binary and multiclass change detection results.

Investigation and Analysis of Impact of CONVID-19 on the Traffic Density Reduction and Face Mask Use by Remote Sensing and Public Visual Data Processing (A Project Funded by National Natural Science Foundation of China)

Key Member | Sigma Laboratory of Wuhan University *Mar., 2019 – Mar., 2021*
Advisor: Liangpei Zhang & Chen Wu, Professor at LIESMARS, Wuhan University

- ✧ Designed a novel vehicle detection model combining unsupervised vehicle candidate extraction for very-high-resolution remote sensing images (0.5 m).
- ✧ Quantitative analysis of the traffic density reduction before and after lockdown in six cities worldwide (Wuhan, Milan, Madrid, Paris, New York, and London).
- ✧ Evaluated the correlation between COVID stringency index and traffic density change ratio, indicating a highly correlation with the COVID lockdown policy stringencies.

The Remote Sensing Monitoring Analysis of Chinese Dongting Lake Water Area Variations Using Multi-Temporal SAR Images (Undergraduate Innovation and Entrepreneurship Project)

Group Leader & Key Member | Central South University *Mar., 2019 – Mar., 2021*

- ✧ Designed a simple and effective SAR image water extraction index based on statistical feature.
- ✧ Obtained multi-temporal waterbody segmentation maps of Dongting Lake region.
- ✧ Analyzed the seasonal and annual variation rules and influencing factors of Dongting Lake.

OTHER EXPERIENCES

Editorial Intern on Geo-Spatial Information Science (*SCI Q1*) *Jan., 2022 –Up to Now*

- ✧ Undertook and planned exchange lectures for young scholars.
- ✧ Wechat and international account operation and promotion of the journal.
- ✧ Collected and sort out the cutting-edge scientific research results in the relevant fields of journals.
- ✧ Academic poster designing.

ADDITIONAL INFORMATION

Reviewer: *IEEE Transactions on Image Processing (TIP), IEEE Transactions on Geoscience and Remote Sensing (TGRS), IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (JSTARS), IEEE Geoscience and Remote Sensing Letters (GRSL)*

Languages: English (The College English Test, CET 6)

Programming Language: Python, Matlab, C/C++

Deep Learning Framework: PyTorch, Keras, TensorFlow

Interests: Photography, Reading, Running