Jialin Sun

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Short Biography

Jialin Sun is a master student in Land use and information technology at China Agricultural University. He has a background in remote sensing with interdisciplinary knowledge from geography, agricultural, machine learning and artificial intelligence. Recently, he is focusing on what foundation models, particularly Segment Anything Model (SAM), can bring to remote sensing domain. He is now developing a weakly supervised semantic segmentation method for crop mapping based on SAM.

Education

09/2022 – present	**China Agricultural University**
	Master in Land use and information technology
	• GPA: 3.61/4 (2/14)
09/2018 – 06/2022	**Nanjing University of Information Science and Technology**
	Bachelor in Remote Sensing Science and Technology
	• GPA: 4.09/5.0 (4/23)

Research Interests

- Environmental remote sensing
- Land use and land cover mapping
- Multi-source data fusion, time series analysis
- Machine learning, deep learning

Research Experiences

Research on what Segment Anything Model (SAM) can bring to remote sensing domain

Independent research   *06/2023 - present*

(1) Enhancing crop mapping through an automated sample generation framework based on SAM

- Evaluate the performance of SAM for crop parcel segmentation using medium-resolution satellite imagery, such as Sentinel-2 and Landsat-8.
- Develop a novel automated sample generation framework based on SAM.
- Assess the effectiveness of the framework through the datasets in Henan Province of China and southern Ontario of Canada.

(2) A weakly supervised learning method based on SAM for crop mapping

- Use adapters to finetune SAM for crop parcel segmentation in Sentinel-2 images.
- Generate high-quality pseudo labels through finetuned SAM and point, bounding box and image-level weak annotations. Particularly, an attention-based U-Net network is used to create class activation maps (CAMs) with multi-temporal images.

updated on 21/02/2024

- Apply pseudo labels to train a fully supervised segmentation model to conduct crop mapping.

Large-scale crop mapping with multi-source satellite images using a spatiotemporal datacube-based deep learning framework

Supervised independent research *10/2022 – 05/2023*

- Develop a datacube-based framework to conduct large-scale crop mapping.
- Adopt a novel sample extraction technique based on spatiotemporal datacube.
- Fuse GF-1 and Sentinel-2 multi-temporal images by early and late fusion strategy.

FY-4 LPW product authenticity validation

Supervised independent research *10/2021 – 03/2022*

- Validate FY-4 layer precipitable water product using radiosonde data.

Publications

[1] **Sun, J.**, Yan, S., Yao, X., Gao, B., Yang, J., A Segment Anything Model based weakly supervised learning method for crop mapping using Sentinel-2 time series images. (***Under review**)

[2] **Sun, J.**, Yan, S., Alexandridis, T., Yao, X., Zhou, H., Gao, B., Huang, J., Yang, J., Li, Y., Enhancing crop mapping through automated sample generation based on Segment Anything Model with medium-resolution satellite imagery. (***Under review**)

[3] Yan, S., Yao, X., **Sun, J.**, Huang, W., Yang, L., Zhang, C., Gao, B., Yang, J., Yun, W., Zhu, D., TSANet: A Deep Learning Framework for the Delineation of Agricultural Fields Utilizing Satellite Image Time Series. Available at SSRN 4580471. (***Revised**)

[4] **Sun, J.**, Yao, X., Yan, S., Huang, J., Xiong, Q., Li, G., Zhu, D., Large-scale crop mapping with multi-source satellite images using a spatiotemporal datacube-based deep learning framework. (***Submitted**)

Skills

- Computer language: Python, MATLAB, IDL, Linux, high-performance computing, Google Earth Engine
- Software: ArcGIS, ENVI, SNAP

English proficiency

- Chinese College English Test Band 4 (CET4): 658
- Chinese College English Test Band 6 (CET6): 604
- TOEFL: 107 (Reading: 28/Listening: 29/Speaking: 23/Writing: 27)