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IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing
Special Issue on “Recent Advancements in Weakly Supervised Multimodal Learning for Earth Observation Data Analysis”

Multimodal learning is essential in remote sensing, driven by the diverse and complex data from Earth observation platforms, including optical imagery, SAR, hyperspectral data, LiDAR, and textual descriptions. These modalities offer complementary views but present significant challenges in data alignment, fusion, and interpretation. Weakly supervised learning addresses the scarcity of high-quality labeled datasets, leveraging weak, unlabeled, or partially labeled data to extract meaningful patterns across diverse data types. Visual language models (VLMs) bridge visual and textual modalities, enabling tasks like language-guided image analysis and automated report generation, which can revolutionize Earth observation systems for applications such as disaster management and environmental monitoring. This special issue focuses on recent advancements in weakly supervised multimodal learning, emphasizing novel algorithms, frameworks, and methodologies for Earth observation. It aims to integrate VLMs and other advanced techniques to develop more intelligent, flexible, and interpretable Earth observation systems.

The broad topics include (but are not limited to):

- Weakly Supervised Multimodal Fusion Techniques for Earth Observation:
 - Advanced methods for integrating data from different sensors, such as optical, SAR, LiDAR, and hyperspectral.
 - Cross-modal attention mechanisms and alignment strategies for multimodal learning.
 - Learning from weak, sparse, or partially labeled multimodal data in remote sensing.
 - Semi-supervised, self-supervised, and unsupervised techniques tailored for multimodal datasets.
 - Applications of weakly supervised multimodal fusion in Earth observation tasks such as change detection, semantic segmentation, and 3D reconstruction.
- Weakly Supervised VLMs for Multimodal Earth Observation:
 - Combining visual and textual data for enhanced interpretation and decision-making.
 - Language-guided segmentation, classification, and object detection in remote sensing imagery.
 - Multimodal neural architectures for leveraging text descriptions and visual features in Earth observation.
 - Methods for generating textual summaries or descriptions from remote sensing data.
 - Leveraging VLMs to create interpretable and actionable insights from multimodal data.
- Benchmarking and Evaluation of Weakly Supervised Multimodal Learning in Remote Sensing:
 - Developing standardized benchmark datasets and evaluation protocols for multimodal Earth observation tasks.
 - Comparative studies of multimodal learning techniques for weakly supervised applications.

Schedule

April 1, 2025 Submission system opening
December 31, 2025 Submission system closing

Format

All submissions will be peer reviewed according to the IEEE Geoscience and Remote Sensing Society guidelines. Submitted articles should not have been published or be under review elsewhere. Submit your manuscript on <http://mc.manuscriptcentral.com/jstars>, using the Manuscript Central interface and select the “**Recent Advancements in Weakly Supervised Multimodal Learning for Earth Observation Data Analysis**” special issue manuscript type. Prospective authors should consult the site <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9082768> for guidelines and information on paper submission. All submissions must be formatted using the IEEE standard format (double column, single spaced). Please visit http://www.ieee.org/publications_standards/publications/authors/author_templates.html to download a template for transactions. Please note that since Jan. 1, 2025, IEEE J-STARS, as a fully open-access journal, is charging a flat publication fee \$1,800 per paper.

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