Special Issue

SAR Image Change Detection: From Hand-Crafted to Deep Learning

Message from the Guest Editors

Synthetic Aperture Radar image change detection has emerged as a pivotal technology in modern remote sensing. Traditional approaches, predominantly relying on hand-crafted algorithms such as ratio operators, and statistical models, frequently struggle with SAR's inherent challenges—speckle noise, geometric distortions, and intricate backscattering mechanisms. These limitations often result in reduced accuracy, particularly in heterogeneous environments, and necessitate labor-intensive parameter tuning. The paradigm shift toward deep learning has revolutionized SAR change detection by automating hierarchical feature extraction and enhancing model robustness. Convolutional Neural Networks and advanced architectures like U-Net and Transformer-based models excel at capturing multi-scale spatiotemporal patterns, effectively suppressing noise while preserving subtle change signatures. Innovations such as Siamese networks, attention mechanisms, and unsupervised learning frameworks further address critical bottlenecks like labeled data scarcity and cross-domain adaptation, enabling scalable deployment across diverse geographical regions.

Guest Editors

Dr. Yuming Xiang

Dr. Ling Wan

Dr. Niangang Jiao

Dr. Sourabh Paul

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Remote Sensing
Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
remotesensing@mdpi.com

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Remote Sensing is now a prominent international journal of repute in the world of remote sensing and spatial sciences, as a pioneer and pathfinder in open access format. It has highly accomplished global remote sensing scientists on the editorial board and a dedicated team of associate editors. The journal emphasizes quality and novelty and has a rigorous peer-review process. It is now one of the top remote sensing journals with a significant Impact Factor, and a goal to become the best journal in remote sensing in the coming years. I strongly recommend *Remote Sensing* for your best research publications for a fast dissemination of your research.

Editor-in-Chief

Dr. Prasad S. Thenkabail
Senior Scientist (ST), U. S. Geological Survey (USGS), USGS Western Geographic Science Center (WGSC), 2255, N. Gemini Dr., Flagstaff, AZ 86001, USA

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