Dear Colleagues,

Synthetic aperture radar (SAR) is an important active microwave imaging sensor whose all-day and all-weather working capacity give it an important place in the remote sensing community. Since the United States launched the first SAR satellite, SAR has received much attention in the remote sensing community, e.g., geological exploration, topographic mapping, disaster forecast, and traffic monitoring. It is valuable and meaningful, therefore, to study SAR-based remote sensing applications.

In recent years, deep learning represented by famous convolution neural networks has promoted huge progress in the computer vision community, e.g., face recognition, driverless field, Internet of things (IoT). Deep learning can enable computational models with multiple processing layers to learn data representations with multiple-level abstractions. This can greatly improve performance of various applications. Today, scholars are realizing the potential value of deep learning in remote sensing. Many remote sensing application techniques have been involved in deep learning, e.g., target and oil spill detection, traffic surveillance, topographic mapping, AI-based SAR imaging algorithm updating, coastline surveillance, and marine fisheries management.

Interestingly, when SAR meets deep learning, how to use this advanced technology correctly needs to be considered carefully, and how to give full play to the best performance of this “black-box” model also needs careful consideration. Notably, deep learning uncritically abandons traditional hand-crafted features and relies excessively on abstract ones of deep networks. Is this reasonable? Can the abstract features of deep networks fully represent real SAR? Should the traditional hand-crafted features provided with mature theories and elaborate techniques be abandoned completely? These questions are worth pondering when one applies various deep learning techniques to the SAR remote sensing community. In general, deep learning is always proposed for natural optical image whose imaging mechanisms are greatly different from SAR.

When SAR meets deep learning, should SAR accommodate itself to deep learning, or should deep learning accommodate itself to SAR? The relationship between the two needs further exploration and research. Furthermore, is deep learning really suitable for SAR? The number of SAR samples is far smaller than that of natural optical images. In this case, could we ensure deep networks learn SAR mechanisms deeply?

This Special Issue provides a platform for researchers to handle the above significant challenges and present their innovative and cutting-edge research results when applying deep learning to SAR, in various manuscript types, e.g., article, letter, review, technical report. Potential topics include but are not limited to the following:

Object detection and classification;

Ocean remote sensing;

Terrain classification;

Data analytics in the SAR remote sensing community;

Intelligent SAR agriculture monitoring;

Interferometric SAR technology;

SAR image intelligent processing;

AI-based SAR imaging algorithm updating;

SAR forest applications;

Earth observation;

Marine pollution.

We are looking forward to receiving your contribution to this Special Issue entitled “Synthetic Aperture Radar (SAR) Meets Deep Learning”.

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Guest Editors

<https://www.mdpi.com/journal/remotesensing/special_issues/synthetic_aperture_radar_meets_deep_learning>