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The New Working Groups of the GRSS Technical Committee on Image Analysis and Data Fusion

The Image Analysis and Data Fusion Technical Committee (IADF TC) of the IEEE Geoscience and Remote Sensing Society (GRSS) serves as a global, multidisciplinary network for geospatial image analysis (IA), e.g., machine learning (ML), deep learning (DL), image and signal processing, and big data and data fusion (DF), e.g., multi-sensor, multiscale, and multitemporal data integration.

The wide scope of IADF broadened further with the recent advances of IA and DF. The increasing availability of space or airborne remote sensing data requires advanced methods for multimodal DF, including image alignment, low-level preprocessing, feature extraction, and image fusion. It also allows for new opportunities for IA such as sensor transcoding, cross-modal image interpretation, and domain adaptation. Many of these advancements are achieved by ML approaches. In particular, DL has been extremely successful at all levels of the processing chain to automatically interpret remote sensing images including image compression, cloud removal, noise suppression, image registration and normalization, feature extraction, and representation learning as well as semantic analysis and extraction of bio-/geophysical parameters. One of the main causes for the recent success of ML and DL is the increasing availability of large-scale benchmark data sets, i.e., data that contains reference data additionally to the input images, which allows the proper training and evaluation of learning-based approaches.

To ensure that these diverse aspects are well represented by IADF, three working groups (WGs) were created that are dedicated to distinct fields within the scope of IA and DF, namely benchmarking (WG-BEN; Figure 1), image and signal processing (WG-ISP; Figure 2), and ML/DL for IA (WG-MIA; Figure 3).

WG-BEN

Data sets have always been important for research on novel remote sensing methodologies, as they are need-



ed for the development and evaluation of new algorithms. In today's era of big data and DL, data sets have become even more important than before: large, well-curated, and annotated data sets are of crucial importance for the training and validation of state-of-the-art models for information extraction from increasingly versatile multisensor remote sensing data. In addition, due to the increasing number of new methods being proposed by scientists and engineers, the possibility to compare these methods in a fair and transparent manner has become more and more important.

The WG-BEN addresses these challenges and provides input with respect to evaluation methods, data sets, benchmarks, competitions, and tools for the creation of reference data. Furthermore, we contribute to evaluation sites, databases, and standardization endeavors.

WG-ISP

The WG-ISP promotes advances in signal and image processing relying upon the use of remote sensing data. It serves as a global multidisciplinary network for both DF and IA, supporting activities about several specific topics under the umbrella of the GRSS IADF TC. It aims at connecting people, supporting educational initiatives for both students and professionals. The WG-ISP encloses different topics, such as pansharpening, superresolution, multimodal image registration, DF,



FIGURE 1. The logo of the WG-BEN.

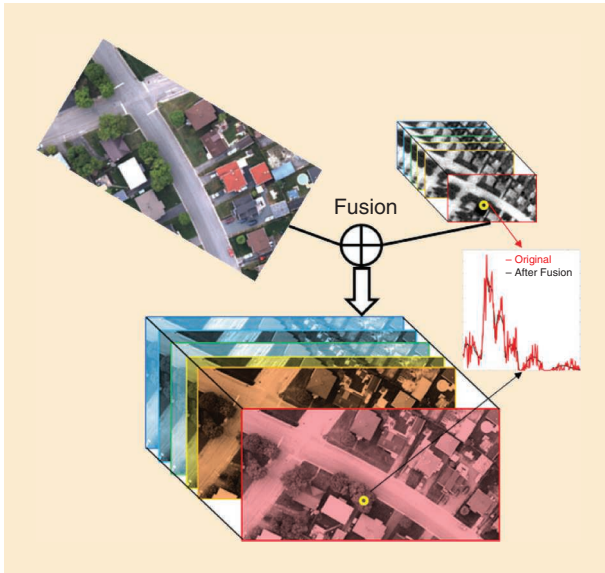


FIGURE 2. The logo of the WG-ISP.

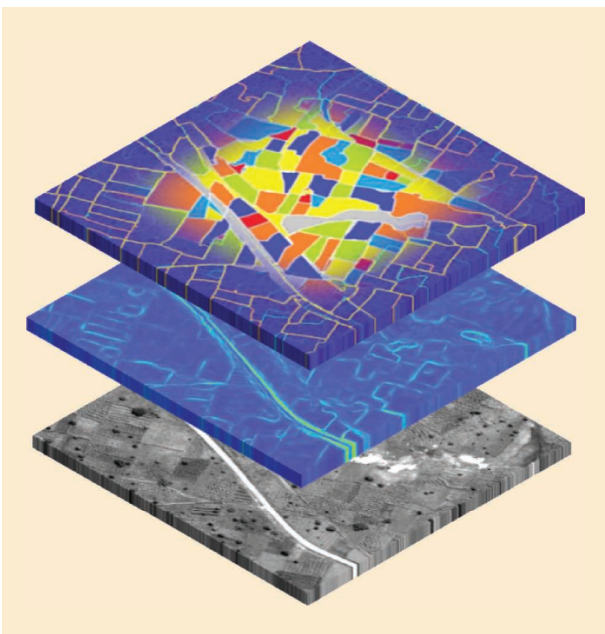


FIGURE 3. The logo of the WG-MIA.

multimodal data analysis, segmentation/clustering, denoising, despeckling, image enhancement, image restoration, and many others.

Current activities include the organization of invited sessions at international conferences, special issues in international journals, contests using remote sensing data, and the support to the GRSS IADF newsletters. A prime example of WG-ISP activities is a new contest exploiting data acquired by the new PRISMA satellite mission operated by the Italian space agency and addressing the hyperspectral pansharpening problem, awarding the winners at the 2022 IEEE Workshop on Hyperspectral Imaging and Signal Processing. Future activities will push toward the promotion of training for students (in particular, Ph.D. students) proposing new initiatives (e.g., short courses, tutorials, and summer schools).

WG-MIA

The WG-MIA fosters theoretical and practical advancements in ML and DL for the analysis of geospatial and remote sensing images. Under the umbrella of the GRSS IADF TC, WG-MIA serves as a global network that promotes the development of ML and DL techniques and their application in the context of various geospatial domains. It aims at connecting engineers, scientists, teachers, and practitioners, promoting scientific/technical advancements and geospatial applications. To promote the societal impact of ML-based solutions for the analysis of geospatial data, we seek robustness, domain generalization, accountability, transparency, explainability, and adversarial mitigation in ML algorithms.

The WG-MIA is leading the conversation on the development of ethical, understandable, and trustworthy ML techniques. Our key activities include ML algorithm development challenges, organizing special issues in IEEE journals, and workshops at main conferences.

JOIN IADF

You can contact the IADF TC chairs at iadf_chairs@grss-ieee.org. If you are interested in joining the IADF TC, please fill in the form on our website (<https://www.grss-ieee.org/technical-committees/image-analysis-and-data-fusion/>) or send an email to us including your:

- ▶ first and last name
- ▶ institution/company
- ▶ country
- ▶ IEEE Membership number (if available)
- ▶ email address.

Members receive information regarding research and applications on IA and DF topics as well as updates on the annual DF contest and on all other activities of the IADF TC. Membership in the IADF TC is free! You can also join the LinkedIn IEEE GRSS Data Fusion Discussion Forum (<http://www.linkedin.com/groups/IEEE-GRSS-Data-Fusion-Discussion-3678437>) or follow IADF on Twitter (@GrssIadf).