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Editorial: Advances and applications of artificial intelligence in geoscience and remote sensing

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Editorial on the Research Topic
Advances and applications of artificial intelligence in geoscience and remote sensing

The Earth is the space that human beings depend on. Earth observation and remote sensing technology use modern information technology to carry out disaster and threat early warning, mineral and resource detection, climate change and other real-time monitoring, prediction and distribution law exploration of adjacent space, surface and internal structure of the Earth. It has been widely used in military, civil, energy and other fields, and has become an indispensable information technology means for the development of human society.

In recent years, with the continuous development of Earth Science and remote sensing technology, especially the continuous emergence of different detection sensors and new detection systems, and the continuous accumulation of historical data and samples, it is possible to use artificial intelligence (AI) for big data analysis, and it has become a research hotspot in this field.

In the field of oil and gas seismic exploration, technologies such as seismic data processing and reservoir prediction have shifted from classic signal processing methods to data-driven artificial intelligence methods, specifically including: 1) seismic data processing. In this Research Topic, newly developed artificial intelligence models are utilized to solve seismic denoising (He et al.), velocity analysis (Wang D. et al.), data reconstruction, etc., in order to minimize the negative impact of perceived factors as much as possible. 2) Reservoir parameter inversion and oil and gas prediction, automatic fault tracking shear wave velocity prediction (Wang H. et al.), logging modeling, seismic wave field forward modeling, seismic impedance inversion(), rock fracture detection, etc.

For remote sensing super-resolution image restoration and reconstruction, authors proposed a novel Auto-weighted low-rank Tensor Ring Factorization with

Hybrid Smoothness regularization (ATRFHS) for mixed noise removal in HIS (Wang Z. et al.).

For Remote sensing target detection and recognition, authors presented a system which uses multiple sensors and a convolutional neural network (CNN) architecture to test cross-sensor object detection resiliency (Mohan and Simske, 2023).

In the future fields of Earth science and remote sensing, artificial intelligence may play a more important role and have greater development space. Especially artificial intelligence models driven by sufficient knowledge, which do not rely on the neural network structure of large models and targeted interpretable networks, are worthy of attention.

A total of 20 submissions were received for the advances and applications of artificial intelligence in geoscience and remote sensing, and after peer review, 13 manuscripts were accepted, involving 55 authors.

Thanks all authors for sharing their latest achievements and contributions to promoting the application of artificial intelligence technology in the field of geoscience and remote sensing.

References

Mohan, V., and Simske, S. J. (2023). Cross-sensor vision system for maritime object detection. *Front. Mar. Sci.* 10, 1112955. doi:10.3389/fmars.2023.1112955

Author contributions

Conflict of interest

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