frontiers | Frontiers in Earth Science

TYPE Editorial
PUBLISHED 04 January 2023
DOI 10.3389/feart.2022.1090016

OPEN ACCESS

EDITED AND REVIEWED BY
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SPECIALTY SECTION
This article was submitted to Environmental Informatics and Remote Sensing,
a section of the journal Frontiers in Earth Science

RECEIVED 04 November 2022
ACCEPTED 05 December 2022
PUBLISHED 04 January 2023

CITATION
Ouadfeul S-A, Jawak SD, Shirzadi A and Idrees MO (2023), Editorial: Artificial intelligence and machine learning in Earth science.
Front. Earth Sci. 10:1090016.
doi: 10.3389/feart.2022.1090016

Editorial: Artificial intelligence and machine learning in Earth science

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KEYWORDS

AI, ML, earth science, advances, research

Editorial on the Research Topic
Artificial intelligence and machine learning in Earth science

In recent years, Artificial Intelligence (AI) and Machine learning (ML) methods have demonstrated practical usage in several spheres of Earth system science including the hydrosphere, geosphere, biosphere, and cryosphere. With technological evolution, countless numbers of ground, air, space, and marine-based sensors provide information regarding the health of our planet; Modern technologies such as AI and ML have become very useful tools in many areas of Earth science studies because of their capability to interpret petabytes of data collected by a variety of sensors.

The aim of the current Research Topic is to collect recent advances related to artificial intelligence and machine learning in geophysics. The Research Topic demonstrates the use of AI in leaf area index product generation, improved core lithofacies predictions, water level predictions, and forecasting monthly precipitation. In the first paper, (Li) a Nonlinear Auto Regressive neural network with eXogenous input (NARXNN) model generated using spectral reflectance is implemented.

In the second paper, (Koeshidayatullah et al.) a vision transformer model Facies ViT for improved core lithofacies classification useful for subsurface reservoir characterization in different basins worldwide is developed, three machine learning approaches 1) Multilayer perceptron neural network (MLP-NN), 2) Elman neural network (ENN), and 3) integration of particle swarm optimization algorithm to Elman neural network (PSO-ENN) are used to predict the water level in the Dongting lake.

Authors of the third paper (Luo et al.) have implemented a hybrid EEMD-BMA model based on ensemble empirical mode decomposition (EEMD) and Bayesian model

averaging (BMA) for monthly precipitation series data at Kunming station from January 1951 to December 2020 to predict precipitation.

In the last paper, (Deng et al.) effective usage of AI methods in water level prediction, precipitation prediction and LAI has been demonstrated.

We believe that the content of the Research Topic is an important information source for researchers working in the area of artificial intelligence and machine learning.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

Conflict of interest

S-AO were employed by the Sonatrach.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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