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Deep learning for earth resource and environmental remote sensing

Carlos Enrique Montenegro Marin[a], Xuyun Zhang[b] and Nallappan Gunasekaran[c]

[a]District University Francisco José de Caldas, Bogotá, Colombia; [b]Macquarie University, Sydney, AU-NSW, Australia; [c]Shibaura Institute of Technology, Tokyo, Japan

Remote sensing and image analysis are now key mechanisms for environmental surveillance as well as other environmental assets. Specifically, remote sensing involves evaluating objects without communicating with them. As a result of the growing number of people and numerous human processes, long-term monitoring techniques are becoming increasingly important. Over the past few decades, deep learning has gained prominence in the analysis of remotely sensed data, and today it is widely used in real-time image processing. As a consequence, the systems became more effective and could be applied to a variety of remote sensing applications, including the monitoring of earth resources, environmental assessment, and earth science. As well as the capability to cope with high-resolution satellite imaging information, the deep learning methodology offers the features of global resource monitoring and environmental assessment. Additionally, a quality metric illustrating deep learning's accomplishments is provided, as well as future constraints and aspirations related to monitoring the planet's resources and environmental assessment via deep learning. The effectiveness of deep learning approaches for remote sensing applications would significantly improve when the aforementioned gaps in research are acknowledged.

This special issue intends to investigate foundational and practical studies in deep learning for remotely sensed data. Following the peer-review process, five articles were qualified for publication in this special issue in accordance with the evaluation standards. The following essential characteristics highlight the recognised works' notable technological advancement:

The first article, entitled ***"Study on Characteristics of Tight Oil Reservoir in Ansai Area of Ordos Basin – Take the Chang 6 Section of Ordos Basin as an example"*** (Liu et al., 2021) have investigated the reservoir properties of the Chang 6 oil establishment in the Ordos Basin's Ansai area using a number of theoretical statistics. The findings indicate that the lithologic features of the Chang 6 reservoir group in the Ansai area in the northeast seem to be mostly feldspathic sandstone, preceded by lithic feldspathic sandstone. Both the reservoir categories and Chang 6 member reservoirs in the Ansai area depict the lowest porosity and ultra-low permeability.

The next article, entitled ***"Deep Transfer Learning based Fusion Model for Environmental Remote Sensing Image Classification Model"*** (Hilal et al., 2022) have proposed the DTLF-ERSIC approach in this research, is a novel DTL-based fusion model for environmental remote sensing image classification that concentrates on the building of a fusion prototype to merge numerous feature vectors and therefore achieve greater classification efficiency. The DTLF-ERSIC approach combines three methods for feature extraction using entropy. A detailed experimental examination of the DTLF-ERSIC approach was performed on a testing dataset, and the outcomes were evaluated on the basis of several quality parameters. The simulation findings demonstrated the DTLF-ERSIC method's effectiveness over recent state-of-the-art approaches.

The article, entitled ***"Discussion and analysis on the improvement of the widening technology of cement concrete pavement of rural highway"*** (Xiaorui et al., 2022) examines the process of pore obstruction in pavements by studying different external variables such as sediment gradation, horizontal runoff velocity, seepage velocity, porosity, and more. Furthermore, the research investigates this discrepancy using computerised modelling and makes numerous recommendations in conjunction with the simulation model. Ultimately, the work employs exploratory studies to validate the technique described in this article. The findings indicate that the improvement technique described throughout this article is appropriate for the enlargement of cement concrete pavements on rural highways.

The upcoming article, entitled ***"Study on Coal-Rock Interface Characteristics Change Law and Recognition Based on Active Thermal Excitation"*** (Ying Tian et al., 2022) investigates and derives infrared thermal photos of the coal-rock interface generated by active thermal excitation for accurately identifying the coal-rock interaction. It is true that coal and rock with distinct spatio-temporal properties, as well as the infrared temperature

CONTACT Carlos Enrique Montenegro Marin emontenegrom@udistrital.edu.co District University Francisco José de Caldas, Bogotá, Colombia

attenuation laws of coal and rock surfaces, are being studied. The infrared photo of coal-rock is divided and denoised to determine the coal-rock interface with diverse proportions. The research offers a crucial way for recognising coal rock interfaces, enhancing shearer cutting efficiency, and accomplishing smart drum adjustable height management.

The final article, entitled ***"Spatial Distribution and Change Trend of Land Surface Evaporation and Drought in Sichuan Province (China) During 2001 To 2015"*** (Jinbao Liu et al., 2022) have analysed the drought-monitoring system using weather information from 41 locations and MODIS information. They have also developed the enhanced hybrid linear dual source remotely sensed evaporation paradigm to replicate real evaporation in Sichuan Province. Furthermore, they examined the evaporation and drought patterns in Sichuan province during the previous 12 years by developing the evaporation drought index (EDI). This climatic study serves as the foundation for predicting and regulating agriculture operations in the area.

These articles address a broad spectrum of topics, including the most current advances in deep learning for earth resources and environmental remote sensing. We thank all the scholars and referees for their timely and useful contributions. We are thankful to the journal's Editor-in-Chief for permitting us to administer a special issue of this esteemed journal. We believe that the academic world would benefit much from this special issue.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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