

This paper delves into advances in seismic imaging techniques and AI-driven data analysis aimed at increasing the efficiency of oil and gas exploration. By amplifying the exploration workflow, mitigating risks, and reducing operational costs, seismic imaging and AI-based data analysis are poised to revolutionize the oil and gas exploration landscape, stimulating sustainable resource discovery in the evolving energy model. By taking advantage of artificial intelligence algorithms and machine learning models, the interpretation of seismic data is pushed to unprecedented levels of accuracy, enabling the prediction of subsurface structures and the identification of potential hydrocarbon reservoirs with improved accuracy. We explore several artificial intelligence algorithms and machine learning models that have been deployed to interpret seismic data, predict subsurface structures, and identify potential hydrocarbon reservoirs with unprecedented accuracy. Finally, this paper emphasizes the transformative impact of AI technologies in improving exploration workflows and maximizing resource discovery while mitigating risks and reducing operational costs.