

TRIM4Post-Mining: Artificial Intelligence and Virtual Reality for Decision-Making in Remediation for Mining Companies

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On the forefront of current technologies driving the change in geoscientific data management is artificial intelligence. Countless challenges and questions can be approached now in efficient and holistic methods reducing subjective analysis while finding patterns within the data, allowing comprehensive spatiotemporal data analytics, feature extraction, and predictive modelling for the identification of potential hazards, and forecasting dynamics key in decision-making. This is the case in one of the big issues dredging the mining industry: closure and rehabilitation of affected areas, usually a final step ignored by the original inception of a mine. The showcase of artificial intelligence, and specifically machine learning, allows the identification of related information in the form of clusters, for instance, to recognize areas suitable for remediation activity and further planning. Therefore, this approach presents its role in support of decision-making and development during the transition from any commodity exploitation to a revitalized post-mining landscape, enabling alternative infrastructure development, such as for agricultural and industrial utilization, and contributing to recovery of landscapes originally used for mining dumps. Focusing on bringing the results into a more immersive environment and leveraging the derived information, an interactive visualization based on virtual reality and augmented reality technology permits the exploration of alternative and temporal scenarios with up-to-date data and models.