Machine Learning-Driven Assessment of Salt Caverns for Underground Hydrogen Storage in Poland

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Geosciences Research Day

Human versus the Machine

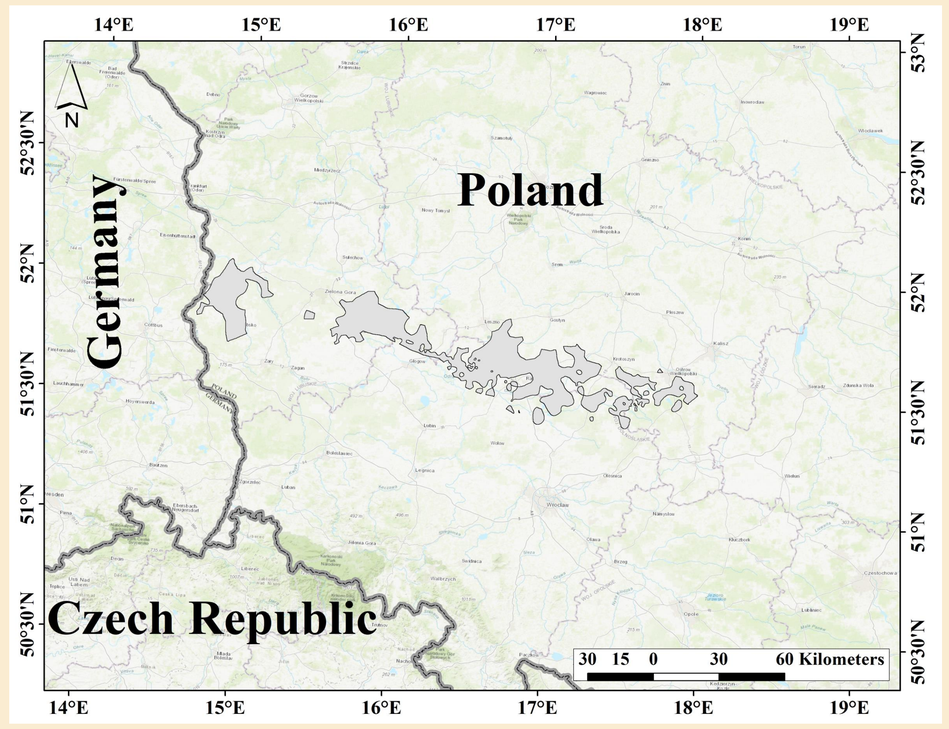
01 Summary

We developed an AI framework using multi-criteria decision and spatial data analysis to pinpoint the best sites for hydrogen storage in salt caverns. Our method integrates eight machine learning algorithms, with CatBoost emerging as the most effective.

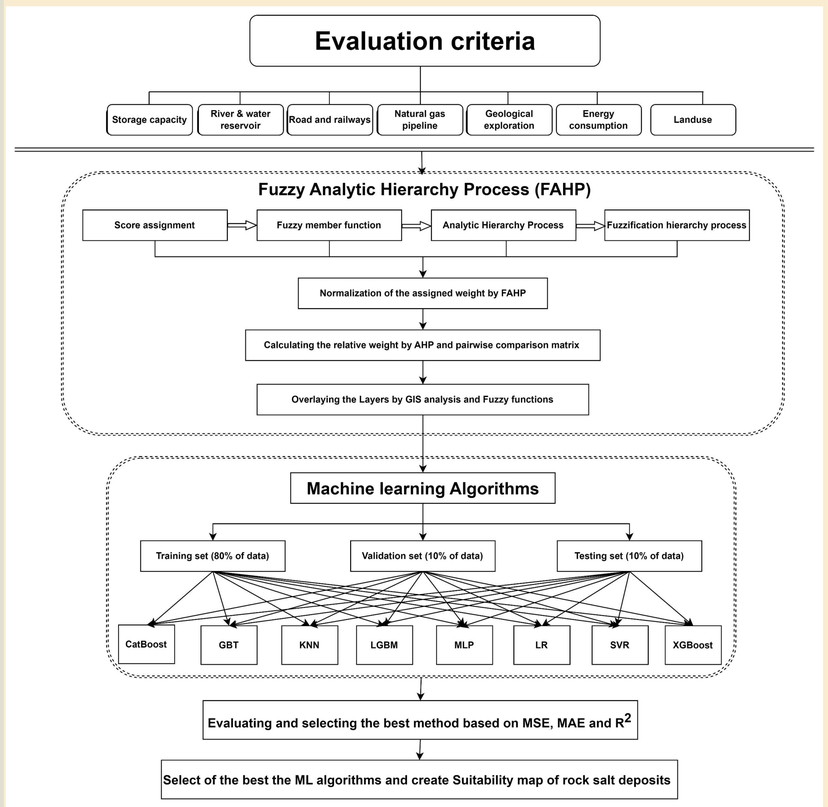
This innovative approach refines the assessment of underground hydrogen storage sites, offering a valuable tool for various stakeholders in identifying prime hydrogen storage locations.

02 Introduction

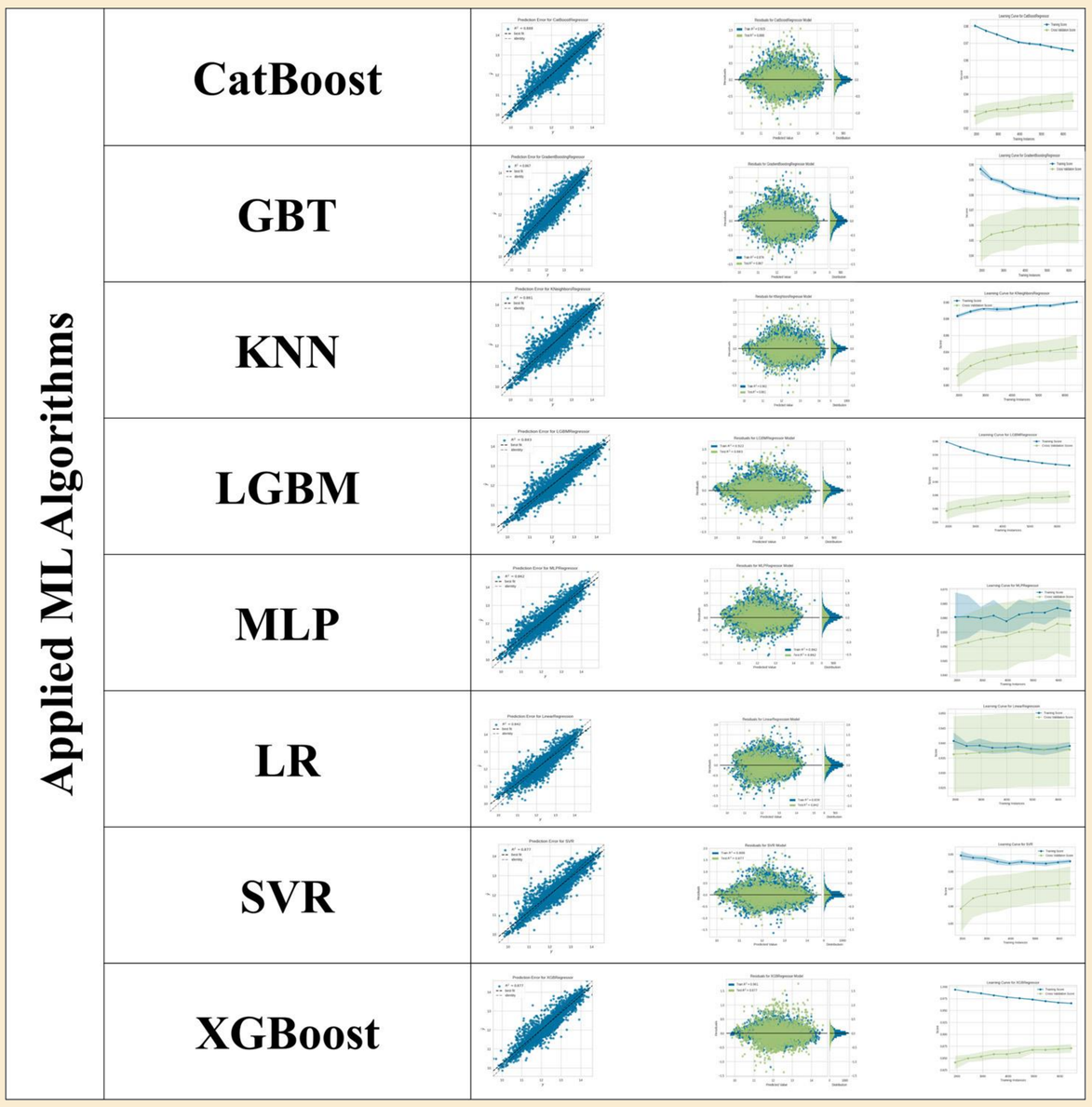
In the fast-growing field of artificial intelligence, algorithms can simulate complex phenomena across multiple disciplines. The main goal is to develop an AI-based method for locating underground hydrocarbon storage in rock salt deposits (Na1), the oldest rock salt deposit in the Fore Sudetic Monocline in southwest Poland. This novel approach to geological studies and resource management provides valuable insights and solutions.



03 Methodology

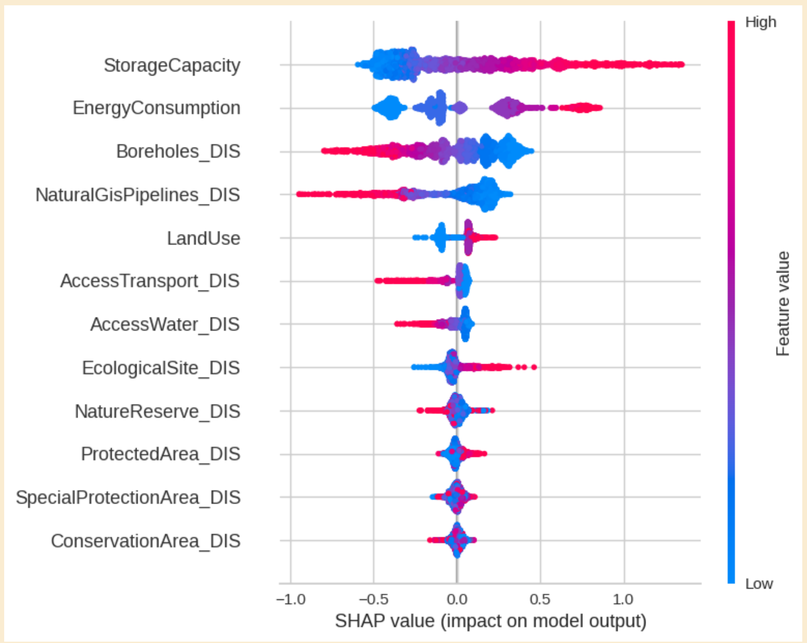


04 Result



05 Discussion

Shapley values consider all feature combinations, unlike traditional feature importance methods, which often ignore feature interactions. This holistic view allows for more nuanced model behaviour interpretation.



06 Conclusion