Objective:-

to make an advantage of the emerging machine learning algorithms to solve subsurface technical problems, specifically the uncertainty of geospatial reservoir distribution within a proposed Miocene exploratory opportunity.

Project Summary: -

- The prospect is located in Esatern basinal area from Ramadan Field
- The Current seismic data is not enough to validate the reservoir Definition in this prospect (East-Ramadan), Neither structural nor stratigraphic. "The only observation is the thickening downward to the East direction of prospect in Miocene Section".
- The reservoir distribution away from well data are based on geological conceptual scenarios, assuming the possibility of sand deposition in the accommodation space in the eastern basin defined from seismic data with a broad margin of possibilities.











Machine Learning Definition: -

Machine learning was initially defined by the American computer scientist Samuel Arthur "Is a field of study that gives computers ability to learn without being explicitly programmed."

The unsupervised machine learning is the key element used in this study

Project Work flow:-

I) Data Preparation:- The Process of Reshaping seismic data SEGY format to Pandas Data-Frame "Tabular" Format so as to be adequate and Manageable by ML Algorithms.



2) Modelling Process :-

- The Selected Algorithm in this Process is the K-M an unsupervised clustering algorithm that tries to a the form of clusters.
- The number of groups is represented by K.

Mitigating 3D reservoir distribution uncertainty of an exploratory prospect Via USML algorithm using 3d Stacked Seismic data, Gulf of Suez.



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Conclusion-

Based on the previous workflow two different iterations of modelling was considered based on two man criteria; Well data constrain as mentioned before, and the resulted image has a geological meaning.

On a final note, using unsupervised machine learning algorithm helped in mitigating the uncertainty of reservoir distribution rather than using an unaided geological conceptual model.

