

# **Artificial Neural Networks Based Seismic Facies Classification and Reservoir Property Mapping for Prospect Generation and Development: Lower Indus Basin, South Pakistan**

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Since the recent past, artificial neural network (ANN) has been widely used to solve the various complex problems in quest for oil where ambiguity is involved. Mostly, ANN has been constructively used in reservoir characterization based on seismic facies classifications and log predictions. Quality results in such analyses are confined to the intelligent and optimal selection of fundamental inputs and parameters for tuning the neural network.

In present work, ANN is applied for pattern recognition of seismic facies and description of petrophysical properties of reservoir to identify drilling targets and prognosis with reduced uncertainty as a role model supported by seismic and well data. Surface and volume based seismic attributes are used as the fundamental input to ANN algorithms of supervised and unsupervised classification of seismic facies reflecting the lithological variations. To complement the results of seismic facies identified through use of ANN, reservoir properties have been mapped using the combination of borehole data and seismic attributes. Results of mapped reservoir properties are based on the number of iterations involving linear and non-linear (ANN) calibration techniques followed by the geostatistical algorithms from CoKrigging and Geostatistical mapping.

The ANN based procedure applied is successful in field trials for exploration and exploitation of Lower Indus basin, South Pakistan. This has significantly reduced the risks associated in drilling wells in the LowerGoru Formation in terms of reduced exploitation costs, increased reserves discovered and increased production with additional drilling locations