



Porosity Estimation By Artificial Neural Networks Inversion . Application to Algerian South Field

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One of the main geophysicist's current challenge is the discovery and the study of stratigraphic traps, this last is a difficult task and requires a very fine analysis of the seismic data. The seismic data inversion allows obtaining lithological and stratigraphic information for the reservoir characterization . However, when solving the inverse problem we encounter difficult problems such as: Non-existence and non-uniqueness of the solution add to this the instability of the processing algorithm. Therefore, uncertainties in the data and the non-linearity of the relationship between the data and the parameters must be taken seriously.

In this case, the artificial intelligence techniques such as Artificial Neural Networks(ANN) is used to resolve this ambiguity, this can be done by integrating different physical properties data which requires a supervised learning methods. In this work, we invert the acoustic impedance 3D seismic cube using the colored inversion method, then, the introduction of the acoustic impedance volume resulting from the first step as an input of based model inversion method allows to calculate the Porosity volume using the Multilayer Perceptron Artificial Neural Network.

Application to an Algerian South hydrocarbon field clearly demonstrate the power of the proposed processing technique to predict the porosity for seismic data, obtained results can be used for reserves estimation, permeability prediction, recovery factor and reservoir monitoring.

Keywords: Artificial Neural Networks, inversion, non-uniqueness , nonlinear, 3D porosity volume, reservoir characterization .