

An artificial intelligence approach for rock detection and lithological horizontal estimation using well log data in Paran Sedimentary Basin, South Portion of Brazil.

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Abstract

Machine learning algorithms are computer programs that have the capability of automatically improve them selves through time. Single layer perceptron (SLP) simulates the basis of neuron synapse to recognize linear patterns in data sets. There are several methods in literature that provide particular criteria to separate data-sets into classes. Among them, linear discriminator analysis (LDA) is a powerfull mathematical approach, based on linear algebra concepts, in order to identify if two vectors are linear dependent or not. This work defines a strategy based on the LDA of well logging in order to identify if a single rock horizon is a linear separable problem. Firstly we simulate resistivity, gamma-ray, density, sonic logs from an interpreted sedimentary basin. After that, we apply the LDA as a constrain validation into the data-set and determine if a specific lithotype is separable from other groups of rocks in a linear framework. In the synthetic log data, LDA indicates a recovery of 62.5% concerning shale lithotype, which is one of the target rocks from conventional and non-conventional reservoir perspective. It is also mentionable that SLP are not able to define the shale-dolomite contact. This result depicts that the resistivity should not be considered as a promising classification of lithotype. Additionally, we could observe that interface shale-dolomite is not well defined, which indicates a resolution problem to be faced in future investigations.

Keywords: Paran Sedimentary Basin, Artificial Intelligence, Well log

1. The First Section

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16 • Bullet point one

17 • Bullet point two

18 1. Numbered list item one

19 2. Numbered list item two

20 *1.1. Subsection One*

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Treatments	Response 1	Response 2
Treatment 1	0.0003262	0.562
Treatment 2	0.0015681	0.910
Treatment 3	0.0009271	0.296

Table 1: Table caption

29 *1.2. Subsection Two*

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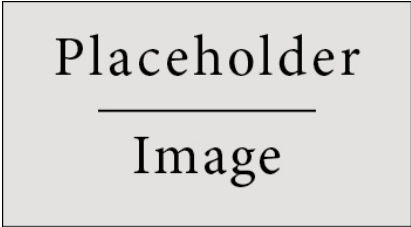


Figure 1: Figure caption

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2. The Second Section

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References

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