



## Feature Engineering in Well Log Interpretation

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### ABSTRACT

Well logs provide important information about reservoir properties around the wellbore. Accurate well log interpretation helps reservoir exploration and characterization as well as for development and decision making. With the evolution of data science, machine learning methods are being extensively used for well log interpretation. It is known that some features extracted from well logs improve the performance of machine learning-based interpretation, for instance, in the estimation of permeability. However, the choice of features is still a trial-and-error process, lacking solid petrophysical or statistical explanation, which can result in poor performance, especially when data sets are small. To provide more robust feature engineering analysis, we summarize the common features used in well log interpretation, investigate the implicit petrophysical and statistical assumptions, and suggest proper conditions for each feature to be used in specific interpretation objectives.

We successfully validate our explanations for features based on well logs acquired in different fields for the estimation of permeability. This work can help to guide petrophysicists and data scientists to choose proper features based on the specific properties prevalent in the reservoir under consideration.

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## NOTES

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