Machine Learning using Multiple Seismic Attributes could be the Paradigm Shift in the Interpretation Process

Deborah K. Sacrey

Auburn Energy, 1342 CR 213, Weimar, Texas 78962

ABSTRACT

"Machine Learning," "Cluster Analysis," "Pattern Recognition." These phrases seem to be the "buzz" word in the industry, along with "Big Data Analytics." But what does this really mean, and what are the ramifications for the interpreter when they apply a statistics-based learning process to their work flow?

The process of statistically analyzing multiple seismic attributes has been around for quite some time. Most of the previous processes were based on "wavelet" or "wave-shape" analysis, but "sample interval" information can give much more detail and allow for interpretation of events in the earth well below standard seismic tuning. This detail and the ability to segregate out events and geobodies will eventually upend the conventional amplitude wavelet interpretation.

This paper shows examples of problems in the everyday interpretation of data which can be solved by the neural analysis (Classification) of data. These problems could be reservoir delineation, interpretation of complicated stratigraphic sequences, or lowering risk in picking drilling locations. Work flows, attribute use, and outcomes are given in each case presented, highlighting the particular difficulty between interpretation in the normal seismic process and using Classification to create a new interpretation thought flow, which is much more accurate. Examples are from the Permian Basin to the Gulf Coast, but the process has been applied in basins around the world.