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## Abstract

The objective of the paper is to compare and demonstrate the effectiveness of different machine learning approach in extracting and clustering critical reservoir information from well logs into rock typing groups. Clastic reservoirs in Alpha field were selected for the study since the area is highly affected by complex geological process where conventional rock typing approach possess a great challenge. The wireline logs data from 5 wells together with sedimentologist core description were utilized for this study. 3 machine learning models chosen each for each methodology which are Random Forest, Gradient Boosting and Logistic Regression for supervised while K-Means, Hierarchical Clustering and Gaussian Mixture Mode for unsupervised. For supervised learning, lithofacies description were used as labels with gamma ray, resistivity, neutron porosity and bulk density as features. All the machine learning predicted outputs were set to 6 groups to mimic the lithofacies grouping within the field. The quality of all machine learning prediction was benchmarked with core description at cored interval and human technical judgement at uncored zone. Random forest showed a more superior result for supervised learning where most of the prediction matched with the labels while K-Means produce the best result among unsupervised learning. Both random forest and K-Means showed a consistent result at uncore interval where it is responding nicely with the well logs characters. The result from the study showed the advancement of data driven application in performing complex subsurface analysis for an improve reservoir characterization.