Using an artificial neural network (ANN) to identify coals from drilling and logging-while-drilling (LWD) data

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Objective
Saving logging cost by quickly identifying coal pay zones for completion packers and slotted casing placement.

Drilling data vs. coal

Methodology

Method Disadvantages
Well logging
- Expensive (tool and rig time)
- Acquired on a few wells
- Potential logging failure (especially in deviated and horizontal sections)
Laboratory tests
- Scale effects
- Time/resource intensive
- Require lab & quality samples

Machine learning: fast, accurate, and low-cost.

Results

Confusion matrix

Precision = True positive / (True positive + False positive)
Recall = True positive / (True positive + False negative)
F1 Score = 2 * (Precision * Recall) / (Precision + Recall)

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