An Automatic Real-Time Data Cleanser for Drilling Operations

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Why Should We Care About Bad Data?

Low oil price has created a situation where one has to improve drilling efficiency to survive. This requires data analysis both in real time, as well as post drilling, to identify ILT and NPT events, and subsequently eliminate them. Bad data reduces the success rates of such initiatives.

Reducing ILT and NPT is the key to drilling economically.

Total well delivery time or cost

Technical limit

ILT

NPT

Removable time/cost

From Sensors to Solution

To truly be a bridge between sensors and solutions, the data cleansing engine is built as an API, for easy integration into any system.

Leveraging Process Fault Detection

Since the technology is able to detect process faults such as vibrations, bit balling, drill bit failure etc., a drilling efficiency metric is made available to guide the drillers in real-time on how well they are doing.

Example of Data Cleansing Operation

Below is an example of a data set where cleansed data replaces bad and missing data.

The Technology Behind

The technology has its origin in Department of Defense (DOD) projects conducted at The University of Texas of Austin. Through a Bayesian network model3, one is able to distinguish between sensor, process and equipment faults. A trustworthiness measure between 0 and 1 is provided for each data point, helping downstream automation algorithms determine whether to use the sensor data or not.

References

1. Gartner, Measuring the Business Value of Data Quality, Published: 10 October 2011
2. Smith, M., Ventana, CIOs Need to Make Information Management a Real Priority, Published: 8 August 2012
3. Ambrus, A et.al., Drilling Rig Sensor Data Validation In the Presense of Real-Time Process Variations, SPE 166387