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# Field Validation of an Automated Geosteering Algorithm in the Haynesville Shale

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## Abstract

Traditional geosteering workflows rely heavily on the expert oversight monitoring of incoming logging-while-drilling (LWD) data and continuous manual updating of geologic interpretations to identify key points in a well where directional decisions need be made. The labor-intensive nature of this work means that a remote supervisor is often limited to only watching 2 or 3 operations simultaneously. Previous studies (Maus, et. al. 2020) have described an algorithm capable of automatically producing multiple geosteering interpretations to reduce the human workload needed to follow along with the drilling operation. This study compares the results produced by this automated geosteering algorithm with interpretations generated through traditional means. The amount of effort required to produce an equivalent outcome is quantified in order to estimate the number of rigs an expert could potentially monitor.

An automated geosteering algorithm was run in parallel with conventional geosteering for wells drilled in the Haynesville shale. Interpretations were checked for estimated landing point, modelled geologic structure throughout the lateral, and estimated footage of the wellbore in the target zone. In places where the automated interpretations provided improbable structures, control points were used to produce higher likelihood interpretations. The number of control points required was considered a proxy for the residual monitoring effort required of an operational geosteerer following the well using an automated system.

The automated interpretations showed nearly 100% agreement with human geosteerers in terms of estimated formation strata drilled through. There were a small number of segments where manual intervention was required to fix unrealistic structures and improve agreement between the geosteering algorithm and the supervising experts. The capability of the automated system to produce and maintain reasonable interpretations for large stretches of the lateral proves it could be an asset for expanding the number of rigs being supervised by an off-site expert in a remote operations center. Time that would normally be spent updating and maintaining simple geologic interpretations can instead be devoted to analyzing the most challenging intervals in each well, resulting in a more efficient allocation of personnel.

The ability to leverage automation and efficiently apply remote expertise is of increasing importance as operators aim to provide profitable returns at scale. This study quantifies the value potential for automation assisted geosteering workflows.