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Data Driven Modeling to Predict Gold-Mineralization: A case study from Goldcorp Red Lake Mine

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Summary

Geologists spend roughly 80% of their time looking for an manipulating data versus analyzing and interpreting data based on knowledge and expertise. As data sets continue to grow in size and complexisity, not only does big data create new challenges, but the complexitiy within the data tools and the lack of harmonization between them adds to the difficulty.

To augment geoscientists, a data-driven modeling workflow was developed for predicting gold mineralization in a specified location within the boundaries of a mine. The workflow created models using known input data and inferred geological information (lithology, veining, mineralization, alterations, and structure information such as faults and folds) frm multiple sources (drilling cuts, bore hole data, rock chips, maps and geological models) in and around the location of interest. The output included a predicted value for the expected gold content in that location.This predicted value can be used to classify the specificed location according to different levels of gold content given speciic thresholds that define categories of grade level (economic, elevated, mineralized or waste).

The intent of the modeling is to reduce drilling costs by targeting new areas more efficiiently, remove biases in the current reasoning process, speed up the process of finding new locations, and increase resources and reserves estimates.

Workflows generated here have similar applicability within the oil and gas environment where gold could be replaced by Oil Saturation (for sweet spot detection) or %quartz in shale to determine optimal locations to place hydraulic fractures.