

APPLICATION OF MACHINE LEARNING ALGORITHMS TO IMPROVE THE ACCURACY AND DATA PROCESSING SPEED OF MARKER TECHNOLOGY GEOSPLIT®

OBJECTIVE

In recent years, there has been a growth trend in innovative tracer-based (marker) well survey technologies in oil and gas industry aimed at long-term monitoring of reservoir production and allowing to provide a substantial amount of information on the dynamic operation of productive intervals. This allows oil & gas producing companies to significantly optimize the modes of operating wells, as well as to reduce operational risks and financial costs. It is obvious that the technically outdated methods of obtaining and interpreting data that have a number of significant drawbacks cannot fully satisfy the rapidly developing oil industry. Therefore, a very important criterion for the selection of tracer-based research methods is the ability to promptly provide accurate data so necessary for oil & gas producing companies to make important and responsible decisions on the optimization of well operation modes. Thus, it becomes expedient to optimize and automate data processing and interpretation processes to increase their accuracy and objectiveness.

SOLUTION

Today, GeoSplit is the only company that provides oil & gas producing companies a method of a long-term multi-phase well inflows survey using quantum dots. Additional advantage of quantum dots application is their high accuracy when conducting tests of reservoir fluid samples with the application of GeoSplit hardware-analytical complex using software with machine learning algorithms "Random Forest" developed by our company.

The principle of operation is as follows: initially the mathematical model is taught on the basis of "referee" samples of reporter markers, then a "decision tree" is built, where the particles are sorted according to a certain parameter at each depth stage. Thus, as a result of the application of machine learning algorithms, the process of determining the encodings of the markers and the speed of their interpretation become automated and, accordingly, much more efficient.

This processing method has a number of indisputable advantages over standard-used tools, this method of counting allows to achieve greater objectivity and accuracy in the analysis of large array of data, minimizing the "human factor" leading to risky errors.

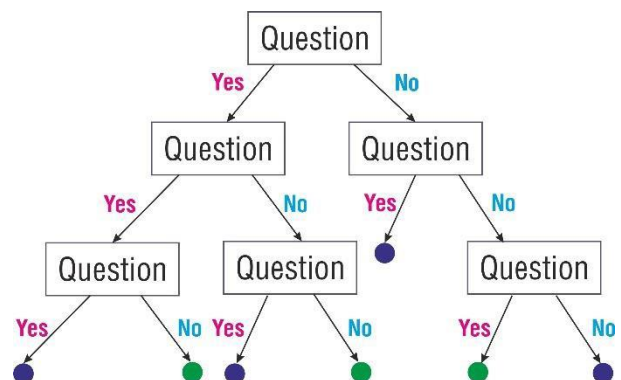


Fig.1 Example of building a decision tree in the machine learning algorithm "Random Forest"

CONCLUSION

Many years of experience acquired by GeoSplit in horizontal wells survey not only reduced the financial costs of oil & gas producing companies, but also optimized the process of analytical interpretation of data, which significantly increased the accuracy of analyses, decreased operating time and reduced to zero the risks associated with human factor.