

Smart Automation Boosts Economics

By Kari Johnson
Special Correspondent

A quiet revolution is happening in America's oil fields as next-generation automation works its way into every aspect of operations. Where once there was stiff opposition, now operators are scrambling to leverage the computing power and data accessibility provided by cloud technology. Edge computing also is becoming increasingly popular as a smart way to process key data in the field for near real-time problem solving.

These concepts offer great potential for operators to truly optimize production and reduce costs. New cyber-physical systems drive optimization with sophisticated algorithms, control systems and communication technology. Their providers say these systems are moving rapidly to identify problems through machine learning and the Internet of Things

and recommend action or even solve problems with artificial intelligence, making near-autonomous wells a reality.

Machine Learning

Machine learning has tremendous potential to automate production optimization workflows that require time-consuming analyses of large datasets, says Jesse Filipi, product manager for Ambyint. He cites dynamometer card analysis as a case in point.

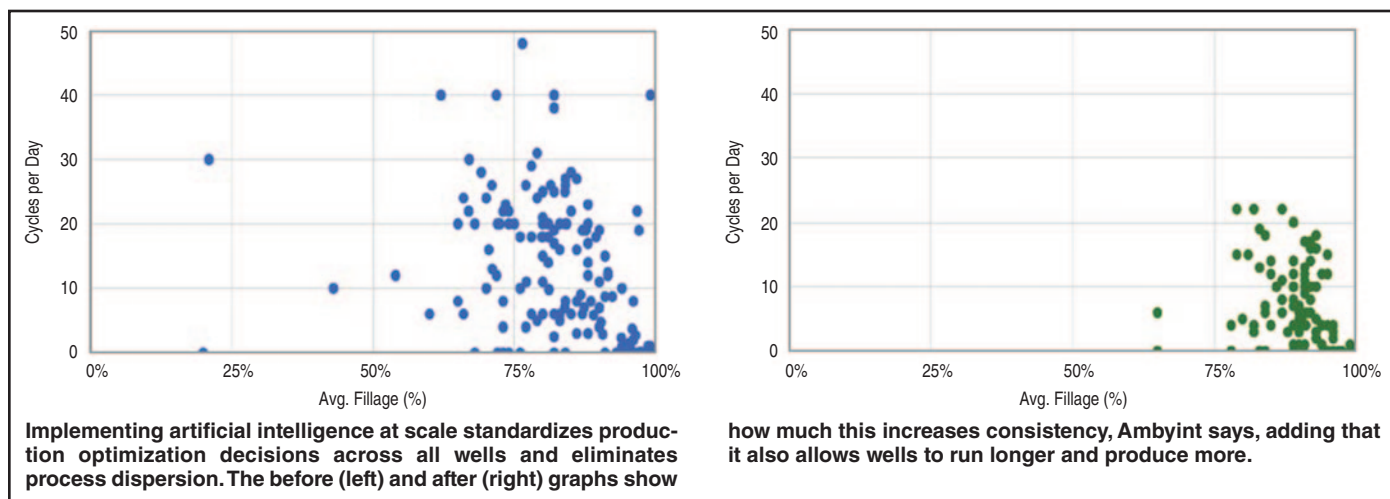
"Humans take 10-20 minutes to review cards for a single well, and they have responsibility for 200-300 wells, so it is impossible for them to look at every card," Filipi describes. "With advanced deep learning, we can analyze all cards for all wells in real time, find features that indicate a problem and highlight them for further investigation."

Using machine learning-based algorithms to classify wells and make routine

optimizations allows humans to prioritize interventions and focus on next-level problems, Filipi reports. He adds that the algorithms codify field-level knowledge, ensuring it is both applied across wells and preserved as throughout personnel changes.

Developing effective algorithms requires collaboration between data scientists and subject matter experts such as petroleum engineers, geoscientists and physicists. "The algorithms also must be tuned to learn from new data and continuously refined," he says. "Scale that across all wells working every day, and the return on investment from machine learning can be significant."

"One of the biggest benefits is stopping overpumping, which can lead to early workovers and high electricity bills," he comments. "The vast majority of rod lift wells are overpumped. By using machine learning to optimize them, we can reduce





Production Technology

operating costs 20%. At the same time, we potentially can increase production from underpumped wells by 10%.”

To increase machine learning’s benefits, Filipi says Ambyint is adding new data and retraining its models constantly to

increase their accuracy and cover new production scenarios. The company also runs several models in parallel to answer different questions.

“Our goal is to use artificial intelligence to help our customers scale their repetitive

workflows to enable them to have a greater impact on production,” he says. “This will lead to faster feedback loops and more quantitative decisions that yield higher production, longer well lives and more efficient operations.” □