C3.ai

The Digital Transformation of Shell

Based on C3 AI's documentary about Shell.
https://C3.ai/enterprise-ai-at-shell

Digital transformation is really about two things: Recognizing that the amount of data we have around our existing business gives us a big opportunity to transform the way we operate. And finding ways we can operate in the world that's coming.

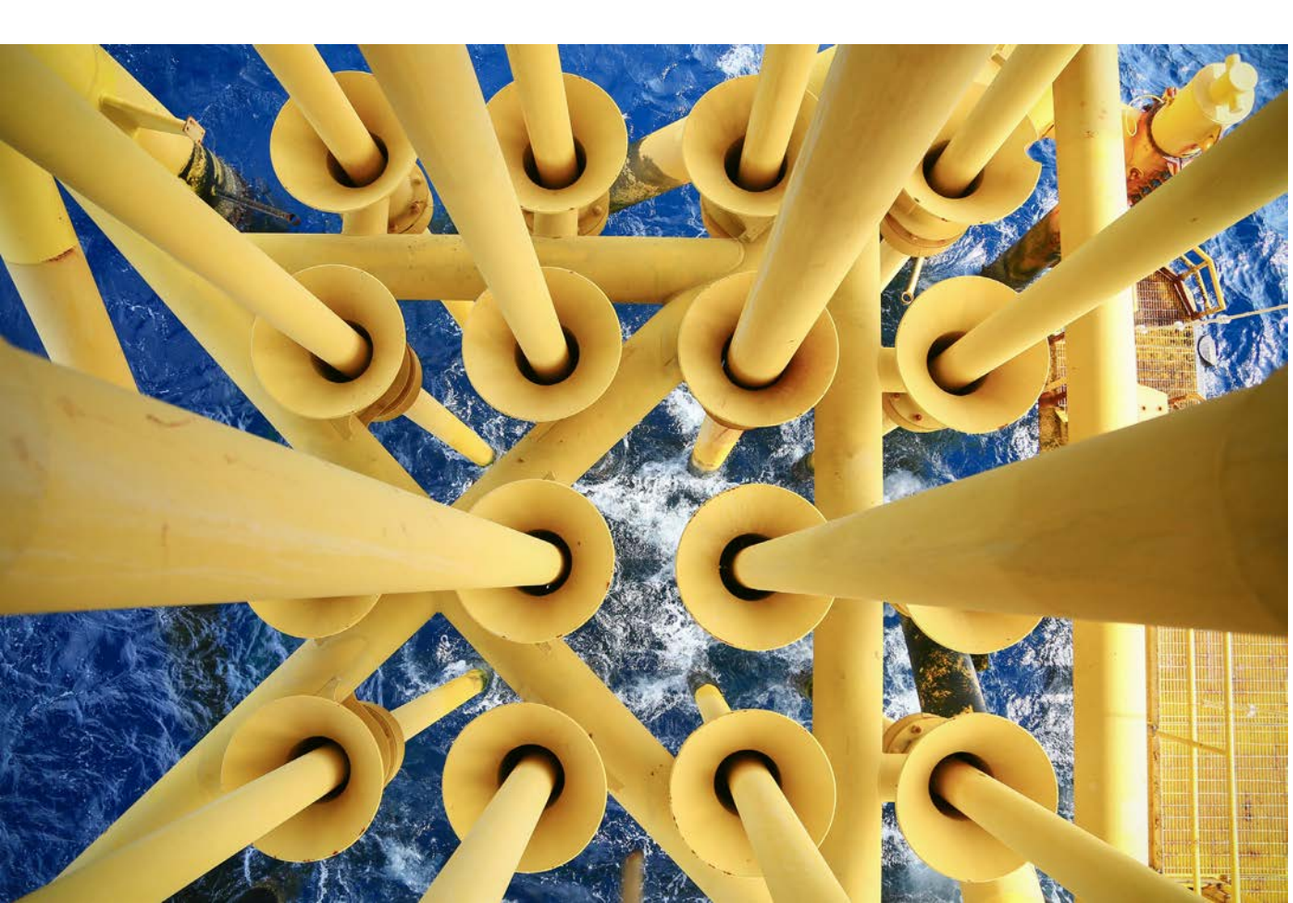
Dan Jeavons

Vice President Computational Science and Digital Innovation

Shell

When Shell approached C3 AI in 2017, the team was trying to fix a pressing problem: Equipment failure. At one of its plants, a plug had suddenly come loose from the stem. It started oscillating, and, as pressure grew, it broke the body of the control valve. It had the makings of a major disaster. Fortunately, no one was injured. But it took Shell mechanics three weeks of unplanned downtime to repair the plant.

That incident led Shell to think about how the company could prevent future failures by applying AI and machine learning to the telemetry data it had collected over many years. Shell considered building an AI platform in house, but soon realized that wasn't where its focus should be. That's when Shell executives came to C3 AI, which quickly proved the power and scalability of its predictive maintenance modeling.



Today, Shell's digital transformation is recognized as among the most successful of any industry. C3's predictive maintenance is monitoring more than 10,000 pieces of critical equipment at upstream, manufacturing, and integrated gas assets globally. Moreover, Shell has said it's recognizing significant economic benefit from its use of AI. And the company isn't slowing down: AI is critical to Shell's plan to become net-zero carbon company by 2050.

We demonstrated that we can identify device failure with very, very high levels of precision. This is being accomplished through the application of an entirely new generation of technology called predictive analytics, or AI.

Tom Siebel — **Founder Chairman and CEO** — **C3 AI**

Shell's Digital Journey

Shell has a rich history in digital technologies and data science, going back to the 1970s when it developed a statistics group. Around 2013, the digital team at Shell recognized the opportunities that would come with the emergence of cloud computing and AI.

That mindset made Shell the perfect partner for C3 AI.

The ultimate AI challenge for Shell wasn't about predicting maintenance problems with a few valves; it was about predicting maintenance issues across Shell's entire global footprint of assets.

Even so, the valve challenge alone is monumental: It requires developing and deploying millions of different models, each developed for a specific piece of equipment, that can detect anomalies before problems occur.

Developing independent models requires assessing a vast array of variables, including the temperature, pressure, and flow rate of each valve. When a problem is detected – based on a deviation from what is 'normal behavior' for that specific valve – it triggers an alert.

Working with C3 AI's technology and analytics, Shell has been able to repair almost 90 valves, saving millions of dollars in unplanned downtime. Today, Shell is collecting more and more data as the company uses AI and ML to address hundreds of other use cases. The company has embedded sensors across its assets, and it uses robots to monitor hand valves and detect leaks of all sorts, all while contributing to the growing pool of useful data.

"While the mechanics of the valve were simple, the context of the valve required that each valve had to be treated as its own independent piece of equipment. Which meant that you really needed at least one independent machine learning model per valve.

Adi Bhashyam — **Group Vice President, Solutions Engineering** — **C3 AI**

This work has led to new opportunities. Shell has, for instance, optimized performance of liquefied natural gas trains. A recent algorithm deployed to a train in Nigeria resulted in the equivalent of taking about 28,000 vehicles off the road. “It’s a great example of how AI is starting to have a big impact,” as Dan Jeavons puts it.

C3 demonstrated their platform was capable of managing two million of these models. That excited us because it gave us confidence that they understood the problem that we had, and that their platform was scalable enough to be able to deal with it as we put these models into production.

Dan Jeavons — Vice President Computational Science and Digital Innovation — Shell

Open AI Energy Initiative

To make that impact broader, and to help transform the entire energy industry, C3 AI in early 2021 teamed up with Shell, Baker Hughes, and Microsoft to create the open AI Energy initiative, an open ecosystem of AI-based solutions for the energy and process industry.

The open AI Energy Initiative is a really exciting partnership between four founding members: Baker Hughes, C3 AI, Shell, and Microsoft. And really what it aims to do is to start to create a set of industry standards and references around how we bring AI technology to the industry.

Dan Brennan — Vice President and General Manager — BakerHughesC3.ai

Digital transformation of the energy industry is a matter of urgency. The world is demanding more energy, but the demand is for energy from sustainable sources, while maintaining an economically healthy industry.

It's no secret that companies that fail to digitally transform often lose their edge, or, in the worst case, cease to exist. The stakes for the energy industry are particularly high. But if the industry follows the example of Shell, the hope is that a decade from now there will be an abundance of clean, safe, efficient energy for all the world's inhabitants. That's an ambitious goal, and a powerful example of using AI for the benefit of the economy, society, and the planet.

View the documentary at

https://C3.ai/enterprise-ai-at-shell

www.c3.ai