

2018 Space Odyssey - It's all About the Data, Stupid

The 2nd annual IoT (internet of Things) Blockchain and Machine Learning conference was held in Calgary in mid-February 2018, and if you missed it, you missed excellent presentations from experts who spoke intelligently and passionately on what could be the future for Oil & Gas technologies in Canada.

I realized early into these presentations that there is a whole new vocabulary of words, acronyms and terms, about which I know very little, but as the presentations continued, I received an education that, by the end of the conference, left me feeling hopeful, excited and wanting more.

I won't try to explain what "Blockchain" means, but will point you to the *Wiki* definition (below), which has a detailed definition. I have read this definition several times and still struggle with it conceptually.

It was stated that "Blockchain" is a layer in between solutions to integrate, for better, faster, transferable, verifiable outcomes. "Blockchain" will be viral on open platforms, some that don't even exist as yet and will reduce risk, improve safety and be a \$2 to \$3 billion industry by 2020 in Alberta.

Being from an industry, (i.e. Seismic Data Acquisition), there were takeaway messages from the conference that I found very interesting. One such message was that "*It is all about the data, stupid*", meaning that data and information about everything and anything when used collaboratively on an open platform, has enormous value.

Examples were presented demonstrating where real cost savings for Oil & Gas companies have exceeded 15% by embracing technologies to improve competencies, production and safety performance with opportunities to get even better as systems are refined.

Data being collected by sensors, pump controllers, monitors and video when transmitted in real time from well heads, pumps, pipes and valves can be integrated into datasets to optimize performance, reduce maintenance and pre-empt failure through predictive analytics.

This Predictive Analysis reminds me of the HAL 9000 computer system on board the Jupiter mission in the movie 2001 Space Odyssey. When HAL reported the imminent failure of an antenna control device, the crew retrieved the device that was found to be ok, leading to a series of events that ended in a fatal conflict between the computer and the crew. HAL continued to insist, in a dulcet, monotone voice that he is "foolproof and incapable of error".

In the future everything will be connected and there are unlimited opportunities for new businesses to replace traditional cumbersome work-intensive processes into real time order to cash processes.

Opportunities with sensors are a \$50 billion industry in Alberta and software and hardware development that integrates Artificial Intelligence (AI) that can out-perform humans will revolutionize labour requirements and reduce the associated risk.

Inaccessible and dangerous areas that need inspection and repair (e.g. wind towers, pylons) will use drones and robots equipped with video and augmented detection systems to record, detect and conduct repairs, eliminating the need for, and the risk to, labour.

Autonomous vehicles (AV's) are being used already at some Oilsands facilities and underwater vehicles (AUV's) are being used for mapping underwater features and inspecting and monitoring underwater infrastructure (e.g. pipelines) that are inaccessible or unsafe for humans.

There are opportunities to reduce the workforce by 66% from 3 workers to 1 and improve productivity by up to 60%, which could be very necessary as the boomer generation retires. New workers will be hired for jobs that don't yet exist or haven't even been conceived as yet. The new labour force will be involved in designing and implementing new technologies. Academia, including the University of Calgary, is devising new programs to fill the need for coders in these emerging technologies.

Asset management and real time cloud-based web systems will replace paper systems and create new business models in the evolution of "trust" in bookkeeping, legal documents, reporting, and smart contracts will replace conventional agreements. No more Accounts Payable and Receivable systems. Billing and Invoicing will be replaced by instant automatic credits and debits as services are performed.

Another takeaway message was *"Don't be left behind, don't delay, embrace the technology and innovation which is accelerating exponentially"*

It is ok to fail, more important is, to get in the game, experiment, set easy goals, iterate, pivot and; adapt and collaborate with likeminded, passionate individuals and companies.

From a seismic perspective, I can imagine the "jug-drone", a geophone built into a drone, with on-board guidance, unlimited power, unlimited data-storage that can fly by itself to its pre-determined location, plant itself and record and transmit acquired seismic data to a mother drone. I can see thousands of these flying in perfect symmetry from one prospect to another as they collect data to add to subsurface datasets for collaborative use in finding resources.

I'm not sure how the current proprietary nature of seismic data will be handled, but I would prefer a business model of collaboration and standardization over competitiveness and duplication, which fits into the "Blockchain" model of sharing data and information.

As we all still live in an imperfect world, there are still barriers to overcome and this will likely continue into the future. Digital systems will always have some level of risk, such as from cyber threats and hacking which means that counter measures will still be necessary to protect systems. It was indicated that 54% of companies have had cyber-attacks of some type in the last 12 months. Data security is one of the benefits of "Blockchain" on an open platform.

My hope is that the events depicted in "The Terminator" movies do not become a reality, as machines learn to program better machines to the point where they become sentient and humans become unnecessary and expendable.

Blockchain (From Wikipedia, the free encyclopedia)

A blockchain, is a continuously growing list of records, called blocks, which are linked and secured using cryptography. Each block typically contains a cryptographic hash of the previous block, a timestamp and transaction data. By design, a blockchain is inherently resistant to modification of the data. It is "an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way" For use as a distributed ledger, a blockchain is typically managed by a peer-to-peer network collectively adhering to a protocol for validating new blocks. Once recorded, the data in any given block cannot be altered retroactively without the alteration of all subsequent blocks, which requires collusion of the network majority.

Blockchains are secure by design and are an example of a distributed computing system with high Byzantine fault tolerance. Decentralized consensus has therefore been achieved with a blockchain. This makes blockchains potentially suitable for the recording of events, medical and other records, management activities, such as identity management, transaction processing, documenting provenance, food traceability or voting.