



Analysis

Why AI and Blockchain are Better Together

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Biography

Dr Scott Zoldi is Chief Analytics Officer at FICO (www.fico.com) responsible for the analytic development of FICO's product and technology solutions. While at FICO, Scott has been responsible for authoring 91 analytic patents, and is actively involved in the development of new analytic products and Big Data analytics applications, many of which leverage new streaming analytic innovations such as adaptive analytics, collaborative profiling and self-calibrating analytics.

Scott is most recently focused on the applications of streaming self-learning analytics for real-time detection of cyber security attacks, and serves on two boards of directors, Software San Diego and Cyber Center of Excellence.

Scott received his Ph.D. in theoretical and computational physics from Duke University.

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Abstract

The growing use of blockchain technology in financial services will include a healthy dose of artificial intelligence, as new, automated analytic techniques look for patterns in the "relationship data" about people, contracts and transactions. The merger of AI and blockchain – two of the hottest tech trends – is one of the predictions made by Dr Scott Zoldi, chief analytics officer at Silicon Valley analytic software firm FICO, and a recognised expert in the field of artificial intelligence.

Introduction

For most of its life, blockchain has been associated with bitcoin, the original cryptocurrency, for which it was invented a decade ago. Back then, blockchain was a means to an end: a method of facilitating secure transactions directly between two entities.

Blockchain has since built significant momentum independent of bitcoin, with businesses, governments, and entrepreneurs looking to leverage it for a wide range of applications. It has even been compared to TCP/IP (transmission control protocol/internet protocol), which laid the groundwork for the internet¹, in its potential as a foundational technology.

While only one percent of CIOs have initiated blockchain adoption in their organizations², there are signs that adoption is becoming more widespread.



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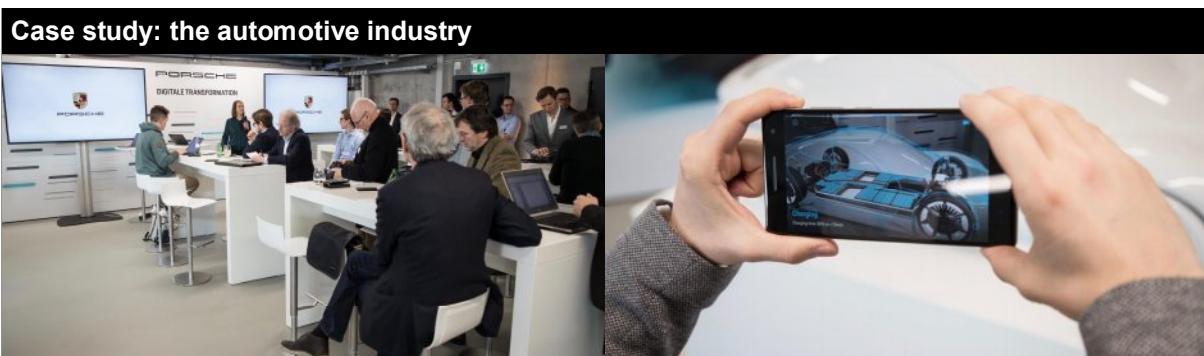
Authorities in the Netherlands recently announced that they're planning to employ blockchain to automate waste management processes³; meanwhile, Sierra Leone successfully employed the technology in what TechCrunch hailed as the first 'blockchain election'⁴, a pilot scheme that might even roll out across Africa.

For blockchain to fulfil its transformative expectations, it must be leveraged in conjunction with artificial intelligence (AI). The key to understanding why this is the case is to realise that the power of AI lies in the quality and quantity of information it's fed.

AI is not a new technology – it's been around in some form since the 1950s and my company, FICO, has used it in fraud detection solutions for more than 25 years. The recent explosion in AI development is the direct result of the rise in data volumes alongside high-performance computing: AI requires an abundance of information, combined with the requisite computing power to process and act upon it.

With the advent of blockchain, the data being fed into AI systems is set to become immutable, timestamped, and auditable; this will have a positive impact on the quality of results obtained. The decentralised nature of blockchain also means we're likely to see far more data sharing: many separate entities contributing to one shared ledger, from which anyone who needs to can pull information.

This raises many interesting machine learning applications where the chain anonymity is maintained and a larger number of immutable events associated with those entities can be made available for analysis. For example, one need only look at many aspects of financial crimes to understand this can be an amazing opportunity for at-scale data sharing and new insights across what is often a siloed view of money movement.



The automotive industry demonstrates the combined potential of blockchain and AI. From intelligent lane assistance to fully autonomous cars, AI is already an integral part of the automotive industry.

Comparatively, blockchain adoption remains in its infancy – but car companies are taking it for a test drive. Among the first to take the plunge is Porsche, which announced in February it was testing applications of the technology⁵, claiming to be the 'first automobile manufacturer to implement and successfully test blockchain in a car'.



Blockchain enables cars to be unlocked securely via an app, and even for users to temporarily grant others access authorisation for vehicles – without needing to connect to a central Porsche server.

While AI and blockchain have remained separate for now, together they have the potential to transform the industry when working together.

Imagine a car that's connected to a blockchain, recording data points and events and distributing them to a shared ledger. The car would record interactions with drivers, other cars, road signs, pedestrians, and more, enabling AI analytics to study the data and develop an understanding of which behaviours correlate with good driving and which correlate with bad.

The blockchain is critical when looking at scenarios of autonomous vehicle interactions. Your vehicle will not want to talk to a central server concerning the vehicles in close proximity and the data they are emitting, given latency issues of communication; rather, cars need to communicate securely locally and their data be immutable. Furthermore, AI models could determine how to utilise the data in the millisecond/second time frame that is needed for decisions around driving actions. These autos could even form 'systems of understanding' based on past driver behaviour or their own automated tendencies from the blockchain to anticipate and predict the accident avoidance outcomes.

Applications could include:

- **Zero Auto Ownership:** As identities on the blockchain will be immutable and tracked, the driving record for drivers can be obtained and analysed, and machine learning models can predict likelihood of accidents, safe driving, excessive behaviours, and even likelihood to leave a mess in the car for the next driver. Since the data is now of high fidelity and quality and linkages are made to financial accounts, this enables mini lending contracts, insurance contracts, and liability measures that can all be automatically maintained via the blockchain through mini-epochs of ownership. This would repeat each time we authenticate ourselves to the nearest auto we want to drive through AI.
- **Defensive driving:** Shared data on the blockchain could allow your car to alert you to potentially dangerous driving habits the drivers around you exhibit. The data could power AI to help drivers make smarter, more informed road safety decisions. AI could take over in dangerous situations, using information from many cars ahead, almost 'Waze' super-scaled and immutable.
- **Predictive maintenance:** By analysing the pooled data of millions of different cars around the world, AI would be able to predict when your car needs to be serviced. It could draw conclusions from patterns it detects across variables like driving conditions and style, temperature, and quality of parts, for example, to determine when you're likely to need your next oil change. Predictive maintenance could save drivers thousands and help prevent dangerous highway breakdowns. The blockchain can also track all the parts in the car, which is often a huge challenge when recalls are needed and there is uncertainty as to which cars have impacted parts.
- **Insurance risk:** Blockchain will help insurance companies assess and score drivers' safety habits and aggregate risk levels. In return for offering up their



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data, drivers may be rewarded with lower premiums, much like schemes now where lower prices are offered to those willing to have a GPS tracking device attached to their car⁶.

Using AI to understand webs of relationships between data points and events recorded in the blockchain – collisions, for example – will enable remarkable predictive power.

Security and safeguards

While large-scale data sharing broadens the applications of AI further, it also raises important security questions. Blockchain operates using sophisticated cryptographic keys, but like any system it has its weaknesses. The blockchain is often viewed as not breakable, but think about authentication and stolen credentials. There continues to be the need to utilise AI in authentication and behavioural analytics, otherwise compromised entities will have their fraud and manipulation on the immutable chain because the entity points to the blockchain are not secured. There could be inherent trust of the blockchain, but it will be misplaced if we can't be certain whether the entities accessing and making transactions are real or fraudulent.

The thousands of nodes operating on public blockchains like Ethereum⁷ are what provide the 'immutability' that blockchain is famous for. To make a change to the ledger, a hacker would need to compromise 51% of the network, which would prove significantly more difficult than compromising just one central server.

Private blockchains, however, operate using far fewer nodes, and are therefore inherently more vulnerable to hacking or manipulation. If we were to start referring to blockchain data in the event of a car crash, regulatory bodies would need a way of ensuring that automotive companies, who could in theory control the majority of nodes in the blockchains used to record driving data, aren't able to change that information.

It's also important to remember that blockchain is an emerging technology. This presents two risks:

1. There may be unforeseen vulnerabilities in the backbone of the technology. Hackers have been unsuccessful at cracking it so far, but as organizations begin to put more of their eggs in the blockchain basket, attackers will become more motivated and numerous. Focus on simple authentication and compromised credentials is likely one of the most important aspects to monitor.
2. Organizations lack the talent to properly implement a blockchain solution. Laziness and ignorance are cybersecurity's biggest enemies, and with the cybersecurity talent gap larger than ever⁸, organizations may leave themselves open to attack. Blockchains can be computationally expensive (some may argue environmentally irresponsible), and AI will need to be used in fall-back situations where decisions cannot wait for immutability latency or the carbon-impact of different value propositions of blockchain decisions.



Properly implemented, though, blockchain represents a significant improvement on the traditional client-server network architecture that offers hackers a single point of attack — decentralised systems are inherently more secure.

While caution is prudent when dealing with any nascent technology, there is a good reason worldwide spending on blockchain solutions is set to hit \$2.1 billion this year, more than double the amount spent in 2017: It's proven to be incredibly secure over the 10 years it's been in use.

What's next?

As FICO's Chief Analytics Officer, I'm excited by the possibilities presented by AI and blockchain. But in technology, foundational changes rarely happen overnight. They require massive adjustments to infrastructure and legislation that will require governments, organizations, and computer science experts to work together to ensure smooth and safe implementation of blockchain technology.

Once that happens, it can facilitate the generation, secure storage, and shared access to the high-quality data that will power a host of new solutions with AI at their heart.

Reference

- 1 <https://hbr.org/2017/01/the-truth-about-blockchain>
- 2 <https://www.cbronline.com/news/cios-blockchain-99-percent>
- 3 <https://www.computerweekly.com/news/252440489/Netherlands-to-harness-blockchain-for-waste-management-operations>
- 4 <https://techcrunch.com/2018/03/14/sierra-leone-just-ran-the-first-blockchain-based-election/?guccounter=1>
- 5 <https://newsroom.porsche.com/en/themes/porsche-digital/porsche-blockchain-panamera-xain-technology-app-bitcoin-ethereum-data-smart-contracts-porsche-innovation-contest-14906.html>
- 6 <https://www.confused.com/car-insurance/black-box>
- 7 <https://www.trustnodes.com/2017/05/31/ethereum-now-three-times-nodes-bitcoin>
- 8 <https://www.pwc.com/us/en/services/consulting/cybersecurity/library/broader-perspectives/cybersecurity-talent-gap.html>

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