

Blockchain and AI, Building **Trust** in the **Digital Realm**



Introduction

Blockchain, we contend, is a natural counterweight to AI: whilst AI is mainly led by incumbents and focuses on sustaining innovation and improving existing business models, blockchain is led mainly by the fringes and represents a disruptive innovation at odds with Web2 and central entities. Therefore, while AI is centralized, blockchain is, in essence, decentralized.

Furthermore, the combined integration of blockchain and AI can lead to innovative applications across industries and users. We see synergies in three domains worth highlighting and exploring further:

1. Enhancing data trust & privacy
 2. Optimizing secure transactions
 3. Enabling decentralized collaboration
-





Enhancing data trust & privacy

AI THRIVES ON HIGH-QUALITY DATA, while blockchain can provide a reliable data source for AI systems by ensuring its authenticity and accuracy on chain. It can also facilitate sourcing data for AI models from a broader decentralized community instead of a single player.

Better data would enhance the quality of AI's outputs, because decisions made by AI can only be as good as the data they manipulate. Regarding automatic driving for example, including more fringe data in AI models could help prevent edge cases and catastrophes.

Moreover, blockchain cryptography combined with AI's advanced data processing capabilities can significantly enhance data security. AI algorithms can identify and respond to security threats in real-time,

while the blockchain ensures that data and processes remain tamper-proof and secure. For instance, Zero Knowledge for Machine Learning (ZKML), which started with blockchain applications, can help prove that a model was trained correctly and that a specific type of model was used.

This setup could particularly make sense for high-impact decisions, such as grants & loans, in order to prove that the same model is being used for everyone and that bias is therefore limited.

Finally, AI tends to impact data privacy negatively, whereas blockchain aims to increase individual data sovereignty. For instance, generative AI can create deep fakes, whereas blockchain can alleviate the problem by timestamping facts and ensuring known processes have been used.

2

Optimizing secure transactions

BLOCKCHAIN OFFERS a secure transaction framework with smart contracts. These self-executing contracts with terms of the agreement directly written into their code can already be enhanced with generative AI algorithms, ensuring more intelligent and responsive contracts. They can also help enable AI-driven transactions. For instance, integrating AI and blockchain can revolutionize supply chain management: AI can optimize logistics and predict supply chain disruptions, while blockchain can provide a transparent and immutable record of transactions, ensuring traceability and authenticity.

The combination of blockchain and machine learning can also help secure transactions by filtering the suspicious ones. For example, machine learning is used to identify malicious transactions

sent to a wallet and flag them to the user before they are submitted to the blockchain. In finance, AI can analyze market trends and provide insights, while blockchain can secure transactions and reduce fraud.

In some cases, blockchain and zero-knowledge proofs (ZKP) can also help prove that transactions are initiated by human and not bots. Proof-of-Humanity is expected to become increasingly crucial over time, given the exponential development of machine-to-machine transactions. Another interesting intersection between both technologies could be creating on-chain mechanisms with human inputs that reward or penalize AIs based on the accuracy / trustworthiness of their inferences.

Finally, the combination of blockchain and AI can help mitigate the risks inhe-

rent to each technology. On one hand, blockchain code can be improved and made more secure by using LLMs to find bugs and to fix them. In addition, AI is also a great tool to detect outliers, classify and optimize blockchain-based transactions. For example, AI arbitrage bots can

help protect or enhance MEV¹. On the other hand, blockchain's transparency can address one of the major challenges in AI: the 'black box' problem, where the decision-making process of AI systems is often opaque.

Recording AI processes and decisions on a blockchain can make AI systems more transparent and accountable, under the condition that it does not facilitate adversarial machine learning.

1. Maximal Extractable Value or the process during which blockchain miners and validators can order transactions within a block in a way that profits them and which can be optimized through machine learning.



Enabling decentralized collaboration

AI THRIVES ON DATA CENTERS, machine-learning models, and a talent pool that is usually within control of a small number of companies. However, combining blockchain and AI fosters new avenues for decentralized development and democratizes access to AI capabilities.

This alliance is particularly evident in the creation of decentralized AI marketplaces, promoting a more inclusive and collaborative approach to AI innovation. Blockchain can indeed provide protocols that redistribute the value created by AI

across contributors of computational power, data, ML models, etc. These platforms enable secure transactions and fair compensation for AI services, under the condition of mitigating adversarial machine learning.

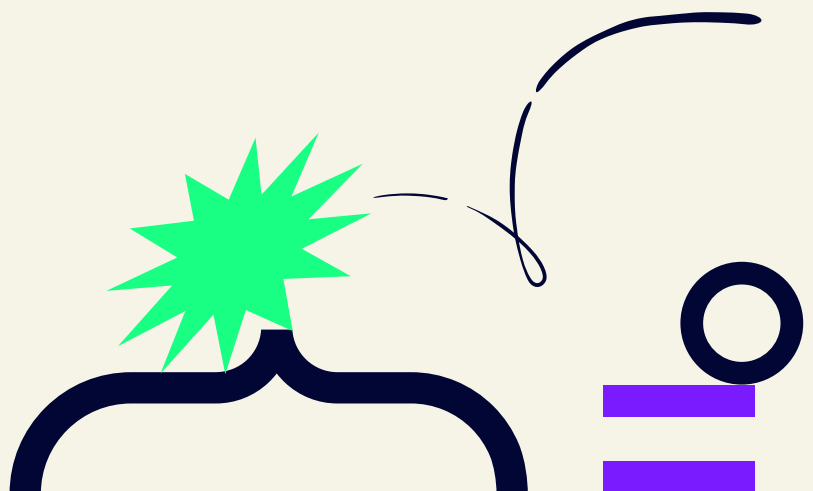
For example, a relevant solution could be on-chain DAOs that govern the quality of training data, submission of training data, and queries... and that use MPC² to encrypt the entire pipeline of creating and running AI from each individual user's training input all the way to the final output of each query.

SingularityNET, for instance, provides a decentralized AI marketplace where individuals can securely sell their AI algorithms, showcasing the collaborative potential of these technologies.

Additionally, AI requires large amounts of energy and uses large-scale GPU clusters generally located in centralized data centers. Blockchain can enable a process by which anyone who has an idle GPU, can contribute computation to the network and have a model trained in a way that provides an alternative to centralized tech companies. Companies such as Owkin, a full-stack AI

biotech, have developed open-source frameworks that allow deep-learning models to be created using Mac GPUs.

In these cases, multi-party computation or ZKML can solve issues related to verification by proving that the process of conducting an inference or training a model was done correctly. **Furthermore, the chain of proof that lives on blockchain enables interoperability between applications.** For example, the same data point could become through blockchain a decentralized single source of truth, and different applications and technologies such as AI could refer to it.



Conclusion

The synergies between **blockchain** and **AI** have the potential to create more secure, transparent, and efficient systems across various industries.

However, challenges exist, such as the computational demands of blockchain, concerns over data privacy, adversarial machine learning attacks, and the need for standardization in data formats and protocols.

Addressing these challenges requires collaborative efforts from technologists, academics, regulators, and industry stakeholders.

XRPL Commons is at the forefront of these considerations, aiming to push blockchain development and solve for better interactions with AI. We explore this theme and more in our Residency program, executive briefings, and multiple events. Get in touch or follow us for information on our upcoming initiatives.

The future of these innovations holds exciting possibilities. Indeed, the combined strengths of these technologies can lead to previously unimaginable innovative solutions.

Contributors

Melanie DAMOUR, Strategic Initiatives Manager

→ www.linkedin.com/in/melanie-damour-5a6b7646/

David BCHIRI, CEO

→ www.linkedin.com/in/davidbchiri/

Luc BOCAHUT, Product Director & Solutions Architect

→ www.linkedin.com/in/lucbocahut/

VISIT OUR WEBSITE

→ www.xrpl-commons.org
