

Blockchain and AI: A revolutionary alliance.

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However, this alliance raises significant issues. It raises questions about security, governance, and the balance between centralization and decentralization.

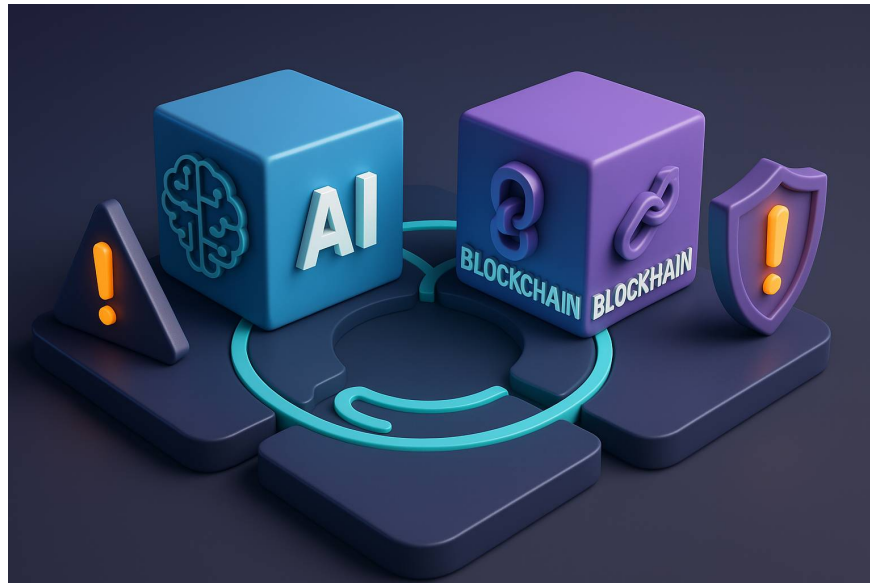
This article will delve into this interaction, its benefits, limitations, and consequences for the global economy.

The two-way relationship between AI and blockchain

Artificial intelligence and blockchain form a dynamic and complementary pair. Each enhances the capabilities of the other, creating a rich synergy of applications. Their interaction is based on four key principles:

1. **AI serves blockchain** : Thanks to its computing power, AI optimizes the execution of smart contracts. It also improves oracles, allowing blockchain to connect with external data.
2. **Blockchain as a guarantee of AI reliability** : It ensures the integrity and traceability of the data used to train and validate AI models.
3. **Blockchain secures AI** : Its encryption mechanisms reduce the risk of manipulation and ensure better control over AI systems.
4. **AI is becoming more decentralized thanks to blockchain** : Blockchain enables the creation of autonomous AI networks that are not dependent on large, centralized platforms.

These four areas will be explored in detail in the following sections.



1. AI is a computing tool for blockchain.

Artificial intelligence provides blockchain with unprecedented computing and analytical power. It strengthens two key elements of blockchain operation:

1. **Optimizing smart contracts** : Using AI, these autonomous programs can manage complex tasks such as analyzing financial data or monitoring supply chains in real time. For example, AI-powered smart contracts can automatically adjust loan terms according to market fluctuations.
2. **Oracle Improvements** : Oracles act as a gateway between the blockchain and the outside world. Artificial intelligence (AI) improves their performance by enabling them to process, filter, and contextualize data. As a result, smart contracts can respond more accurately to real-world events.

2. Blockchain as a reliable source of information for AI

One of the biggest challenges for AI is the reliability of the data it uses.

Generative models, such as ChatGPT , can create 'illusions': misinformation or fabrication. Blockchain can help mitigate this problem.

Thanks to its immutability (recorded data cannot be modified) and verifiability (traceability), it ensures a more reliable database for AI.

The website can verify.

Blockchain enables the construction of a verifiable website.

All information is stored immutably and its origin is traceable. Here are a few specific examples:

1. **Data authenticity** : An image or document timestamped on the blockchain proves its creation date and integrity.

2. **Decision traceability** : AI actions can be recorded on the blockchain. In this way, their origin and validity can be verified.

However, this method has limitations.

Blockchain ensures the integrity of data after it is recorded, but it does not guarantee its original authenticity. Therefore, it cannot, by itself, eliminate misinformation.

3. Blockchain will secure and control AI.

Despite its power, AI still poses risks to security and control. Thanks to its deterministic security mechanisms and cryptography, blockchain can play a crucial role in mitigating these risks.

Data security

1. **Confidentiality** : Blockchain allows AI models to operate without revealing underlying data, thus ensuring privacy protection.
2. **Integrity** : Data used by AI can be stored on the blockchain, ensuring that it remains unchanged.

Control

1. **Smart contracts** : Smart contracts can be used to define strict rules about what AI is allowed to do, preventing malicious or unpredictable actions.
2. **Traceability** : Decisions made by AI can be recorded on the blockchain, helping to verify their origin and validity.

However, this approach is not perfect. Smart contracts themselves can contain vulnerabilities, as the 2016 DAO attack demonstrated. Furthermore, a misconfigured AI could exploit these vulnerabilities on a large scale, posing a systemic risk.

4. Decentralizing AI through blockchain.

One of the most promising aspects of the convergence between blockchain and AI is the concept of decentralized AI. Currently, AI is largely centralized, controlled by a few tech giants like OpenAI or Google . These models require enormous computing resources and large datasets, which limits their accessibility and transparency.

Blockchain offers an alternative solution: Decentralized AI networks, where models are trained and executed in a distributed manner. Here are a few exemplary projects that illustrate this trend:

Decentralized Superintelligence

An ambitious project aims to create a decentralized super-intelligence artificial intelligence. Unlike centralized AI models, this project relies on a blockchain network to ensure transparency, security, and collective governance. The goal is to allow independent stakeholders to contribute to AI development and training, while avoiding the concentration of power in the hands of a few companies.

Decentralized marketplace for AI

Another project allows participants from around the world to contribute to training AI models in exchange for tokens. The project uses blockchain technology to reward contributors based on the quality of data and calculations provided. The project aims to create a decentralized marketplace for AI, where models are trained collaboratively and transparently.

A scalable platform for AI

Another initiative is blockchain, designed to be scalable and user-friendly, making it an ideal platform for hosting decentralized AI applications. This platform allows developers to create smart contracts that can interact with AI models. For example, an application on this platform could use AI to analyze data in real time and execute automated transactions based on the results.

Advantages of Decentralized AI

1. **Transparency** : Data and models can be verified, reducing the risk of bias or manipulation.
2. **Sustainability** : Decentralized networks are less vulnerable to incidents or attacks.
3. **Availability** : The costs of training and operating AI models can be reduced by pooling resources.

Challenges of Decentralized AI

1. **Performance** : Decentralized models may perform less efficiently than centralized models due to latency and computational limitations.
2. **Governance** : Managing decentralized networks presents complex issues, particularly regarding reward distribution and decision-making.
3. **Regulation** : Authorities may have a negative view of AI systems that get out of their control.

5. Impact on industries

The convergence of blockchain and AI has significant impacts on many fields.

1. **Finance** : Smart contracts can automate lending, insurance, and investment. For example, a smart contract could use AI to assess a borrower's creditworthiness in real time.
2. **Healthcare** : Blockchain secures medical data used by AI for personalized diagnosis. For example, an AI model could analyze medical data stored on the blockchain to suggest personalized treatments.
3. **Supply chain** : AI optimizes logistics, while blockchain ensures product traceability. For example, a company could use AI to predict delivery times and blockchain to verify product origin.

6. Ethical and social issues

1. **Algorithmic bias** : AI models can reproduce biases present in training data. Blockchain can help test for these biases by providing data traceability. For example, an AI model used for recruitment can be tested for gender or ethnicity bias.

2. **Accountability** : Who is responsible for the decisions made by an automated AI? Smart contracts can include clear accountability mechanisms, documenting each decision and assigning responsibility to the manager.
3. **Regulation** : Authorities may have a negative view of AI systems that are outside their control.

7. Interaction and environmental impact

Blockchains and AI models need to be interoperable to maximize their potential. Projects are exploring solutions to connect different blockchains. For example, an AI model trained on one blockchain could be used on another blockchain via an inter-chain bridge.

Finally, the environmental impact of this convergence should not be overlooked. Training AI models and mining cryptocurrencies requires a significant amount of energy. Solutions such as Proof-of-Stake blockchains (a transaction validation mechanism that uses less energy than Proof of Work) and more efficient AI models could mitigate this impact.

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