



INTRODUCTION TO THE INTEGRATION OF BLOCKCHAIN TECHNOLOGY AND ARTIFICIAL INTELLIGENCE WITH ROBOTICS

Computer Science

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ABSTRACT

In this paper, we analyse the advantages of integration of Blockchain technology and Ai with robotics and their potential uses in multiple sectors. We also delve in the future implementations of this technology and how it may help to bring the next stage of evolution in human beings.

KEYWORDS

Blockchain technology, Artificial Intelligence (AI), Robots, Machine learning, Deep learning, data security, decentralization, peer-to-peer network, High efficiency

INTRODUCTION

Satoshi Nakamoto an unknown person or a group of people who first proposed and developed the Bitcoin. With nearly 980,000 bitcoins in hand, he is considered to be one of the richest persons in the world. After initial involvement and support Nakamoto handed over the control of network and source code to community members and disappeared.

Blockchain and AI are two ground-breaking technologies that have the potential to radically transform numerous industries and facets of everyday life. As such, a deep understanding of their principles and characteristic is essential because it enables the design and implementation of more effective systems

Blockchain is a shared, immutable digital ledger, enabling the recording of transactions and the tracking of assets within a business network and providing a single source of truth. Blockchain operates as a decentralized distributed database, with data stored across multiple computers, making it resistant to tampering. Transactions are validated through a consensus mechanism, ensuring agreement across the network. In blockchain technology each transaction is grouped into blocks linked together which are then linked. This forms a secure and transparent chain. This structure guarantees data integrity and provides a tamper-proof record, making blockchain ideal for applications like cryptocurrencies and supply chain management.



Figure 1

Artificial intelligence (AI) is technology that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity and autonomy. In 1956, John McCarthy coined the term "artificial intelligence" at the first-ever AI conference at Dartmouth College. Later that year, Allen Newell, J.C. Shaw and Herbert Simon create the Logic Theorist, the first-ever running AI computer program. In 1997, IBM's Deep Blue beat then world chess champion Garry Kasparov, in a chess match.

AI is a branch of computer science that aims to build systems capable of performing tasks such as image recognition, decision-making, or natural language processing. After more than 60 years, there have been advancements in computing power, GPUs, data availability, and algorithmic innovation.

Machine Learning (ML) is a subset of AI that involves the use of statistical methods to enable machines to improve with experience. ML algorithms build a model based on inputs and use that to make

predictions or decisions without being explicitly programmed to perform the task. Deep learning is a further subset of ML that involves neural networks with several layers ("deep" structures) enabling even more complex patterns to be discerned.

Applications

The applications of both AI and Blockchain have been extensive and transformative across various sectors. AI has seen a surge of applications in numerous fields. In healthcare, AI has been used to predict patient outcomes, assist in diagnosis, and even generate treatment plans. In finance, AI algorithms are utilized for credit scoring, algorithmic trading, and fraud detection. In transportation, AI technologies, including deep learning, reinforcement learning, machine learning and neural networks, drive advancements in autonomous vehicles. AI has even been used in climate-modelling, helping scientists understand and predict climate patterns

The first problem that it can solve is security: as many of the systems have problems of trust and data integrity, blockchain can provide a reliable peer-to-peer communication with security measures over a trustless network. Another advantage of this integration is the possibility to make distributed decisions, since blockchain can ensure that all participants of a decentralized network share identical perspectives of the world.

Examples

1. Aitheon

Aitheon is a platform that adopted a blockchain technology based on the ERC-20 standard.⁷ Their goal is to have a complete platform that can reduce the number of time-consuming tasks that developers have to endure, like organising documents. Their solution is a platform with both AI and Robotics that can provide automation for specified business processes. The platform they built has five modules.

The first, an AI module, tries to retrieve information about frequently performed tasks and takes actions to automate those tasks. The second module, called Digibots, is very similar to the first, but this module focuses on automating programming tasks, like back-end solutions and data-driven problems. The third module, Mechbots, is focused on helping businesses integrate robotic automation to increase efficiency and productivity. The last two modules, Aitheon Specialists and Pilots are human specialists that finish the tasks that cannot be fully automated, and also provide supervision of the robots. In short, Aitheon provides a platform that aims to automate time-consuming tasks by integrating AI and robotics.

2. Ethereum

Ethereum is an Open Source Blockchain platform which allows anyone to develop and deploy Blockchain based Applications. Any kind of application including cryptocurrency, tokens, wallets, social apps etc. can be developed and deployed in a Distributed Environment of Ethereum.

Advantages

- **Enhanced Data Security:** Blockchain's diskless environment securely stores personal data. By digitally signing the data and

- ensuring secure private keys, AI algorithms can work on trusted and credible data, leading to more reliable decision outcomes.
- **Improved Trust In Robotic Decisions:** Blockchain's decentralized ledger records transactions on a point-by-point basis, improving acceptance and trust in the decisions made. Recording the decision-making process of AI systems on the Blockchain increases transparency and builds public trust in understanding robotic decisions.
 - **Collective Decision-making:** Decentralized and distributed decision-making algorithms eliminate the need for a central authority, allowing many robotic applications to benefit from collective decision-making.
 - **Decentralized Intelligence:** Combining individual cybersecurity AI agents into a coordinated network provides comprehensive security across underlying networks and resolves scheduling issues.
 - **High Efficiency:** Integrating AI and Blockchain technologies enables for fast and automatic validation of data, value, and asset transfers among stakeholders.

Such robots can be useful in the educational sector, an intricate system of teachers and students working flawlessly with no errors.

Sustainability And Green Blockchain

One of the main factors that has led to sustainable blockchain networks is their impact on the environment, especially if they are based on proof-of-work (PoW) consensus mechanisms. All-green blockchain projects are looking at energy-efficient consensus algorithms such as PoS and DPoS. For example, Algorand is a platform that uses pure PoS, while Tezos employs liquid proof of stake to minimize its carbon dioxide emissions into the atmosphere. This transition represents a growing global concern for sustainability and the ethical use of technology.

CONCLUSION

The blockchain technology has undergone many changes since its onset in 2009. From a mere cryptocurrency image, it spread to a lot of other unexpected domains. As we mentioned earlier, entrepreneurs are venturing to the new use cases of blockchain and are coming with assuring results. After the first blockchain-Bitcoin, many new protocols have emerged; Ethereum is prominent among it. Today, high-level developments are taking place in Ethereum. DApps, ICO, and Tokens are the major area where Ethereum blockchain is highly utilized.

On a wider perspective, the blockchain may bring the next level of evolution on the course of the human race by radically changing the social - economic and political establishments. Yet some others say it is too early to make such auspicious hopes as the technology is still in its infancy.



Figure 2

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