Blockchain, cryptocurrency, artificial intelligence: architects of the future world.

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Abstract: According to the article, cryptocurrencies and blockchain technology hold promise for resolving issues with contemporary financial and economic systems, including centralization, transaction slowness, and excessive intermediary fees. Blockchain can offer more effective and safe data management through decentralization and transparency, expanding its use in a number of industries, including public sector, medical, logistics, art, and education. Notwithstanding obstacles like mining's energy expenses, the move to more energy-efficient algorithms like PoS is advancing the technology's sustainability. Entire industries are already being revolutionized by blockchain, and its influence on daily life is only anticipated to increase.

Key words: blockchain, cryptocurrencies, smart contract, centralization, decentralization.

Current economic and financial technology systems have many shortcomings that are becoming very transparent in the current modern digital transformation. Some of these problems include: high centralization, vulnerability to fraud, slowness of transactions, huge costs of intermediaries such as banks, payment systems. These challenges become especially relevant when the world is moving rapidly towards digitalization where speed, accessibility and security of financial transactions are required. Therefore, the world needs something new, something that can solve most of the shortcomings and problems. Blockchain technology and cryptocurrencies
are promising tools to solve many of these problems. Due to their decentralized structure and increased transparency, they offer the potential for a safer and more efficient financial, economic, technological system. This is why blockchain and cryptocurrencies are becoming an important part of the future.

In cryptocurrency, any rule or regulation is programmed with a cryptographic algorithm. Cryptography is at the core of trust in cryptocurrency.

Blockchain is a complete and immutable transaction history of a decentralized community that all participants in the community agree on. This record is automatically updated on a regular time frame, accepted by the community as fact, and stored on each participant's computer. In this way, blockchain technology allows any “reality” to be stored without the need for governance. This can be applied to any type of property, identity, knowledge or currency. Blockchains can be either a public network to which anyone can connect or a private network. In the latter case, the number of participants is strictly regulated to avoid the loss of sensitive data [1].

Public blockchain is a decentralised network accessible to any user. In such a network, anyone can participate in validating transactions, read and add data, and check the entire transaction history. Public blockchains, such as Bitcoin and Etherium, are transparent as all information is available for viewing and trust is ensured by consensus algorithms and a distributed network of nodes.

Private blockchain is a restricted network managed by a specific organisation or group of participants. Access to validate transactions, add and view data can be restricted to authorised participants only. These blockchains are used in corporate environments to ensure data privacy and allow for faster transaction processing due to the smaller number of participants and controlled structure [2].

Each blockchain can have its own currency (token) which is called a cryptocurrency, for example, the Bitcoin blockchain has its own token which is called Bitcoin.Various actions with tokens are based on smart contracts. Itis a program code written on a blockchain that automatically executes the terms of a transaction or agreement when predetermined conditions occur. Unlike traditional contracts, which require intermediaries to monitor fulfillment, smart contracts operate autonomously: when the conditions are met, the code automatically initiates an action, such as a transfer of funds or a transfer of rights.To add transactions to blockchains you need miners. Miners verify and validate transactions that users want to make. They create consensus. Theoretically, anyone can do all three of these things: mine (verify transactions), forward information to others (full node), and use the system (user) [1].

There are two trends in cryptocurrency: centralization, decentralization.Centralization is when “all power” is held by a central organization. Decentralization means that everyone who wants to be part of a society or system is equally empowered. No one is more important or less important than anyone else.

Based on the information that has been described, one might ask whether blockchain is really only about finance and economics. Of course not, blockchain is not just a way to transact cryptocurrencies, it has much more important and promising possibilities.Blockchain technology will be used everywhere in the future. Finance, healthcare, logistics, etc. Blockchain will be implemented everywhere.

Critics of blockchain often raise the issue of the energy cost of mining, especially in the case of cryptocurrencies such as Bitcoin. However, many projects are now moving to alternative consensus algorithms such as Proof-of-Stake (PoS), which require significantly less energy. Ethereum, one of the largest smart contract platforms, has already completed its transition to PoS, reducing its carbon footprint by 99%. In the future, more and more blockchain platforms are expected to adopt energy-efficient solutions, ensuring the sustainable development of this technology [4, p. 98].

Blockchain technology's combination with artificial intelligence (AI) and the Internet of Things (IoT) creates new opportunities across a range of businesses. Blockchain removes the risk of data manipulation by enabling the development of transparent and reliable data chains that AI may use for analysis and learning. A safe and decentralized environment is provided by blockchain in Internet of Things devices, where billions of sensors exchange data in real time. IoT-enabled smart houses, for instance, can employ blockchain technology to manage energy

resources, storing information about electricity usage and producing analytical reports that are only available to the owner. Furthermore, by storing important travel, repair, and insurance data on the blockchain, autopilot cars may communicate with other gadgets, preventing tampering and giving the owner complete control.

An interesting example is the use of blockchain to create secure management platforms for medical IoT devices such as pacemakers or insulin pumps. Hacking attacks on such devices can have fatal consequences, but the decentralized structure of the blockchain makes them virtually immune to such threats.The synergy between AI, IoT and blockchain is especially important in Industry 4.0, where process automation requires reliable solutions to manage vast amounts of data. In the future, blockchain will be a critical component of intelligent systems that not only securely process information, but also adapt to changing conditions in real time. AI can also help doctors diagnose diseases, predict patient outcomes and personalize treatment plans.

As in medicine, blockchain technology has also found applications in the arts, enabling information to be securely stored, accessible and protected.Art tokenization is the process of converting tangible works of art, such as paintings, sculptures and other valuable objects, into digital tokens that exist on the blockchain. Such a project, developed under the leadership of artist Lisa Sotilis, is a pioneering model for representing artworks not only as physical objects, but also as digital assets. The tokenization process allows the creation of digital analogues of famous works such as paintings by Van Gogh, Leonardo da Vinci or sculptures by Rodin. These works can not only be stored and displayed digitally, but can also be shared with others. Virtual collectors can purchase such tokens, making higher art more accessible. People from anywhere in the world can now familiarize themselves with works of art from the comfort of their own homes. This is especially valuable for those who do not have the opportunity to visitmuseums or galleries. With blockchain, all data about the artwork and its owner can be recorded, eliminating the possibility of forgery. Each transaction and each new owner are recorded on the blockchain. This allows the chain of history of the work to be preserved [3].

Blockchain, along with artificial intelligence, is also being used in other areas, such as:

1. Logistics. It offers the opportunity to reduce costs, speed up processes and increase the reliability of deliveries, which can help companies and their customers get a quality and transparent service.

2. Education. Students' diplomas, certificates and grades can be recorded on the blockchain so that employers can verify qualifications quickly and reliably. Copyrights for educational content can be stored on the blockchain, protecting it from piracy and infringement.

3. Public Administration. Citizen information and other sensitive data can be stored on blockchain, providing access and data protection. Transparent processes on blockchain help governments track the allocation and use of grants and subsidies, preventing corruption.

4. Legal activities. Blockchain can capture property title data, reducing the risk of fraud and speeding up registration processes.

5. Leases and mortgages. The terms of a lease or mortgage can be captured in a smart contract that will fulfill the terms of the transaction, eliminating the need for intermediaries.

6. Gaming. In network multiplayer games, various game assets based on blockchain technology and smart contracts have been appearing more and more frequently in recent years. These are usually collectibles in the form of unique non-fungible tokens - NFTs.

7. DeFi. Blockchain games are games that are based on blockchain technology and use elements of cryptography. They are often games that use cryptocurrency as an in-game tool. The most important thing that this technology carries within the game is absolute ownership of an item [4, pp. 105].

8. Industry. AI-based robots can perform complex tasks with precision and adapt to changing circumstances, resulting in increased productivity and reduced costs.

9. Finance.Blockchain and AI integration can facilitate decentralized lending platforms, algorithmic trading with secure and transparent audit logs, and risk assessment models based on diverse data sets [3].

The prospects for blockchain are enormous, but of course this does not mean that in a few years everyone will be walking around paying with bitcoins. The future of blockchain technology and cryptocurrencies looks promising. While it is too early to talk about a complete replacement of existing systems, blockchain is already offering innovative solutions that are finding their way into a variety of industries. In addition to additional points of recognition and usability improvements, over the next five-seven years we see tokenization of almost all assets. This means that stocks, real estate, gold and literally any other thing will receive a token that is represented on the blockchain. This will lead to seamless communication between these assets and better price discovery.

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