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A Study on Biotechnology and Its Applications

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Abstract

The BlockchainTechnology can cause considerable changes in every aspect of human lives and might have a significant influence for the subsequent couple of decades. This technology changes the way as we are seeing processes of business and has transformed our existing economy. Blockchain technology offers important opportunities for supply chain management. In this review paper, we describe concept of Blockchain, Applications, Advantages, and Disadvantages of Blockchain.

Keywords: Blockchain, Consensus, Bitcoin, Decentralized, Applications, Cryptocurrency

Introduction

A blockchain is a chain of blocks that contain data or information. Despite being discovered earlier, Satoshi nakamoto created the first widely used and successful use of the blockchain technology in 2009. He created the first digital cryptocurrency called Bitcoin through the use of Blockchain technology. Let's understand how a blockchain actually works. .In a blockchain network, each block holds some data along with the hash of the block before it. A hash is a distinct mathematical code that is associated with a certain block. The block's hash will also be liable to change if the data inside the block is altered. Blockchain security is achieved through the linking of blocks using certain hash keys.There are nodes on the network that validate transactions even though they happen on a blockchain. These nodes, known as miners in the Bitcoin blockchain, process and confirm network transactions using the proof-of-work principle. Each block must make reference to the previous block's hash in order for a transaction to be. Only if the hash is accurate can the transaction proceed. The hash associated with the block will also change if a hacker attempts to attack the network and change the information of a particular block.The updated hash won't match the original one, making the intrusion obvious. By reflecting any changes to the chain of blocks across the whole network and making them easy to identify, this assures that the blockchain cannot be changed. In a nutshell, the following is how blockchain enables transactions:

1. Decentralised

Blockchains are decentralized in nature meaning that no single person or group holds the authority of the overall network. While everybody in the network has the copy of the distributed ledger with them, no one can modify it on his or her own. This unique feature of blockchain allows transparency and security while giving power to the users.

2. Immutable

The immutability property of a blockchain refers to the fact that any data once written on the blockchain cannot be changed. To understand immutability, consider sending email as an example. Once you send an email to a bunch of people, you cannot take it back. In order to find a way around, you'll have to ask all the recipients to delete your email which is pretty tedious. This is how immutability works.

3. Peer-to-Peer Network

With the use of Blockchain, the interaction between two parties through a peer-to-peer model is easily accomplished without the requirement of any third party.

4. Tamper-Proof

With the property of immutability embedded in blockchains, it becomes easier to detect tampering of any data.

Application of Blockchain Technology

There is no requirement to communicate with third parties or pay them transaction fees. Despite being the first widely used implementation of Blockchain technology, Bitcoins and cryptocurrencies are not the only ones. Due to the nature of blockchain technology, organisations, corporations, and entrepreneurs from all over the world are exploring its possibilities and bringing about revolutionary changes in a variety of industries.

Let's separate the wheat from the chaff and find out how Blockchain can be useful in actual implementation.

1. Smart contracts

Different businesses deal with each other in order to exchange services or products. All the give and take terms and conditions are signed by the involved parties in the form of agreements or contracts. However, these paper-based contracts are prone to errors and frauds which challenges the trust factor between both the parties and raises risks. Blockchain brings forward an amazing solution to this problem through Smart Contracts.

2. Identity management

Identity Attributes on Blockchain

The distributed ledger technology used in blockchains offers you advanced methods of public-private encryption using which, you can prove your identity and digitize your documents. This unique secure identity can work as a saviour for you while conducting any financial transactions or any online interactions on a shared economy. Moreover, the gap between different government bodies and private organizations can be filled through a universal online identity solution that blockchain can provide.

3. Government Elections

No matter how secure government elections are made, the chances of frauds through anti-social elements always persists. The current voting system relies on manual processing and trust. Even if security breaches and

frauds are eliminated, the chances of manual errors cannot be ignored. In such cases, the best solution is to automate the overall process with the help of smart contracts.

4. Intellectual Property Protection

Digital content or information can easily be reproduced and distributed with the aid of the internet. Due to this, people from all around the world hold the power to copy, replicate and use it without giving credits to the actual producer of the content.

5. BT in Food Industry

The blockchain gets more and more integrated into the food industry it'll make the entire process moretransparent and safer.

6. Blockchain Technology in Cybersecurity

On 7 September 2017, Equifax, one in all the world's bigger bank line reporting agencies, shocked the planet once they revealed that they'd just faced an enormous cybersecurity breach.

They faced unauthorized data access from mid-May through July 2017,which they found on July 29.

7. Vehicle Industries

Auto or vehicle companies have many application areas for BT by the cause of, it's a component-based industry. The centralized BT based supply chain with trust-based distribution is that the latest model for a way we construct, procure vehicles for day to day uses.

8. Supply Chains

It involves globally many parties across time zones and is a multi-layered chain. Moving the provision chain to the blockchain is usually discussed by distributed ledger enthusiasts. From food distributors to pharmaceutical enterprises, many supply chains may benefit from employing a combination of IoT and blockchain to streamline processes.

Benefits of Blockchain Technology

- Time-saving: No central Authority verification needed for settlements making the process faster and cheaper.
- Tighter security: No one can temper with Blockchain Data as it shared among millions of Participant. The system is safe against cybercrimes and Fraud.
- Reliability: Blockchain certifies and verifies identities of every interested party. This removes double record, reducing rates and accelerate transactions.
- Collaboration: It permits every party to interact directly with one another while not requiring third party negotiate.

- Cost-saving: A Blockchain network reduces expenses in several ways. No need for third-party verification. Participants can share assets directly. Intermediaries are reduced. Transaction efforts are minimized as every participant has a copy of shared ledger.
- Greater Accessibility and availability: In BT data are stored in a decentralized way that's why anyone can easily access the data whenever they need the data with accuracy.
- Security: In which every transaction assigned with a unique timestamped cryptographic hash code, it may be a 64- or 128-digits alpha-numeric key signature value which is entered corresponding to transaction each block.
- Immutability and Data integrity: whenever a new transition has been recorded in the computerized based blockchain database, it cannot be altered directly or can be deleted only after applying consensus. Participants of Blockchain can reduce fraud while strengthening regulatory compliance.
- Transparency: All the transactions involved in BT are transparent. Everyone can see the details of other transactions and each node contains the complete ledger. The shared digital ledger contains all the information of the actual source, destination, date and time of the block transactions.

Disadvantages of Blockchain technology

- Issue of high Expense: BT has first opening charges and therefore the applying the BT isn't freed from cost which could be a downside of decentralization. The user node must pay money for the transactions and computational power.
- Data modification: Blockchain technology does not allow easy modification of data once recorded, and it requires rewriting the codes in all of the blocks, which is time-consuming and expensive. The downside of this feature is that it is hard to correct a mistake or make any necessary adjustments.
- Latency issues: For providing the security in BT, complex verification and validation process are performed that takes lots of time for verifying the transactions of BT.
- Wasted Resources: During complex verification and mining process it requires huge amounts of computational power like CPU's and GPU's power. The energy used in Bitcoin mining network is near about $15 million per day.

Conclusion

Blockchain is a distributed, P2P technology that offers data protection and immutability. It also has aspects of decentralisation. Although BT offers strong data security, the verification and validation of transactions takes a long time. Alongside its key application areas, the main qualities of its privacy and security, traceability, and time-stamping have been observed in terms of acceptance. BT can change how people develop trust, moving

away from relying on outside parties and towards technology. There is no requirement for communication with third parties or payment of transaction fees to third parties. Because to BT's transparency, permissionlessness, and cross-border character, everyone has access to the technology, which has led to the development of the blockchain network. Everyone has an equal opportunity to use the technology and, as a result, the blockchain network created with it because of the transparency, permissionlessness, and borderlessness of BT. In a public blockchain, anyone can utilise an electronic wallet on the network for either personal or professional purposes. Although blockchain is a relatively new term in the world of technologies, it is undoubtedly the final. Starting with their very first cryptocurrency application, the technology has already experienced tremendous growth. With each passing day, more application areas are being investigated.In future we will work on it and try to reduce the both of computation time and energy of verification and mining process.Once the technology is adopted and accepted on a global level, it'll transform the way we live today.

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