



RECENT DEVELOPMENTS IN JOINT ARTIFICIAL TECHNOLOGY AND BLOCKCHAIN TECHNOLOGY : ITS POTENTIAL USE FOR THE FUTURE

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ABSTRACT

With blockchain, a decentralised framework and distributed systems database, a full ecosystem will be formed around the centralised system for many years. From 2016 to 2020, a comprehensive analysis of blockchain research in information systems culled 46 publications from 16 prestigious journals. To give an overview of the technology, this article discusses its features and implementation methodologies. This study also shows potential blockchain research areas for the future. The purpose of this article is to examine blockchain technology, which is still in its early stages of development, as well as the associated information security problems that merit additional study. There are several applications for Blockchain in financial sector, internet of things (IoT), big data (HDDs), cloud computing (AWS), and edge computing (computational resources at the edge of the network). The opposite is also true: technology is slowly but surely helping many sectors advance intelligently. The combination of blockchain with artificial intelligence (AI) is a natural advantage today as two promising technologies. It's possible that blockchain can encourage AI to become more intelligent by increasing the autonomy

and credibility of the blockchain itself. In this article, we take a more in-depth look at how blockchain and artificial consciousness work together. Then, we'll look at whether or not integrating blockchain with machine learning is even possible, based on what we've learned about the history of both technologies. On to the research on blockchain and AI convergence, both at home and abroad, which we've summarised in this section. After that, we'll go through some possible use cases for the convergence of the two technologies, as well as some of the issues and obstacles that already exist. Finally, we talk about what we'll be doing in the future.

Keywords: Artificial Intelligence, Blockchain, Intellectual Property, Trademarks.

INTRODUCTION

In spite of the fact that it has been around for a decade, blockchain technology is still a relatively new concept. The growing acceptance of blockchain applications in a variety of fields has contributed significantly to the technology's growing popularity. Because fully decentralized ledger technology documents all data and money activities, it provides several advantages. In a transparent, secure, and immutable manner, evidence of interactions at all between the two parties may be kept simply. In spite of this, the growing popularity of blockchain leads to questions about its long-term viability. The following debate aims to delve into insights into the future possibilities of blockchain technology. It's feasible to have a clear picture of blockchain technology's future if you know how it works now. In reality, the development moment of distributed ledger technology can demonstrate how it will develop in the future.



A basic understanding of blockchain concept, operation, and essential characteristics is critical to any discussion of the technology's future possibilities. Having a comprehensive understanding of the current relevance of blockchain technology allows you to compare and contrast different sectors that have benefited from its use. When everything is said and done, readers may look forward to new blockchain applications and advances. Recent years have seen a significant increase in interest in blockchain technology. There has been a 2000% increase in the demand for blockchain talents between 2017 and 2020, demonstrating the importance of blockchain as a highly prized ability. As a result, there's ample reason to be excited about the possibilities that blockchain technology holds.

WHAT DOES THE TERM "BLOCKCHAIN" MEAN?

When using blockchain, an immutable ledger may be shared between network participants in real time. In addition to keeping track of transactions, the ledger may also be used to monitor assets throughout a corporate network. Assets can comprise both tangible and intangible types of assets when using blockchain technology.

Tangible assets include things like cash, a house, property, or a car, amongst many others. These include things like intellectual property (IP), trademarks, copyright, and patents as well as other non-financial items. Because it can track and trade nearly much of any value on a digital environment, blockchain is the technology of the future. Intriguingly, with blockchain, there weren't any longer any worries about the dangers and expenses associated with traditional financial transactions.

Different ways to building blockchain networks might be used by businesses. Access to the global blockchain networks is possible for anybody with a computer and an internet connection. A particular organisation governs a private blockchain network. Permissioned blockchain networks necessitate either permission or an invitation from the network's administrators before anybody may join. Consensus blockchains are those that are built and maintained by a group of organisations.

BLOCKCHAIN'S CHARACTERISTICS OF VALUE

The advantages of blockchain technology are its openness, sharing, and high level of safety. All participants may see every transaction that has taken place on the network. The approved participants, on the other hand, could only see one transaction at a time. The question of the secret ingredient to blockchain's long-term viability is, of course, unavoidable. Any future blockchain forecast will be based on how much value companies will receive from it. Look at the unique characteristics that make blockchain technology so valuable.

1. Have faith in yourself

Only with the consent of the majority of the network's participants may fresh data be added to the blockchain ledger. Following credible confirmation that the encrypted information being transferred is true, network members approve transactions.

2. Transparency and immutability

Immutability and transparency will be critical in determining the future of blockchain. Because of immutability, new information on a blockchain can only be added to existing data. Once data is added to the blockchain



network, it cannot be altered or lost. The notion that any internet backbone participant may audit the modifications to the ledger shows that blockchain is transparent.

3. A substantial increase in efficiency

The cost reductions and increased transaction speed provided by blockchain technology are unquestionably significant advantages. The use of blockchain technology has the potential to eliminate the need for middlemen, resulting in significant savings. The blockchain also makes commercial transactions possible at any time and without any hindrance. The most essential benefit of blockchain is that it speeds up financial transactions.

4. A lack of central authority

Decentralization is unquestionably the most important aspect for blockchain's future. No one person, organisation, or corporation has control over the blockchain ledger. Instead, the blockchain network is maintained by all of the computers that are part of it. No central authority is needed to build confidence for transactions because any two parties can engage in them.

BLOCKCHAIN'S CURRENT USE CASES

Blockchain has enormous promise. However, many people are sceptical about the future of blockchain. As a result, it's critical to have a sense of how blockchain has transformed certain sectors. When it comes to business blockchain systems, IBM blockchain is a well-known one that has grown in popularity. Existing blockchain applications may offer a look into what the technology's future holds. IBM blockchain has been put to good use in a variety of ways.

When it comes to dealing with cryptocurrency-related technical difficulties, INBLOCK turns to IBM LinuxONE. Thus, digital asset transfers are more convenient, safe, and quick as a result of this.

Using a blockchain banking platform on the IBM cloud, Plastic Bank creates a high-security, scalable incentive system for people to collect and recycle plastic waste.

Using IBM Food Trust, Kroger, the nation's largest grocery retailer, works with suppliers to track food from farm to shelf.

Copyrights are managed by Spotify on the blockchain.

As a result, Eastman Kodak is reliant on blockchain-based technologies to create storage for stock images.

As a result, all of the blockchain forecasts made up to this point have come true. Financial transactions and information sharing via public networks are now more secure because to this innovation. As a result, businesses will see lower costs and more value from using blockchain. However, it's equally logical to think about what the future of blockchain technology will look like. Observing future patterns can give you a good idea of how organisations and individuals will view blockchain technology in the future.

WHAT THE FUTURE HOLDS FOR BLOCKCHAIN TECHNOLOGY

After a worldwide epidemic, the globe saw drastic changes in nearly every sector, from administration to industry. People were confined to their own houses, while multinational corporations were forced to manage their operations from a distance. As



a result of this, the need for digital transformation and the implementation of blockchain technology has grown. However, the long-term viability of blockchain should be the primary concern. Consider some of the most important developments in blockchain technology as we look to the future.

THE FINANCIAL INDUSTRY WOULD BE THE FIRST TO USE BLOCKCHAIN TECHNOLOGY.

The use of blockchain technology by the banking and financial industries does not need a fundamental reorganisation of existing procedures. Conventional banks are quickly embracing the usage of blockchain in their daily operations. Recent research shows that distributed ledger technology and blockchain can help financial service companies save \$15 billion to \$20 billion annually by the year 2022, based on their estimates. The banking industry, according to Gartner, will use blockchain by 2022 to generate over \$1 billion in value. Because of these excellent potential, it's simple to argue that blockchain represents the industry's future.

IN-DEMAND BLOCKCHAIN EXPERTISE IS INCREASINGLY IN-HIGH DEMAND

As blockchain technology's potential is recognised by the globe, businesses will require employees who are well-versed in blockchain concepts. However, the supply of blockchain expertise has not been influenced by the emergence of blockchain as a technology. People with blockchain knowledge are in high demand, according to Upwork, a freelance website. There aren't many blockchain engineers around since the technology is so new and there's so little knowledge of it. Because of this, blockchain technology's future promises some excellent

job prospects for motivated individuals. As a result of the enormous blockchain technology skills shortage, blockchain experts stand to benefit from increased compensation. You can have a successful blockchain career in the future if you have the relevant professional education and training for specific blockchain job categories.

NEW FORMS OF GOVERNMENT

New governance frameworks are urgently needed as the blockchain ecosystem expands dramatically. So, how will these new forms of government actually operate if they are implemented? To improve decision-making, payment, and permissioning efficiency, look at governance structures that can support large, varied consortia. With the new governance models, blockchain technology will have a bright future since they ensure that data from diverse sources is standard. Other than that, new governance frameworks can aid in the gathering of fresh, better-resilient information. CIOs and CTOs believe that a scalable governance architecture is required to facilitate interactions across various blockchain networks (almost 68 percent). Organizations in the blockchain ecosystem will have to adopt a scalable governance model in the next years.

THE BLOCKCHAIN-INTERNET OF THINGS (IOT) RELATIONSHIP

When additional technologies are used in conjunction with blockchain, we will be well on our way to accomplishing several important milestones. Blockchain has the potential to provide reliable data that may be used to inform and strengthen the algorithms underpinning other technologies. Additionally, blockchain could maintain data security while simultaneously providing a



thorough audit of every stage of the decision-making process.

According to IDC, by 2025, 35% of IoT deployments will be able to use blockchain services. To put it another way, combining blockchain with IoT might have a significant impact on the future of communication between devices in the Internet of Things (IoT). Additionally, blockchain can enable smart devices to carry out automated microtransactions more quickly and cheaply than now possible. Smart contracts may be used to transfer information or money between IoT devices.

SMART CONTRACTS AND THE LAW NEED TO BE BETTER INTEGRATED

Smart contracts, a feature of blockchain technology, provide exciting prospects for the future. Smart contracts work on the principle of automating specific operations when certain criteria are met. In the future, additional criteria in smart contracts may potentially be vulnerable to automatic control, although this is achievable now.

Insurers AIG's pilot blockchain project for the production of complicated insurance policies is one of the most notable instances of blockchain's potential future use in legal applications. However, a level playing field for smart contract conflicts is difficult to come by. As a result, it's conceivable that smart contracts will use the rule of law to settle conflicts between the parties.

THE INTERCONNECTEDNESS OF BLOCKCHAINS MAY ADVANCE TO A NEW LEVEL

It's much too early to declare that interconnectedness has reached its pinnacle. As well as being necessary for smooth cross-

platform operations, interoperability is critical. Organizations think that standards and governance guarantee for interconnection and interoperability across permissioned and permissive blockchain networks is critical for adopting a manufacturing blockchain network in the range of 83%. About a quarter of the companies surveyed said governance and standards were critical to interoperability. More members are likely to request assistance on integrating diverse protocols as a result of new technological advancements in this sector. As a result, it's realistic to expect that blockchain platforms won't impede a business in the future. If this is the case, then industry-wide adoption of blockchain will be sped up and no onboarding issues will be encountered. Future blockchain trends appear to be centred on a variety of distinct topics, all geared toward continually improving value for consumers. The enterprise view on blockchain, but at the other hand, will have a significant impact on its future. Many individuals downplayed the possibilities for blockchain technology's use in many industries. The good news is that it has defied all expectations and is already working well with blockchain applications in a wide range of industries and use cases. Blockchain technology's future prospects are highly reliant on innovation and might offer significant value to businesses. Enterprises are exploring new methods to use blockchain in the future, outside of the traditional functions and applications.

TECHNOLOGY OF ARTIFICIAL INTELLIGENCE

Beginning in 1956, artificial intelligence technology has had three major development periods: during 1956 to 1970, 1980 to 1990,



and from 2000 to the present. It was in 1959 when the idea of machine learning was first floated that things really began to take off. In the 1980s and 1990s, the United¹ States and Japan invested heavily in artificial intelligence research, helping to push the field to its pinnacle. Machine intelligence has entered a new phase of rapid development as a result of recent breakthroughs in machine learning and reinforced learning algorithms, as well as the exponential rise of network data and the accompanying qualitative increase in computer capacity. In artificial intelligence, the following essential technologies are included: computational sight information, intelligent appropriate learning technology, swarm intelligence, autonomous drone level of quality, smart chip future technologies, and central nervous system interface technology, which is extensively utilised in different sectors such as healthcare, driverless vehicles, education development, gaming and entertainment.

RESEARCH ISSUES IN THE INTEGRATION OF BLOCKCHAIN AND AI

Here, we'll break down and categorise the many uses for blockchain and AI integration.

- Distributing Software

It has exploded in the information era, and the quality of information is in its circulation. Data trust systems now in place, however, have flaws that limit their usefulness by preventing safe data exchange. Data sharing can be revolutionised with the advent of blockchain technology because of its inherent properties such as immutability, decentralisation, and tracability. When it

comes to exchanging information, blockchain is mostly utilised as a distributed database. The usefulness of blockchain is severely limited by the lack of data analysis capabilities. To make up for blockchain's shortcomings and increase the value of its applications, artificial intelligence technologies can be employed. Liu et al. used Ethereum with deep learning to offer a collaborative architecture for effective data gathering and safe data sharing in the industrial IoT powered by mobile crowd sensing. As a result, the authors utilised a decentralised evolutionary programming mechanism to help intelligent phone terminals detect located near focuses and then utilised blockchains to maintain the protection and reliability of the research sharing in order to maximise data collection while using minimal energy.

Figure 1 shows how Dai et al. used blockchain and intelligent machines to build a safe and intelligent network topology for the upcoming generations of wireless networks, which ensures flexible and powerful resource sharing as illustrated in Figure. A distributed and secure resource-sharing environment was created using blockchain technology, and challenges of uncertainty, stochastic nature, and complexity in wireless communication systems were solved using artificial intelligence technology. A secure evidenced environment was created using the consortium blockchain, and a caching method designed using deep reinforcement learning was employed to make the most of available cache resources.

¹ Was Lincoln Wrong About Saving the Union? | The American <https://spectator.org/lincoln-union-secession/>

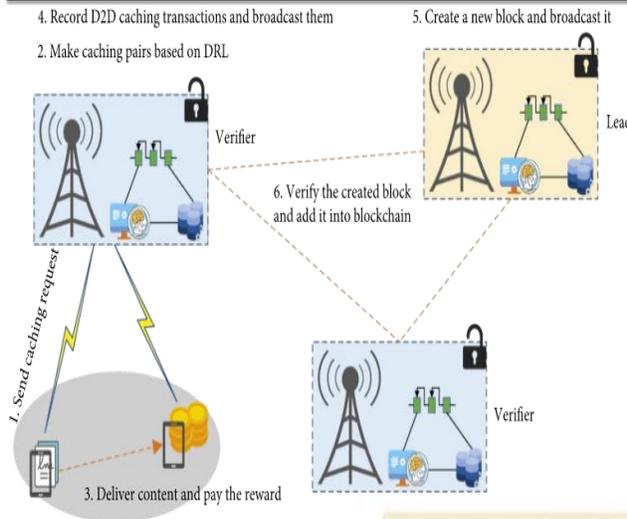


Fig. 1.

Lu et al. developed a federated learning-based network architecture to minimise transmission costs and handle privacy concerns. In order to increase model learning efficiency, the authors used a composite blockchain architecture that combined consortium blockchains with local directed acyclic networks. This assured the stability and security of model parameters. Two-phase verification was used to guarantee the shared data was reliable after the model was put into the blockchain.

The modern intelligent monitoring system can offer a wider range of services thanks to artificial intelligence-based video analysis technologies. However, malevolent attackers and unreliable third parties continue to pose problems in terms of security and privacy. It was determined that the authenticity and confidentiality of virtualized intelligence monitoring systems could be ensured using Lee et al. blockchain's technology. The Merkle-Tree approach presented here can improve video data transmission effectiveness, minimise bandwidth requirements for transmission and redundant

data storage overhead, and achieve secure video data synchronisation without jeopardising target privacy.

A rising number of personal health data may be stored on wearable devices, which can then be utilised to build a variety of health-related applications. Many researchers and commercial firms can benefit from the vast quantities of health data that blockchain technology captures while also safeguarding the anonymity of data sources. Different forms of cardiovascular clinical evidence were processed and incorporated into the primary cardiovascular output using neural networks by Bagchi et al. Through the blockchain method, these results were made available to patients and clinicians. In order to cope with poor information integrity in information sharing, Zheng et al. presented a machine learning-based data quality check modules that, when incorporated into the system, can evaluate the elevated data needed by associated applications.

- Applications for securing communications

The success of consensus mechanism and incentive systems will be determined by the incidence of bad conduct in the blockchain system, which is always evolving. On the one side, such nefarious activities put the blockchain's security at risk. Because of this, it will be more difficult to evaluate and identify harmful activity in the blockchain's massive amounts of data. By combining blockchain with artificial intelligence, the current blockchain system will be improved. Wrong coding and loopholes may be included in smart contracts, resulting in enormous financial losses. In order to discover smart contract vulnerabilities, researchers now use a combination of low-



accuracy symbolic execution and dynamically execution approaches. SoliAudit is a technique suggested by Liao et al. for detecting smart contract vulnerabilities. Static analysis and dynamic testing tools were utilised, and deep learning and interactive fuzzers were used to improve the identification of smart contract vulnerabilities. Using 17,979 samples, the SoliAudit technique was able to identify vulnerabilities with an accuracy of up to 90% and is still capable of swiftly adapting to new undiscovered flaws without the need for specialised expertise or preset characteristics. To identify smart contracts from a different perspective, Zhuang et al. presented a vulnerability detection approach combined with machine learning, utilising a graphs neural network method. They built a contract graph and devised an eradication phase to normalise the network and emphasise the most important nodes with a focus on its syntactic and semantic structure. The normalised graph may be used to learn from and discover weaknesses in smart contracts using a nondegree network deep neural network and a new temporal information dissemination network, which was suggested.

The public chain's incentive mechanism is at its heart. It encourages users to execute the consensus protocol and keep it secure. However, creating an incentive system that works in tandem with incentives is extremely challenging. Figure 2 shows the methodology suggested by Hou et al. to discover blockchain incentive mechanism-SquirRL vulnerabilities based on deep learning. SquirRL may be used as a broad approach to assess the incentive mechanism's shortcomings by protocol developers. When used to examine adversarial tactics, SquirRL

does not give theoretical assurances, but it may be used to demonstrate the insecurity of an incentive system.

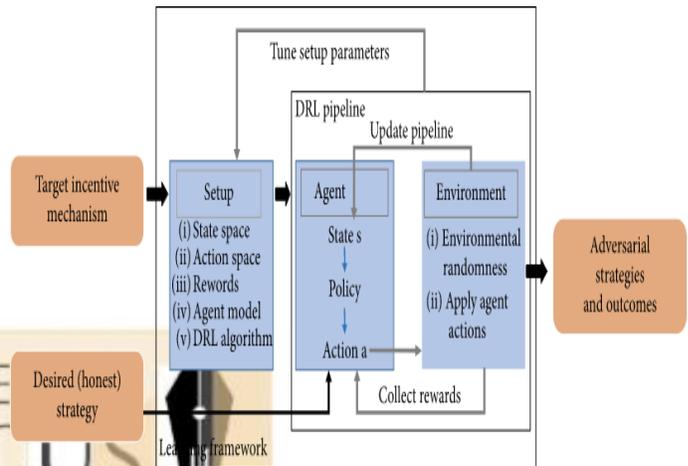


Fig. 2

As a result of the blockchain's ability to create so much transaction data, detecting fraudulent activity will be more difficult. Data and machine learning were presented by the authors as a way for detecting and capturing Ponzi schemes on Ethereum. To find possible Ponzi schemes, this approach first collected characteristics from online accounts and smart contract operation codes before building a classification model. DOORChain was created to combat blockchain's nefarious tendencies. It integrated deep convolutional neural network, ontology, and operations research, three potent approaches for detecting intrusions and harmful activity. For formalising and detecting malicious behaviour on the network, this method made use of operations research constraints, especially ontology to detect behavioural suspicious attacks, and then used constructive criticism from this formalisation of machine learning to confirm regardless of



wether exchanges in the block - chain were malicious or not.

- Applications for Transacting

When it comes to data protection, blockchain offers² a significant edge over artificial intelligence (AI). Method of forecasting and transaction analysis are two areas where the two approaches can be combined.

Using machine learning techniques, McNally et al. were able to accurately forecast the direction of Bitcoin's price by employing Probabilistic optimizing of machine learning algorithms and extended short-term memory networks It was discovered by McNally et al. that nonlinear deep learning approaches outperformed the popular ARIMA model's predictions in terms of experimental outcomes. As transaction accounts in the Bitcoin system, users utilised pseudonymous Bitcoin addresses, making the study of Bitcoin address correlations difficult. An alternative technique for associating bitcoin addresses was put out in, allowing users to keep tabs on other users' Bitcoin addresses. Once the Bitcoin addresses were extracted, the computational complexity was reduced by turning the clustering task into a binary classification. Using a two-layer model, the algorithm then determined if the two Bitcoin identities belonged to the same person. Lastly, it created a grouping for addresses that belonged to the very same user. In order to perform address-user mapping, Shao et al. presented a deep learning approach that makes it feasible to identify users in the Bitcoin system. A deep convolutional neural network was utilised to integrate transaction behaviour into the address representation,

allowing Shao et al. to get the feature vector for each address. In the end, confirmation, recognition, and clustering are used to find out who lives at each address.

- Applications for Bank Account Deposits

Due to its intrinsic properties, blockchain can ensure the validity, integrity, and trustworthiness of digital information. As well as assisting with data analysis and³ processing, artificial intelligence may also help smart contracts evolve and dynamically adjust in the real world. Storage arrays, retrieving, and inspection services may be greatly enhanced by fusing blockchain with artificial intelligence technologies.

Today's culture relies on immunisation as a primary means of avoiding infectious illnesses. As far as population health and national defense are concerned, vaccine safety is directly tied to both. Vaccine supply chain problems, including as expiry and record falsification, are, nevertheless, all too prevalent. As a result, a robust vaccination regulation framework is urgently required. Thus, Yong et al. created a vaccination ledger system based on blockchain and machine learning technologies. Using blockchain technology, a new trust mechanism will be established and an extra way of data analysis will be added to the present information management system. Vaccine institutions and authorities may query personal vaccination data and vaccine circulation using the vaccine blockchain system, which was built using an Ethereum smart contract. It also tracks pharmaceutical operations records for immunization institutions and

² *How Blockchain Can Help SMBs - Hacker Noon.*
<https://hackernoon.com/how-blockchain-can-help-smbs-compete-with-the-big-dogs-865dc2c06528>.

³ *Quality and Productivity Laboratory | Members.*
<https://coe.northeastern.edu/Research/qpl/~OLD-2011-2-8/members-details.htm>.



governments. The vaccination blockchain technology can address any liability concerns that may arise.

Because of their low impact on the environment, electric vehicles are seen as a critical part of green city planning initiatives. As the number of people buying electric cars rises, it's becoming increasingly difficult for them to locate charging stations that meet their needs.

Farmers, production facilities, wholesalers, retailers, and consumers all have a role in the food supply chain, making it a complicated system. Fraud is often the result of an informational mismatch between multiple parties, and the use of blockchain can assist eliminate this problem. In contrast to this, other studies focus more on food traceability and less on monitoring. Mao et al. developed a blockchain-based credit rating system to improve the efficiency of food supply chain monitoring and management.

ISSUES AND DIFFICULTIES

In this part, we discuss the difficulties and obstacles associated with integrating blockchain with artificial intelligence.

- Scalability

In order to successfully develop smart blockchain applications, it's critical to address the scalability issue. An established blockchain must serve as the foundation for every new decentralised application (DApp). The system's performance and scalability must be sufficient for a large-scale application before it can be implemented. Consistency problems, network latency, and speed limits are among the blockchain scalability challenges based on guaranteeing data security and decentralisation. Most

nodes must agree on the transaction information in order to keep the blockchain safe from attack. The quest of scalability at the expense of the distributed network's consistency requirements leads to a split in the blockchain. There will be network delays between nodes because the block chain technology is a distributed peer-to-peer system, limiting the system's capacity to scale. This is especially true for networks with longer delays. Third, the capacity of the blockchain limits transaction performance, which is also the primary reason for the lack of widespread adoption of blockchain-based apps. Blockchain transactions are conducted in parallel for reasons of security and ultimate consistency, making it impossible to boost transaction throughput.

- Privacy and Safety

Usability, security, and data confidentiality are all major concerns while developing an usable system. Because the blockchain system serves as the backbone for the Web of Value, the material passing between its nodes is transparent and open, even if some users don't wish to share it. As a result, not just whether blockchain technologies can be widely adopted depends on how well user privacy is protected. Information concealing and identity confusion are two common ways to preserve privacy on the blockchain. It is hard to identify the true user using identity obfuscation technology, which employs private signatures including such group signatures and ring signings (which confuse both sides' identification information) to obfuscate the personal data. If required, the supervisor can see user information using the supervisor's private key to maintain user privacy.



Zero-knowledge verification and secure multi - party computation are only a few of the technologies used by information concealing to preserve user transaction privacy without disclosing any private information. Although the calculating process has increased, the system's efficiency has decreased, necessitating additional improvement in real applications. It's a challenging challenge to figure out how to rationally employ an artificial intelligence programme to boost efficiency. In addition, the current method must be redesigned for use in a distributed setting when using an artificial intelligence algorithm.

- Off-chain storage and on-chain collaboration of data

There are two ways to store data: conventional data systems and blockchain systems. Each has its own set of drawbacks. Off-chain storage and processing systems are necessary for blockchain to boost performance, but traditional information systems also require blockchain technology to assure data exchange and legitimacy. An successful mix of blockchain technologies and new information systems is needed, with the most important part being to guarantee that data on chain and data off chain are highly congruent. Furthermore, data is essential for the advancement of artificial intelligence. Data quality issues, data monopolies, data misuse, and other issues plague artificial intelligence technologies even today. With blockchain's help, these issues will have new avenues for growth. Blockchain and artificial intelligence can only be used in the real economy if the data on the chain and off the chain are properly combined.

WORK TO BE DONE IN THE FUTURE

The future convergence of blockchain and artificial intelligence will be discussed in this section.

- Cloud computing and distributed storage integrated in a hybrid architecture

Smart blockchain's transactional and data storage modes may evolve into a hybrid architecture in the future, mixing on-chain and off-chain retention due to many distributed situations. Off-chain storage is quicker, cheaper, and more private than on-chain storage, but off-chain data has a hard time taking use of blockchain trust. The integration of on-chain and off-chain information will be a significant future research topic, allowing the confidence in the chain to be translated to off-chain data.

- Finding the right balance between improving performance while also ensuring safety

Blockchain offers several advantages, but a speed barrier prevents widespread use. There are a number of performance-related concerns with blockchain technology in general, but transaction throughput, faster transaction latency, and block capacity are the most pressing. Different solutions to the blockchain's performance issues, such as directed acyclic, event sharing, off-chain activities, and block enlargement, have been proposed, however these will all erode the blockchain's trustworthiness and security. When privacy protection is more important, the blockchain system uses more secure cryptographic methods, which increases privacy protection but decreasing the efficiency of the system's transactions. The ability to strike a balance between performance enhancement and privacy



protection will be critical for future advancements in blockchain technology.

- Constructing a Global Network of Trust

There is increased collaboration and interoperability between devices in blockchain application situations. Cooperation is based on mutual trust; that is, everyone believes that the other party's identification and the information supplied are correct. By virtue of the consensus process and immutability modification that it offers, Blockchain technology inherently ensures the validity and trustworthiness of data. A node's identity and role must be authenticated if a device is to be located on that particular node. It is necessary in a blockchain situation to build a distributed trust. The next research focus will be on authenticating other nodes' identities without the need for a centralised authority.

- Raising Awareness Among Users and Improving Compliance with Laws

Because blockchain technology is evolving so quickly and industry rules are taking their time to catch up, there will unavoidably be turmoil and bubbles in the market. As a result of deleveraging, tighter regulations, as well as the peaks and troughs of the stock market, people are continually keeping an eye on the blockchain. Illegal activities disguised as blockchain-based transactions have been outlawed. As a result, there is a lack of consensus on what blockchain technology is and how it differs from a currency. As a result, it's critical to increase public awareness about blockchain technology.

CONCLUSION

Both blockchain and artificial intelligence, as cutting-edge technologies, have the potential

to integrate and fully transform information technology in the future. An in-depth study of the integration feasibility of blockchain with artificial intelligence is conducted in this paper, and the research on the incorporation of blockchain with artificial intelligence is fully summarised in the local market as well. Finally, we'll mention some of the exciting potential uses for this technology in the future.

