

# The Prospect of Blockchain Application in The Field of Artificial Intelligence

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**Abstract:** In recent years, with the rapid development of artificial intelligence and blockchain technology, people pay more and more attention to both of them, especially the integration of the two technologies. Through in-depth analysis of the problems existing in the field of artificial intelligence and blockchain, this paper analyzes the main problems and potential defects faced in its development process, and thinks about its progress space and technical pain points, and discusses the technical superiority of artificial intelligence, and analyzes its application in data, computing power, algorithms and other aspects. As well as the advantages and industry prospects that may be brought by the integration of the two, We hope to bring new theoretical basis for the further in-depth discussion of the integration development of the two in academia and industry, and also hope that more research institutions and small enterprises will participate in the overall environment of science and technology development.

**Keywords:** Artificial intelligence, Blockchain, Distributed, Decentralization.

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## 1. The Connection Between Artificial Intelligence and Blockchain

Artificial intelligence, or AI, is simply a robot with human thinking abilities, such as the Go robot that fought against professional ninth Dan Lee Sedol. The growth of artificial intelligence needs to rely on big data. The more open data available for analysis, the more correct the prediction and evaluation of the machine will be. All the data on the blockchain are open, which can be provided to artificial intelligence. Blockchain, on the other hand, does not require trust institutions and information cannot be tampered with, which can guarantee the reliability of public data. In short, blockchain has a lot of use for artificial intelligence.

## 2. Problems in the Field of Artificial Intelligence

### (1) Data is monopolized

With the acceleration of digitization in various fields, the amount of data presents an explosive growth trend, and the abundant derivative value contained in massive data also makes it of important strategic significance in the digital economy. The difference between "data competition" and data accumulation leads to data monopoly, and a large amount of data is occupied and controlled by oligarchs. Artificial intelligence technology is a new technology that integrates data, algorithms and services [1]. Its core is to make decisions, evaluate and understand specific patterns and data sets, and finally form autonomous interaction. The more data AI can learn and analyse, the more accurate predictions, assessments and decisions it can make. However, due to the existence of data monopoly, many enterprises in the A field are stagnated due to the lack of sufficient data. Even Internet giants such as Google, Amazon and Facebook can only obtain enough data from their own fields. As a result, more and more companies are turning their attention from data collection to data trading, because data is insufficient and much of it comes from the black market, compromising its authenticity and quality.

### (2) There are limitations in computing power

Computing power can be understood as the computing

power of equipment. In the case of a digital currency, for example, computing power is the total amount of computing power needed to generate new blocks at a given network consumption, which increases as more data is processed. Under the influence of computing power, artificial intelligence technology is more secure and reliable, and its efficiency is significantly improved. During the research and development of artificial intelligence, it is necessary to import rich pictures, videos and training scenarios. The calculation process is very tedious and requires a large number of calculations, which requires high requirements on CPU, GPU, FPGA and other high configuration hardware resources. Due to the high cost of network resource allocation, it is difficult for most small and medium-sized enterprises to bear it, leading to obstacles in computing power. In the process of artificial intelligence operation, the computer is its important carrier, so the need for high-performance computing, the learning chip requirements are relatively high, the need for special customization, resulting in many enterprises in the computing power to spend a huge cost, the establishment of a computing center, resulting in a lot of resources are consumed. At present, there are two ways to improve the computing power of AI. One is to buy machines, and the other is to rent machines. These two ways belong to the purchase and rent of computing power, and the cost is very high.

(3) There is still room for improvement in personnel training and core algorithms

It can be predicted that artificial intelligence has a broad space for development, and the international entrepreneurial atmosphere is also very active. For example, the research on basic application technologies such as voice and facial recognition technology, machine vision technology, intelligent search and decision-making aid has been very common. And the man-machine game, voice interaction, professional robot, information security, machine translation and other professional application technologies have been widely applied in practice, at the same time, such as unmanned driving, intelligent medicine, intelligent manufacturing, etc., also gradually from the test to the use stage. However, from the analysis of the research status of artificial intelligence at home and abroad, it can be found that

there is still room for further improvement in the aspects of talent training, algorithm updating and optimization, which is the common focus of the international field of artificial intelligence research.

#### (4) Unreasonable application of technology

If artificial intelligence technology is abused by illegal personnel, it will cause people's security problems. In the case of the user and the algorithm, the human is in a passive state. For example, your phone will often tell you how far you are from your home or business, and whether to turn on location. Or smart algorithms that target ads, news, and content to users. In addition, hackers can also use artificial intelligence technology to steal personal information, resulting in a lack of security in the network environment; The use of artificial intelligence technology, combined with the difference of users' cognitive level, to optimize web content, artificial intelligence technology can have a profound impact on the public cognition and judgment, an enterprise after mastering these data, if the use of bad means to transfer it to other models, using algorithms for malicious operations, users' experience, even interests and security will be affected.

#### (5) Lack of privacy security

Many AI technologies require access to users' personal information to implement specific services, increasing the rate of information leakage and allowing users to inadvertently expose their privacy. The British Broadcasting Corporation reported in 2019 that IBM had obtained one million photos from Flickr without users' permission to practice its facial recognition algorithm. For tech companies, there is no doubting the value of the image. A large amount of image data can help people train the facial recognition algorithm more accurately, so that it can quickly identify specific users in different pictures and scenes. However, the people in these photos may not have imagined how easily their profiles could be collected and leaked by technology companies. The above examples show that the application of artificial intelligence cannot do without individual information, and massive individual data is a necessary condition for the continuous update of artificial intelligence. With the development of artificial intelligence technology, the acquisition, storage and analysis of massive information become inevitable. While providing convenience for human daily life, it is also easy to obtain more information about personal privacy, so there is a risk of privacy exposure that cannot be ignored.

### 3. The Current Difficulties Faced by Blockchain

Blockchain, as an emerging technology, is still confronted with such challenges as "information barriers", difficulties in physical connection, and the underlying technology itself to be broken through in the process of actual industrial implementation. It is also being "choked" by numerous problems.

#### 3.1. Energy consumption

Blockchains that use a proof-of-work system to determine which node wins the rights to the next block in the confirmation chain can become very energy-intensive. Both Bitcoin and Ethereum use proof-of-work models, where nodes compete to solve complex equations the fastest. As networks grow, the number of competitors increases and compete for more computer power, which consumes energy.

Energy consumption is extremely inefficient because only one node will eventually win the right to confirm the next block. The proof of ownership model is seen as a way to solve the energy consumption problem facing blockchain. However, such a system presents its own challenges. For one thing, the code required to build a good proof-of-equity system is much more complex than a proof-of-work system. This can lead to more errors and bugs.

Second, it may be easier for a single party to control most of the cryptocurrencies pledged, allowing it to exercise too much control over the blockchain. The latter vulnerability is less likely to occur in a proof-of-work model because a single party would need to acquire most of the computer power on the network. Other parties can gain additional computer power to seize control and ensure that the blockchain remains decentralized. Despite these shortcomings, Ethereum is moving from a proof-of-work model to a proof-of-equity model.

#### 3.2. NO universal standard

Almost every implementation of blockchain technology is unique. First, it makes interoperability between blockchains difficult. If a company wants to share data with another company's blockchain, they may need to develop additional tools to allow data to flow between the two blockchains. There are already dozens of blockchain interoperability solutions in use, but the fact that no one solution is right for everyone highlights the fragmented standards implemented by blockchain. The second challenge comes from developers creating something on the blockchain (for example, smart contracts or decentralized financial applications). Because there are no common standards, developers have to redesign everything to offer the same product on another blockchain. The lack of standards can also lead to bugs in the code, as developers use less familiar platforms.

### 4. How Does AI Drive Blockchain

(I) Artificial intelligence helps blockchain reduce energy consumption

Mining in blockchain is a very difficult thing, which requires a lot of energy and money, but artificial intelligence can free it from barbaric mining and make it more flexible and efficient. One of the drawbacks of blockchain technology is the high demand for operating costs, while the practice has proved that consensus mechanism exists in many blockchains, so energy is the core of confirming and sharing transactions. Deloitte, one of the world's big Four accounting firms, estimates that the overall operating cost of blockchain authentication and sharing services is about \$600 million per year, which is significantly reduced with the support of intelligent systems. Mining is a familiar work, which requires a large amount of electricity and capital. Through the intervention of artificial intelligence, mining gets rid of brute force means and changes the "miner form" from a static, predefined, mechanized, autonomous, adaptive and social agent.

(II) Artificial intelligence-assisted blockchain fraud detection

By "learning", AI can easily detect and prevent fraud, and this technology is now widely used in banking and e-commerce. In the case of abnormal card swiping service, the system will send a message indicating that security risks exist. In online shopping, encounter impersonating customer service people, will be the e-commerce platform automatic

prompt to prevent fraud. Faced with problems that traditional technology cannot solve, it may be wise to turn to blockchain, which is also in development. In the case of data centralization, data usage is not transparent and open, lack of effective management of their data, many people will give up sharing data. Blockchain is the best solution [2]. On the chain, the person who uploaded the data and the related usage direction and results will be clearly recorded, and the user has the absolute right to use the data. For AI, the more secure the data sharing, the more data, the better the model, the better the results, the more new data. The AI industry may be helpless in the face of expensive computational capital, but the most important thing in blockchain is computational power. Mining is extremely difficult and requires a lot of energy and financial resources. The extra computing power saves money on AI, which has proven to be the best way to save energy, offers a similar solution to blockchain, and has the advantage of saving money on mining hardware. Blockchain will greatly promote the development of the AI industry, and conversely, AI can also become a booster for the development of blockchain. Deloitte Enterprise estimates that the overall operating cost of blockchain authentication and sharing will be about \$1.4 billion per year in 2023. The advantages of artificial intelligence and blockchain are very obvious. Artificial intelligence can expand the application scope of blockchain beyond data analysis, while blockchain can provide reliable basic data for artificial intelligence to support its "deep learning".

## 5. Exploration of Blockchain in Artificial Intelligence

(I) Blockchain contributes to the understanding of AI decision making

Sometimes the AI makes decisions that are difficult to understand, because it can evaluate many variables from existing data and can "learn" by itself, combining these variables to analyze the overall difficulty of the task. From a human point of view, these variables are hard to predict, and using blockchain to record AI decisions will provide a better understanding of AI's "mind." So as to avoid making decisions inconsistent with the design intention, in the event of an emergency quickly find the root of the problem, and make corresponding adjustments.

(II) Blockchain helps AI obtain more comprehensive data

The development of AI technology depends on the availability of various information sources, and while companies like Google, Facebook, and Amazon have access to vast amounts of data, they are available for many AI processes, but not commercially available. The core of blockchain is to maintain the accuracy of records, authentication and execution [3]. Its purpose is to introduce point-to-point connection and manage and maintain massive data in a decentralized way, mostly managed by users themselves, which can improve the efficiency of data sharing and improve the data monopoly of technology giants. The function of the decentralized data sharing platform is reflected in the information exchange. With blockchain as the core, the update and record are carried out by multiple scattered individuals, rather than by an authority. Because blockchain is an open distributed linked list, all actors can access it in the network. In this model, each data provider uses a decentralized data sharing platform to establish an information flow starting point. As needed, AI can support

intelligent research by retrieving, viewing data quality evaluation, publishing data and subscribing. On this basis, the end users and suppliers can realize trusted, transparent and equal data sharing. This paper proposes a blockchain-based incentive mechanism to maintain the operating mode of the ecosystem model. The data sharing platform based on blockchain can realize information sharing and traceability, promote the flow of information among organizations, establish a free and open data market, and enable AI researchers to obtain more data, conduct more training, and become truly "intelligent".

(III) Blockchain helps AI share computing power

At present, the computing power of the vast majority of ordinary computers in the world has not been actually applied. As long as the computing power of this part is brought to the extreme, artificial intelligence modeling cost can be significantly saved and resource utilization rate can be rapidly improved. Combined with the distributed feature of blockchain, it can maximize the idle computing power distributed around the world. In addition, the blockchain smart contract can dynamically adjust the network computing nodes [4] based on the computing amount required by users, so that they have strong computing power to meet the computing needs of users.

(IV) Blockchain assists AI algorithms in building research platforms

There are three reasons for the lack of core algorithm of artificial intelligence: first, the lack of corresponding technical personnel; Second, the research and development of artificial intelligence is time-consuming and laborious, the training of data is very high, and once the error, can not be corrected in time; Third, most of the research and development of AI algorithms is not disclosed, which results in the duplication of technology development. In the process of strengthening the cultivation of professional talents, blockchain technology can be used to build artificial intelligence algorithm research platform. The goal of the platform is to use swarm intelligence to optimize artificial intelligence algorithms. A series of complex intelligent algorithms, upgraded and maintained by several AI experts, replace a single research unit and ensure the accuracy of AI algorithms. Researchers around the world, especially those in poorer developing countries, can take open AI technology, apply it to the blockchain, and optimize it so that human resources are not wasted.

(V) Blockchain can help AI build traceable algorithmic regulatory architecture

If every step of the AI is recorded in the blockchain, it will be traceable and immutable, while the AI model will be encrypted and calculated, and when connected, it will become more transparent, thus avoiding illegal activities. This will help AI establish a traceable system of rules to prevent abuse and monopoly of AI technology. Taking the artificial intelligence part of learning and training as an example, technicians input all the data, hardware equipment and other data used in the training and learning process of artificial neural network into the block chain [5], which will be verified by each node and permanently stored in the block chain, where the data will be saved.

## 6. Conclusion

Data, computing power and algorithm are the three elements of the development of artificial intelligence. Without huge data and powerful computing power, artificial

intelligence cannot be developed. If an enterprise has huge data and abundant computing resources, it will gain a relative monopoly position in information technology, increasing the risk of committing crimes. Blockchain is a new management architecture that allows multiple organizations to record and verify data, and effectively controls the abuse of algorithms, thus helping more research institutions and small enterprises to participate in the development of technology.

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